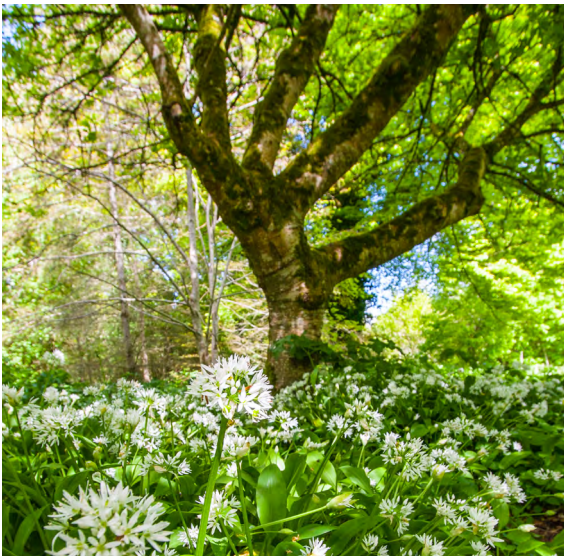




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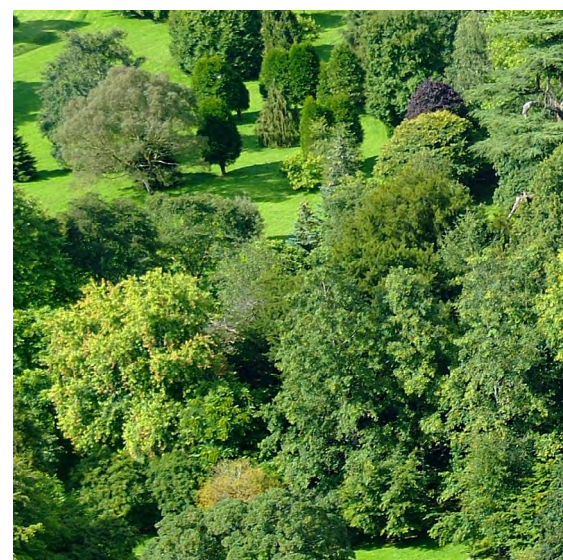
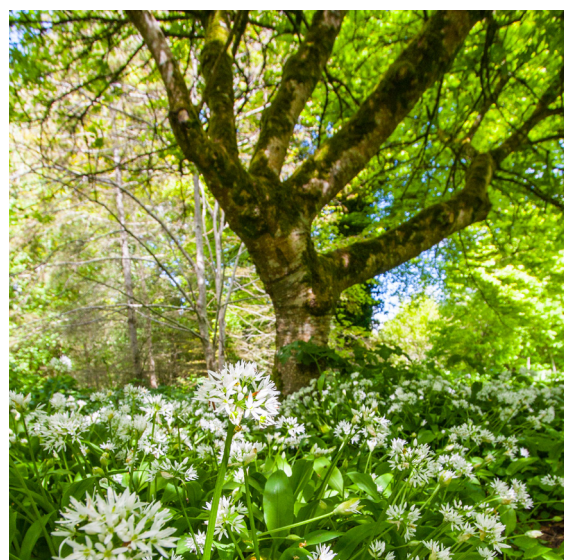
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CHAPTER 1

Introduction



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CHAPTER 1

Introduction

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1 Introduction

1.1 BACKGROUND CONTEXT

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Bluescape Limited to assess a proposed residential development at Lackenroe, Glounthaune, Co. Cork.

As the project is an urban development which exceeds the 10 hectare threshold specified by Part 2, Schedule 5, 10(b)(iv) of the Planning and Development Regulations 2001 an EIAR has been undertaken as a statutory environmental assessment. The EIAR has been completed in accordance with Directive 2011/92/EU (as amended by 2014/52/EU) and guidance in the 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report 2017' document.

The proposed development consists of the construction of a mixed-use residential development of 289 no. residential units consisting of 201 no. dwelling houses and 88 no. apartment/duplex units, a two storey creche, 4 no. ESB substations and all ancillary site development works including commercial and community units. The proposed development will be constructed on lands of circa 13.87 hectares in area to the north and south of the L-2970 public road, known locally as 'the Terrace'. A full description of the proposed development is provided in Chapter 2 of this EIAR.

1.2 PURPOSE AND BACKGROUND OF EIA PROCESS

EIA requirements are governed by Directive 2014/52/EU, which amends the previous EIA Directive (Directive 2011/92/EU). 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 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:

- population and human health;
- biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- land, soil, water, air and climate;
- material assets, cultural heritage and the landscape;
- 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 at Lackenroe, Glounthaune, Co. Cork.

1.3 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).
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, August 2017);
- 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,

Scoping for has also assessed possible alternative approaches to the proposed development. Consideration of alternative sites and layouts within the final chosen site are set out in Chapter 3 of this EIAR.

Figure 1.1 - 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).



1.4 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 289 no. residential units and 742.8 sqm non-residential floor space (creche, commercial unit and community unit) on a site area of 13.87 hectares, an EIAR is required as prescribed by Class 10(b)(iv) of the 2001 Regulations.

1.5 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.

Section 7(1)(b) of the Planning and Development (Housing) and Residential Tenancies Act 2016 (as amended) states that a request for scoping may be submitted to An Bord Pleanála, however this is not mandatory. Article 5(2) of the 2014 Directive states that European Member States may decide that competent authorities should give a scoping opinion mandatorily, notwithstanding whether or not the developer requests. However, this transposition has not been introduced in Ireland. The transposition of this provision is optional and the consultation paper from the Department indicates that it is not intended to introduce mandatory scoping

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 County Council in accordance with Section 247 of the Planning and Development Act 2000 in September 2018, May 2021 and August 2021. A series of meetings have taken place with the technical staff of Cork County 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. Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
2. The Heritage Council
3. An Taisce
4. Irish Water
5. Inland Fisheries Ireland (Southwest Region)
6. Transport Infrastructure Ireland
7. The National Transport Authority
8. Department of Local Government, Housing and Heritage
9. Department of Education and Skills
10. Cork County Childcare Committee
11. National Parks & Wildlife Service

The particulars sent to the above bodies are contained in Appendix 1-1 with any responses received contained in Appendix 1-2.

1.6 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:

Competencies – Each chapter outlines who authored the chapter, and their position, qualifications, affiliations, and experience.

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 “Description of Effects” outlined in Table 3.3 of the 2017 Draft Guidelines on Information to be Contained in Environmental Impact Assessment Reports.

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)

A Natura Impact Statement has also been prepared regarding the proposed development. Following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests of the Great Island Channel Special Area of Conservation (SAC) and Cork Harbour Special Protection Area (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 SAC and Cork Harbour SPA.

1.7 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 over and in the relevant chapters.

Planning Consultants: HW Planning

Address: 5 Joyce House, Barrack Square, Ballincollig, Co. Cork.

Chapters Prepared: Chapter 1 – Introduction, Chapter 2 - Project Description, Chapter 3 - Alternatives Considered, Chapter 13 - Population & Human Health, Chapter 14 - Interaction of Impacts and Chapter 15 - Summary of Mitigation Measures

Personnel: Harry Walsh, Director - BA HONS, Master of Regional and Urban Planning, MIPI.

Landscape Architects: Cunnane Stratton Reynolds

Address: Copley Hall, Cotters Street, Cork

Chapters Prepared: Chapter 4 – Landscape & Visual

Personnel: Jim Kelly, Director - B.Agr.Sc in Landscape Architecture (UCD), PG.Dip Landscape Architecture, Member of the Irish Landscape Institute MILI Chartered Landscape Architect, MLI (UK), Chartered Landscape Architect, CMLI (UK).

Evelyn Sikora, Senior Landscape Planner - BA MA, MILI.

Project Engineers: AECOM

Address: 1st Floor, Montrose House, Carrigaline Road, Douglas, Cork

Chapters Prepared: Chapter 6 - Material Assets – Services, Infrastructure & Utilities, Chapter 7 - Land & Soils, Chapter 8 - Water (Hydrology & Hydrogeology).

Personnel: Emma McKendrick, Regional Director - BEng CEng MICE FIEI

Keith Fitzpatrick, Associate Director - NCEA in Electrical Engineering (Merit), BSc Building Services Engineering, Masters in Engineering Management (MEM), ACIBSE, MIEI, MIET.

Traffic Engineers: MHL & Associates.

Address: Carrig Mor House, 10 High Street, Douglas Road, Cork.

Chapters Prepared: Chapter 5 - Material Assets – Traffic & Transportation.

Personnel: Ken Manley, Director - BE CEng MIEI HDip Env Eng FConsEI.

Ecologist: Kelleher Ecology Services

Address: Curraghdermot, Castlelyons, Co. Cork

Chapters Prepared: Chapter 9 - Biodiversity

Personnel: Dr. Katherine Kelleher, Principal Ecologist & Director – BSc in Zoology and PhD in Ecology.

Dr. Daphne Roycroft, Ecological Consultant. - BSc and PhD in Ecology.

Michelle O'Neill - 10 years of experience working as an ecological consultant within the public and private sector on projects that include habitat and botanical surveys, breeding and winter bird surveys, mammal surveys, data analysis, assessment and report writing.

Dr Isobel Abbott, Ecological Consultant - BSc in Zoology, PhD in Ecology.

Einne O'Cathasaigh, Ecological Consultant - MSc in Marine Biology, BA in Zoology.

Dr Domhnall Finch, Senior Ecologist - B.Sc. degree in Environmental Science, Master's degree in Biodiversity and Conservation, PhD.

Environmental Consultant: AWN Consulting

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

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

Personnel: Alex Ryan, Acoustic Technician - BA, BAI and MAI in Mechanical and Manufacturing Engineering, Associate Member of the Institute of Acoustics.

Dr. Avril Challoner, Senior Environmental Consultant, - BEng (Hons) in Environmental Engineering, HDip in Statistics, PhD in Environmental Engineering (Air Quality). She is a Chartered Scientist (CSci) and Member of the Institute of Air Quality Management.

Built Heritage/Archaeology: John Cronin & Associates / Louise M Harrington Architectural Heritage & Historic Landscape Consultant

Address: Unit 3a Westpoint Trade Centre, Ballincollig, Co. Cork / Whitethorn, Douglas Road, Cork.

Chapters Prepared: Chapter 11 - Cultural Heritage

Personnel: John Cronin, Director – Qualifications in archaeology (B.A., University College Cork (UCC), 1991), regional and urban planning (MRUP (University College Dublin (UCD) 1993) and post-graduate qualifications in urban and building conservation (MUBC (UCD), 1999).

Tony Cummins, Senior Archaeologist – primary and post-graduate degrees in archaeology (B.A. 1992 and M.A. 1994, UCC).

Louise Harrington, Historic Landscape Consultant - MA in Historic Landscape Studies (with Distinction) from the University of York, an MPhil from University College Cork, and a BA in the History of Art with Spanish from Trinity College Dublin.

Project Architects: Deady Gahan Architects.

Address: Eastgate Village, Little Island, Co. Cork

Chapters Prepared: N/A

Personnel: Eamonn Gahan, Director - Liam Murphy, Architect,

1.8 CUMULATIVE IMPACTS

The potential environmental effects of the proposed development have not been assessed in isolation. Rather, the potential impacts of this project has been considered in combination with other relevant permitted or proposed projects in the vicinity of the site which may result in cumulative environmental impacts have also been considered, as well as the relevant policies and objectives of any future plans/projects. Each of the projects listed in table 1.1 have been assessed for potential cumulative impacts. These projects were identified by using Cork County Councils Planning Enquiry Systems and An Bord Pleanála's website.

Application Reference	Applicant(s)	Description	Outcome/Current Status
Part 8 Development	Cork County Council	Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune	Under Construction/ Partially Complete
21/6851	Citidwell Developments Limited	Demolition of 2 no. farm buildings and a derelict dwelling and the construction of 21 no. units.	Application currently pending a decision from Cork County Council.
21/5072	Barlow Properties Ltd	Construction of 94no. residential units	Application currently pending a decision from Cork County Council.
21/4622	Glounthaune Homes Trust	Construction of 12 no. residential units	Application currently pending a decision from Cork County Council.
18/6250	Keta Products Ltd.	Demolition of The Great O'Neill Public House and construction of a two-storey extension of the existing Fitzpatricks shop to the east to replace the demolished public house, for use as an extended retail.	Under Construction – Nearing Completion
17/5699 (ABP Reference 300128-17) Amended by 18/6312 & 20/5864	Bluescape Ltd	Phase 1 of Proposed Development. Construction of 38 no. residential units & upgrade of local road network	Construction recently commenced
ABP-301197-18	O'Mahony Developments Limited	Strategic Housing Development Construction of 174 number residential units	Under Construction with initial phases occupied.

Table 1.1 Cumulative Impacts

1.9 TYPOGRAPHICAL ERRORS

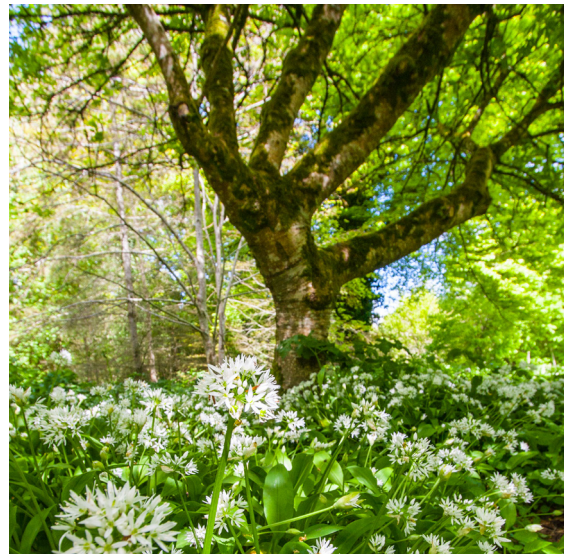
Every effort has been made to ensure that the content and findings of this EIAR is consistent and error free. However, it is acknowledged that some minor grammatical/spelling and typographical errors may occur. These typographical minor inconsistencies are unlikely to result in any material impacts on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



LACKENROE SHD

CHAPTER 2

Project Description



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LACKENROE SHD

CHAPTER 2

Project Description

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2 Project Description

2.1 INTRODUCTION

2.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning. Harry has 22 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 the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

2.1.2 Chapter Context

Recital 22 of the 2014 EIA Directive requires a detailed description of the project be included in an EIAR:

"In order to ensure a high level of protection of the environment and human health, screening procedures and environmental impact assessments should take account of the impact of the whole project in question, including, where relevant, its subsurface and underground, during the construction, operational and, where relevant, demolition phases".

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

2.2 EXISTING/BASELINE ENVIRONMENT

2.2.1 Local Context

The subject lands of approximately 13.9 hectares in area, are situated in the settlement of Glounthaune approximately 9km east of Cork City Centre and 6km west of Carrigtwohill. The site is located to the north of the existing village centre and comprises two separate land parcels to the north and south of 'the Terrace' (L-2970). The northern land parcel of 11.41 hectares in area, comprises sloping and south facing agricultural lands with attractive views over Cork Harbour/ River Lee Estuary. The parcel is subdivided by existing hedgerows into several smaller fields. To the east of the northern lands are further undeveloped agricultural fields with a linear settlement pattern of one-off houses along the northern, western and southern boundaries. The northeastern corner bounds the L-2969 where there is an existing agricultural field entrance. The southern boundary of the land parcel is situated circa 430 metres northwest of Glounthaune train station. A cluster of 1 no. derelict dwelling house and associated outbuildings is situated in the southern areas of the northern parcel.

Figure 2.1 Northern Land Parcel with Panoramic Views over River Lee Estuary



Figure 2.2 Existing Derelict Dwelling House in Northern Parcel



Figure 2.3 Existing Hedgerow/Ditch in Northern Parcel



The southern land parcel of 1.24 hectares in area, consists of a sloping undeveloped site situated between the Terrace and Johnstown Close to the south. The southern land parcel is largely overgrown by vegetation with a number of Category A/B trees, particularly in northern and eastern areas of the site. The southern parcels fronts onto Johnstown Close and will benefit from the delivery of the 'Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune' (referred throughout this EIAR as 'the greenway'), permitted by Cork County Council through the Part 8 process which is nearing completion. An existing 4 storey apartment building known as 'Waterside' is located at the sites southwestern boundary, adjacent to a local neighbourhood centre containing Fitzpatrick's shop and The Great O'Neill public house. Glounthaune train station is located approximately 250 metres east of the site's southern boundary to which it is linked via the new greenway.

Figure 2.4 Southern Parcel - Panoramic View over River Lee Estuary



Figure 2.5 Southern Land Interface with Johnstown Close & Greenway



Figure 2.6 Section of Greenway between Southern Parcel and Glounthaune Train Station

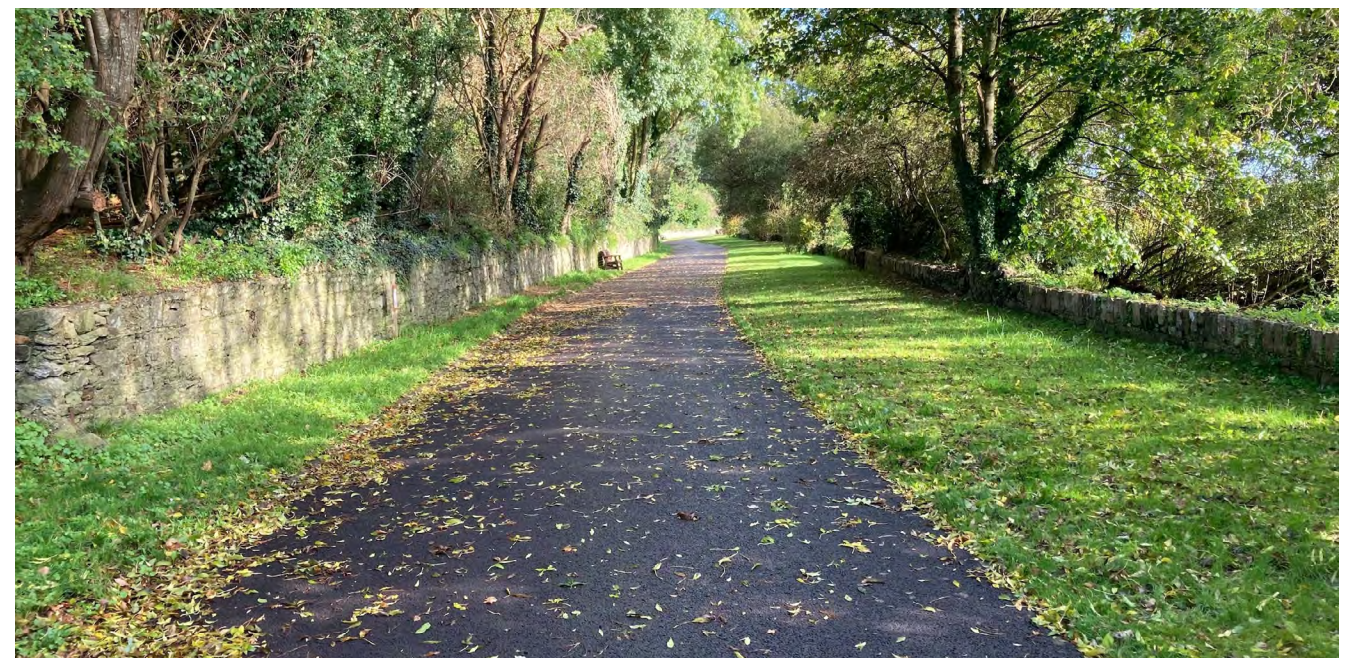
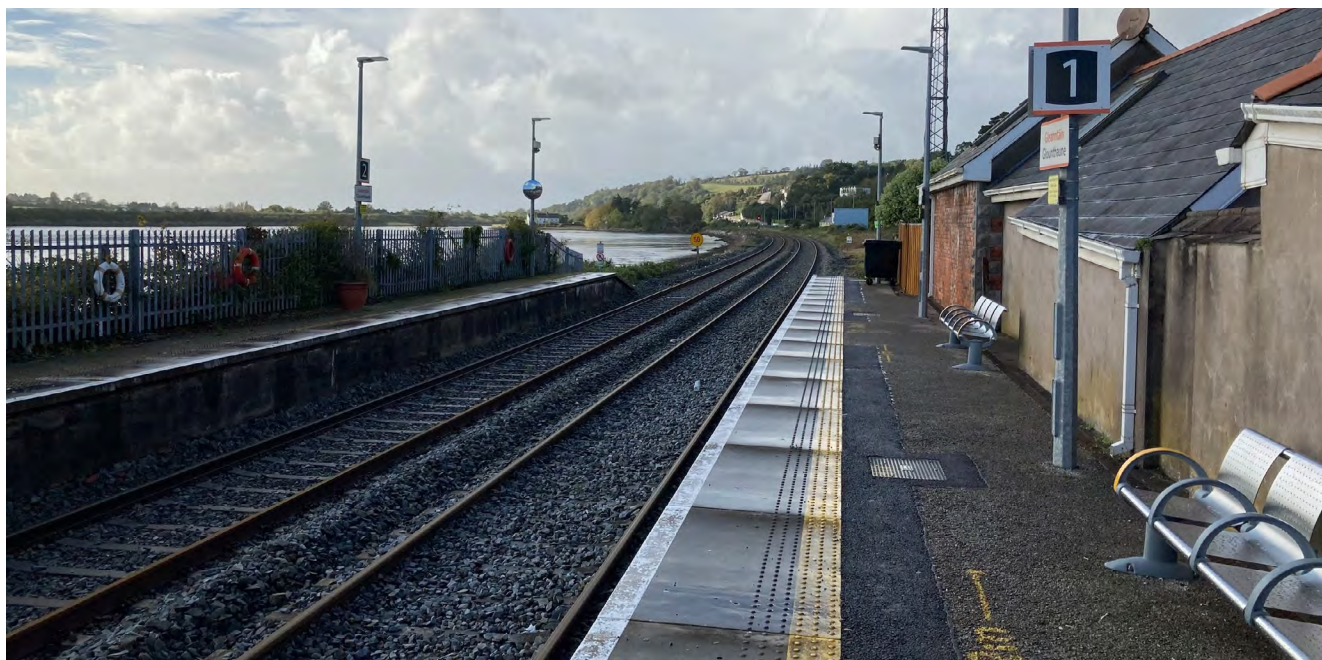


Figure 2.7 Pedestrian Crossing linking Greenway with Glounthaune Train Station



Figure 2.8 Glounthaune Train Station Platform – Looking west towards Little Island and Cork City.



The southern parcel is located to the west of Ashbourne House and gardens, which is listed as a Protected Structure in the Cork County Development Plan 2014. Ashbourne House was previously in use as a hotel and more recently as a Direct Provision Centre for the HSE. The remainder of the subject site relates to the existing road network (The Terrace and Johnstown Close) and greenway where it is proposed to provide new foul/surface water infrastructure.

The subject lands are located within the settlement boundary of Glounthaune as defined in the Cobh Municipal District Local Area Plan 2017. The proposed development represents the second phase of residential development at the subject lands, which is being delivered in accordance with a Masterplan for the overall lands developed by Dedy Gahan Architects in 2017. The first phase of the 'Lackenroe Masterplan' is currently being realised, with construction having recently commenced on the construction of 38 no. dwelling houses at the site to the immediate west of the northern and parcel permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17 (subsequently amended by 18/6312 and 20/5864).

Figure 2.9 Lackenroe Masterplan

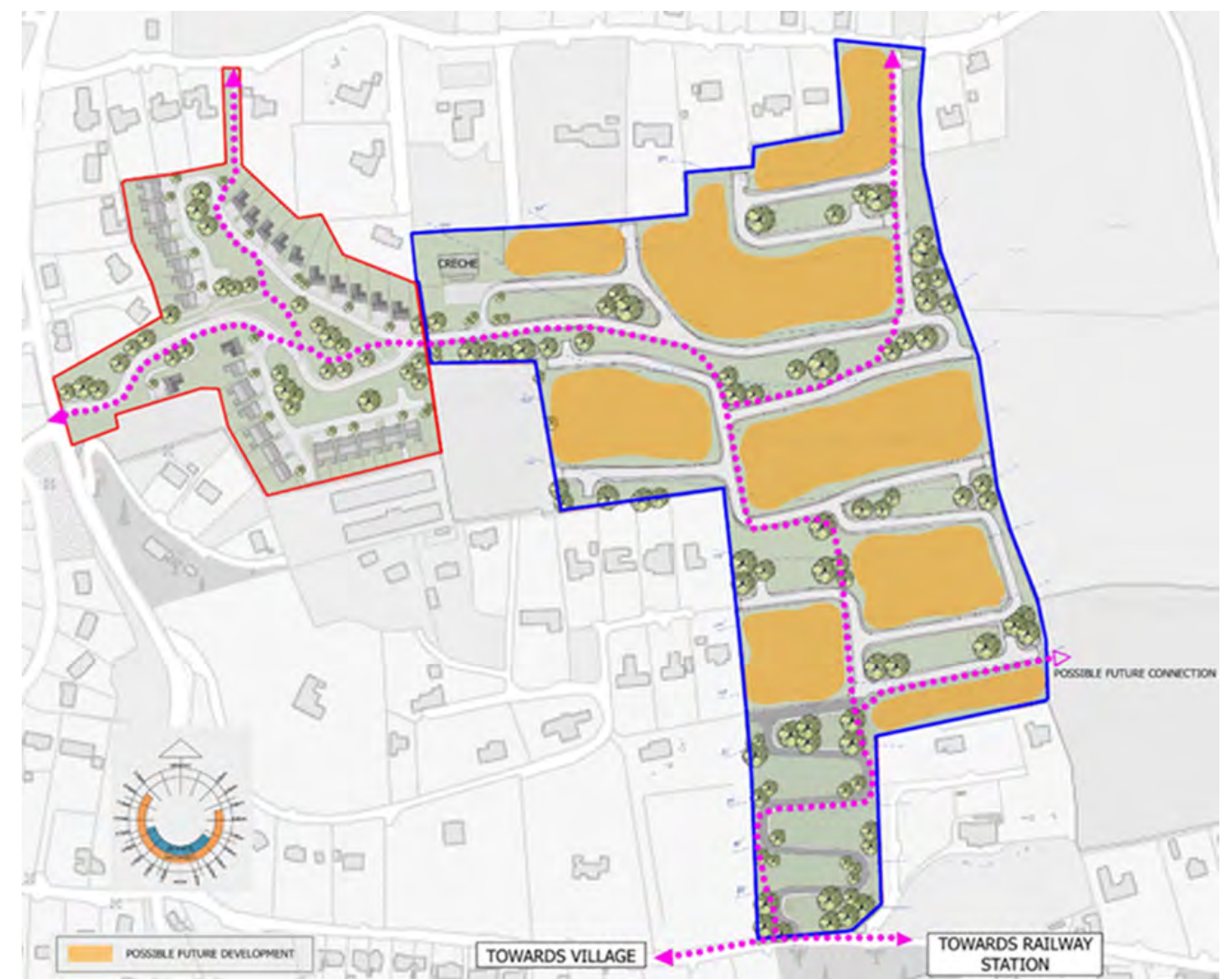


Figure 2.10 Phase 1 - Permitted Site Layout



Phase 1 consists of the construction of 25 no. 4 bedroom detached/semi-detached units, and 13 no. 3 bedroom detached/semi-detached units. The development makes provision for the upgrade of the Knockraha road with access to the site via a new signalised junction with Cois Chuain and a pedestrian access to the L-2969-0 country road to the north of the site.

2.2.2 Broader Context

The settlement of Glounthaune has a current population of circa 1,400 people according to 2016 Census figures. The settlement is identified as a 'Key Village' in the settlement hierarchy of Cork County Development Plan 2014 and is well placed to capitalise on its strategic location close to urban and employment centres such as the city centre, Little Island, Carrigwohill and Midleton. Glounthaune is one of only two suburban train stations (the other being Little Island), to be located on both the Cork - Cobh and Cork - Midleton railway lines. This results that the settlement is situated on a high frequency rail corridor, with services at peak times of every 15 minutes to Cork City (Kent Station). Journey times via rail to Cork (Kent Station) are approximately 10-12 minutes, 13 minutes to Midleton and 14 minutes to Cobh, with Little Island and Carrigwohill stations 3-5-minute train journey from Glounthaune.

Figure 2.11 Glounthaune in Context of Cork Metropolitan Rail Network

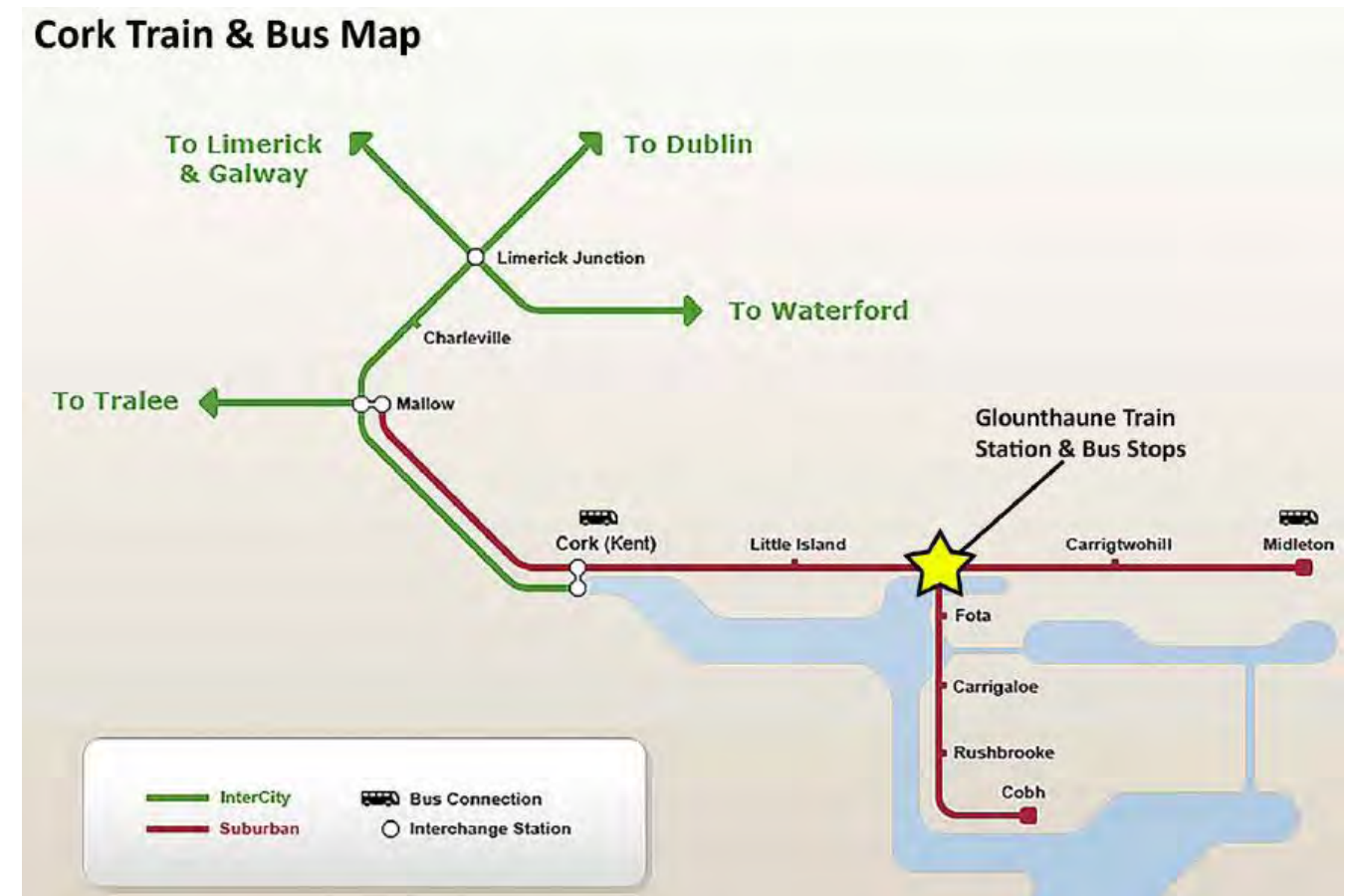


Figure 2.12 Glounthaune Train Station Platform – Looking east towards Cobh, Carrigtwohill and Midleton.



A review of the timetables of both the 'Cork-Cobh' and 'Cork- Midleton' services, confirms that Glounthaune benefits from four train services every hour to Cork City Centre, and two train services every hour (at peak times) to the strategic employment and service towns of Midleton, Carrigtwohill and Cobh. This reflects that Glounthaune station provides the most frequent train service in Metropolitan Cork to the Cork City Centre which in turn links into the national rail network.

Table 2-1 – Glounthaune Train Station – In Context*

Service	Travel Time (Average)	Frequency (Peak Times)	First Time/ Last Time (Mon-Sat)	No. of Services Daily
Glounthaune – Cork (Kent Station)	12/13 minutes	Every 15 minutes.	<u>First:</u> 6.13am <u>Last:</u> 23.13pm	46 no. services per day
Glounthaune – Little Island	3 minutes	Every 15 minutes.	<u>First:</u> 6.13am <u>Last:</u> 23.13pm	46 no. services per day
Glounthaune – Carrigtwohill	5 minutes	Every 30 minutes	<u>First:</u> 5.56am <u>Last:</u> 10.26pm	22 no. services per day
Glounthaune – Midleton	13 minutes	Every 30 minutes	<u>First:</u> 5.56am <u>Last:</u> 10.26pm	22 no. services per day
Glounthaune - Fota	3/4 minutes	Every 30 minutes	<u>First:</u> 5.41am <u>Last:</u> 10.41pm	24 no. services per day
Glounthaune – Carrigloe (Passage West Ferry)	8 minutes	Every 30 minutes	<u>First:</u> 5.41am <u>Last:</u> 10.41pm	24 no. services per day
Glounthaune – Rushbooke	11 minutes	Every 30 minutes	<u>First:</u> 5.41am <u>Last:</u> 10.41pm	24 no. services per day
Glounthaune – Cobh	14/15 minutes	Every 30 minutes	<u>First:</u> 5.41am <u>Last:</u> 10.41pm	24 no. services per day

*This table only refers to outbound trains from Glounthaune Station and not arrivals.

2.3 OPERATIONAL PHASE

2.3.1 Development Description

The proposed Strategic Housing Development (SHD) will consist of the Phase 2 of the residential development at Lackenroe and Johnstown (townlands), Glounthaune Co. Cork, which adjoins Phase 1 to the west and comprises the construction of a mixed-use residential development of 289 no. residential units consisting of 201 no. dwelling houses and 88 no. apartment/duplex units, a two storey creche, 4 no. ESB substations and all ancillary site development works. The proposed development will be constructed on lands to the north and south of the public road, L-2970, known locally as 'the Terrace'. A portion of the site to the south of 'the Terrace' was formerly within Ashbourne Garden and is considered to be within the curtilage and attendant grounds of Ashbourne House, which is a Protected Structure (Ref 00498).

The proposed development to the north of 'the Terrace' provides for 260 no. residential units comprising of 196 no. dwelling houses, 64 no. apartment/duplex units and a two storey creche. The 196 no. dwelling houses includes 5 no. 4 bedroom detached dwellings, 44 no. 4 bedroom semi-detached dwellings, 12 no. 4 bedroom townhouses, 2 no. 3 bedroom detached dwellings, 22 no. 3 bedroom semi-detached dwellings, 47 no. 3 bedroom townhouses and 64 no. 2 bedroom townhouses. The 64 no. apartment/duplex units contains 5 no. 3 bedroom units, 32 no. 2 bedroom units and 27 no. 1 bedroom units contained in 6 no. three storey apartment buildings, with ancillary bicycle parking and bins stores.

The proposed development to the south of 'the Terrace' provides for 29 no. residential units comprising of 5 no. dwelling houses and 24 no. apartments. The 5 no. dwellings include 1 no. 3 bedroom detached dwelling, 2 no. 3 bedroom townhouses and 2 no. 2 bedroom townhouses. The proposed apartments are provided in a four-storey mixed-use building containing a ground floor community unit and a commercial unit with apartments at ground and upper floor levels comprising 3 no. 3 bedroom units, 7 no. 2 bedroom units and 14 no. 1 bedroom units with ancillary rooftop terrace, car parking, bicycle parking and bin stores.

Vehicular access to 2 no. dwellings in the lands to the north of 'the Terrace' will be provided via an upgraded entrance from 'the Terrace' with vehicular access to the remainder of dwellings in the lands to the north of 'the Terrace' via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17. A separate secondary emergency access is also proposed from the L-2969 to the north.

Vehicular access to the 5 no. dwellings to the south of the 'the Terrace' will be via a new entrance from 'the Terrace' and the proposed apartment building will be accessed from Johnstown Close. The proposed development also makes provision for a pedestrian link from the proposed development north of 'the Terrace' to Johnstown Close via 'the Terrace' which will include a signalised pedestrian crossing and associated traffic calming measures on 'the Terrace'.

Ancillary site works include the demolition of 1 no. existing derelict dwelling house and associated outbuildings, landscaping and servicing proposals including the realignment of the existing pedestrian/cycle route on Johnstown Close, the undergrounding of existing overhead lines, upgrade of the storm and foul sewer network to the south and east of the subject lands along 'the Terrace' and Johnstown Close (L-3004).

When assessed cumulatively with the permitted first phase the proposed development provides for 327 no. residential units on total site area of circa 16.6 hectares. As referenced in the above development description, the proposed development provides for other uses, ancillary to the residential development including.

- A two storey 67 no. child creche (551.4 sqm) in the northern land parcel of the development. The creche facility is located adjacent to a proposed Multi-Use Games Area (MUGA) and central amenity parkland, providing for a communal central node in the northern parcel.

- The proposed mixed-use building in the southern land parcel, fronting onto Johnstown Close provides for a ground floor community unit (113.6 sqm) and commercial unit (77.8 sqm), which both front onto the greenway.

The proposed development will contribute towards achieving the strategic aims of the 'County Metropolitan Cork Strategic Planning Area', as identified in the Cork County Development Plan 2014 (CDP), by providing high quality residential development along an existing high frequency public transport corridor which will promote sustainable commuting patterns. (CDP Objective CS 4-1). The proposed mixed-use development represents a 'Public Transport Orientated Development' and will promote the creation of a more self-sufficient and sustainable settlement into the future in accordance with CDP Objective HOU 3:1, 'Sustainable Residential Communities'. CDP Objective SC 1-1, 'Social and Community Infrastructure Provision' aims to 'Support the provision of social and community facilities which meet the current and future needs of the entire population'. The proposed development provides for community/social outlets, in the form of a 67 child creche facility in the northern land parcel and community unit fronting onto the greenway/ Johnstown Close, in addition to the provision of several high quality public open spaces and play areas throughout the scheme. The proposed development will assist Glounthaune fulfilling its strategic function as a 'Key Village' in the CDP.

2.3.2 Access, Connectivity & Public Realm

As referenced previously, vehicular access to the northern land parcel will be provided via the signalised junction from the L-2968 Knockraha Road, permitted in Phase 1 which was designed to accommodate vehicular access to future development of the wider masterplan lands. Phase 1 also provided for public realm upgrades including the provision of new footpaths and traffic calming measures.

Figure 2.13 Signalised Junction from the Knockraha Road permitted in Phase 1

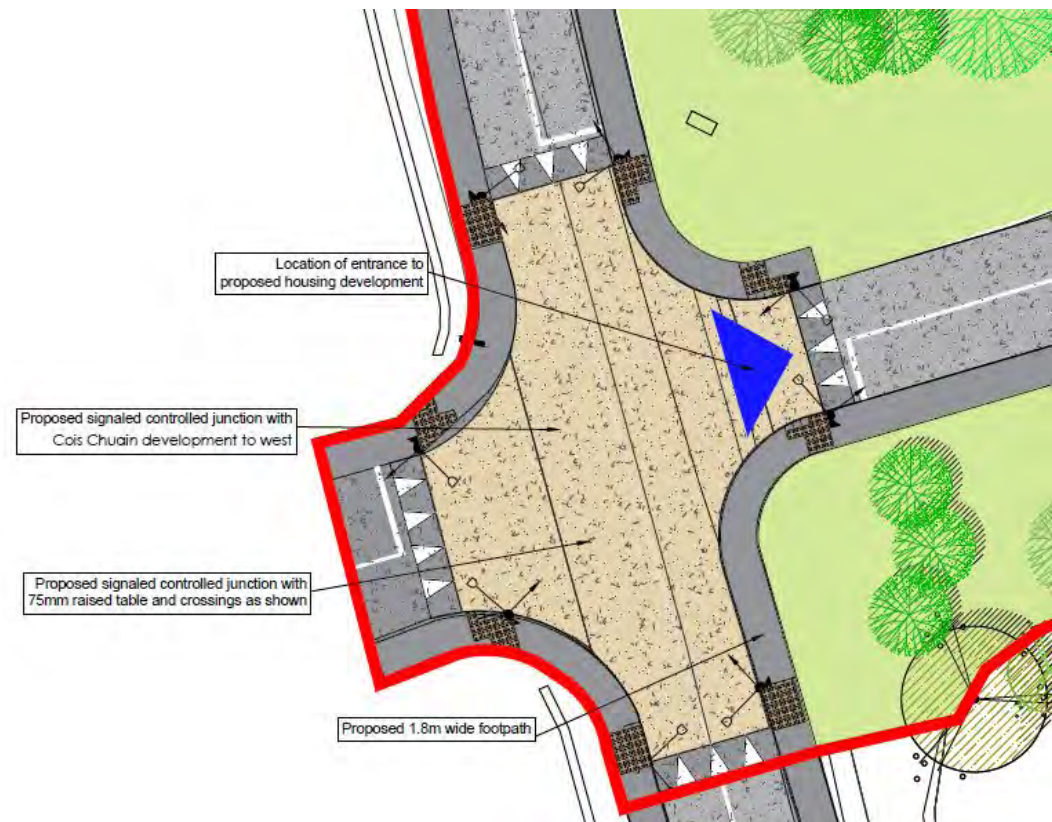
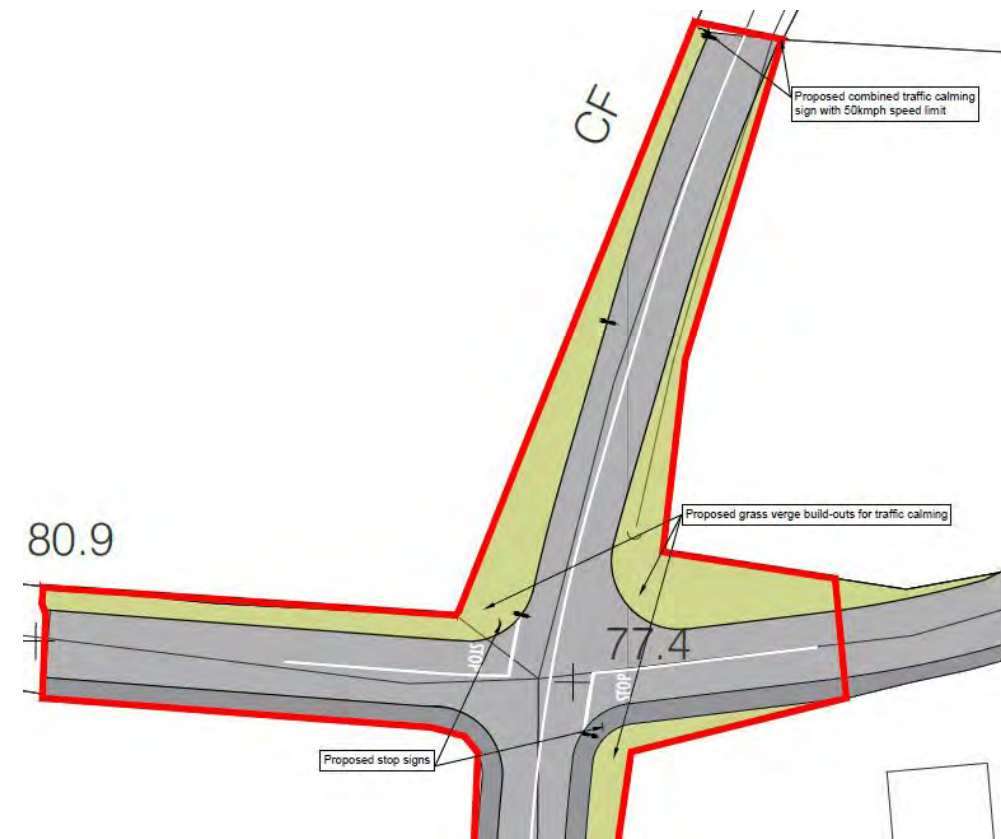


Figure 2.14 Upgrades to the Knockraha Road permitted in Phase 1



The proposed development provides for a separate emergency access to the L-2969 to the north. This entrance will not serve as a secondary vehicular entrance to the northern land parcel and is for the purposes of providing an alternative vehicular entrance for any emergency vehicles accessing the site. Demountable road bollards are to be installed which will prevent traffic generated from the development accessing the L-2969.

The proposed development provides for pedestrian and cyclist paths through the northern parcel onto 'the Terrace' where a signalised pedestrian crossing is proposed to link the lands to the north and south of the Terrace. A separate vehicular entrance to serve 5 no. dwelling houses in the southern parcel is proposed, and the continuation of the proposed pedestrian/cyclist paths which will connect to the greenway on Johnstown Close, providing pedestrian and cyclist links to the train station/village core.

Figure 2.15 Upgrades to the Terrace and Pedestrian/Cycle Path through Southern land parcel



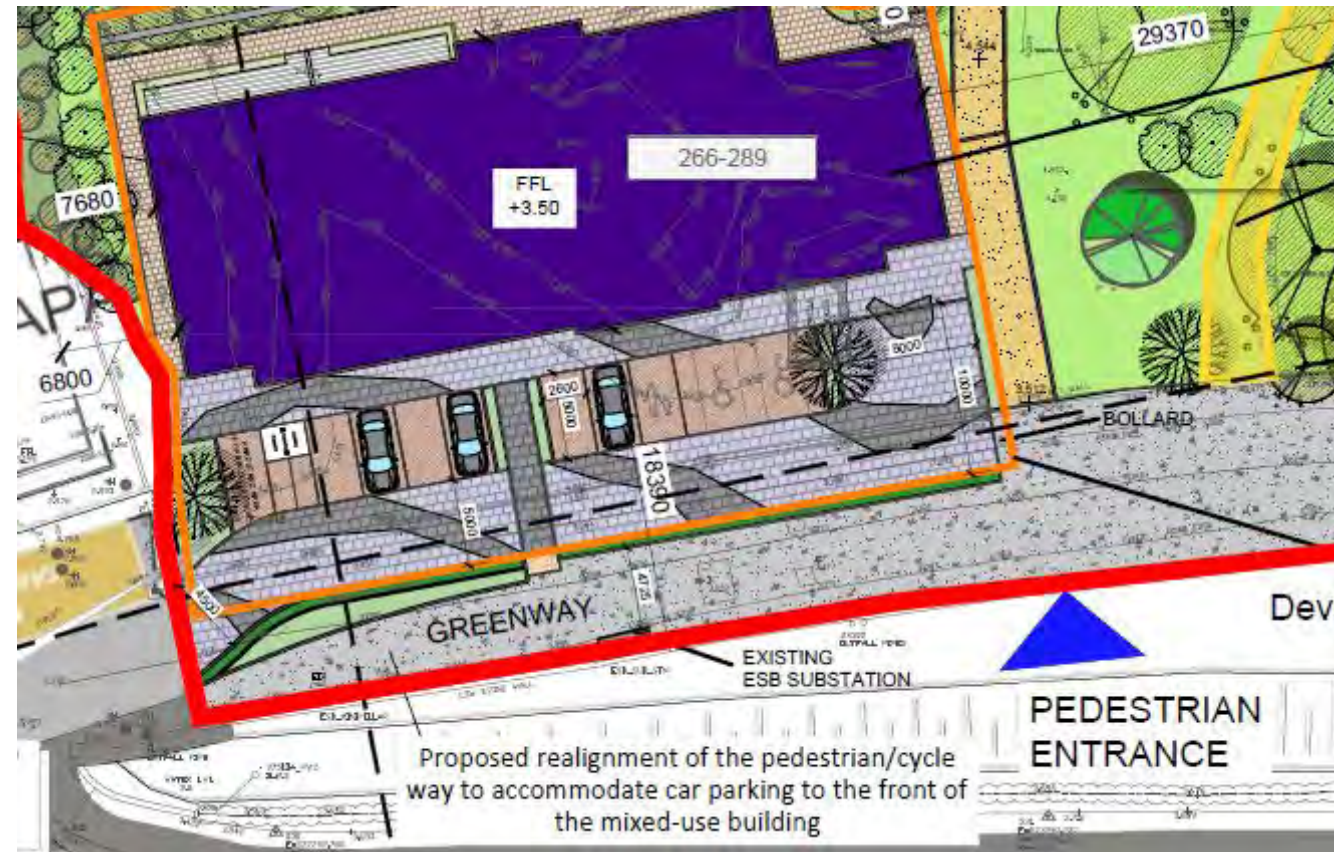
In order to facilitate the movement of cyclists through the northern and southern parcels, a bicycle wheeling ramp is proposed to run along the stepped footpaths. This will enable cyclists to wheel bicycles up and down steeper areas of the site without having to carry bicycles or take up/down steps.

Figure 2.16 Typical Bicycle Ramp (Source: www.cyclehoop.com)



The proposed development also provides for the realignment of the existing greenway to the south of the site, along Johnstown Close. The purpose of these works is to ensure that motorists, pedestrians and cyclists can all co-exist in this area, and reduce any potential conflicts which might occur. The realignment of the greenway results that car parking to the front of the proposed mixed-use building in the southern area of the site can be accommodated, in addition to improving safety for pedestrians and cyclists.

Figure 2.17 Proposed Greenway Realignment on Johnstown Close



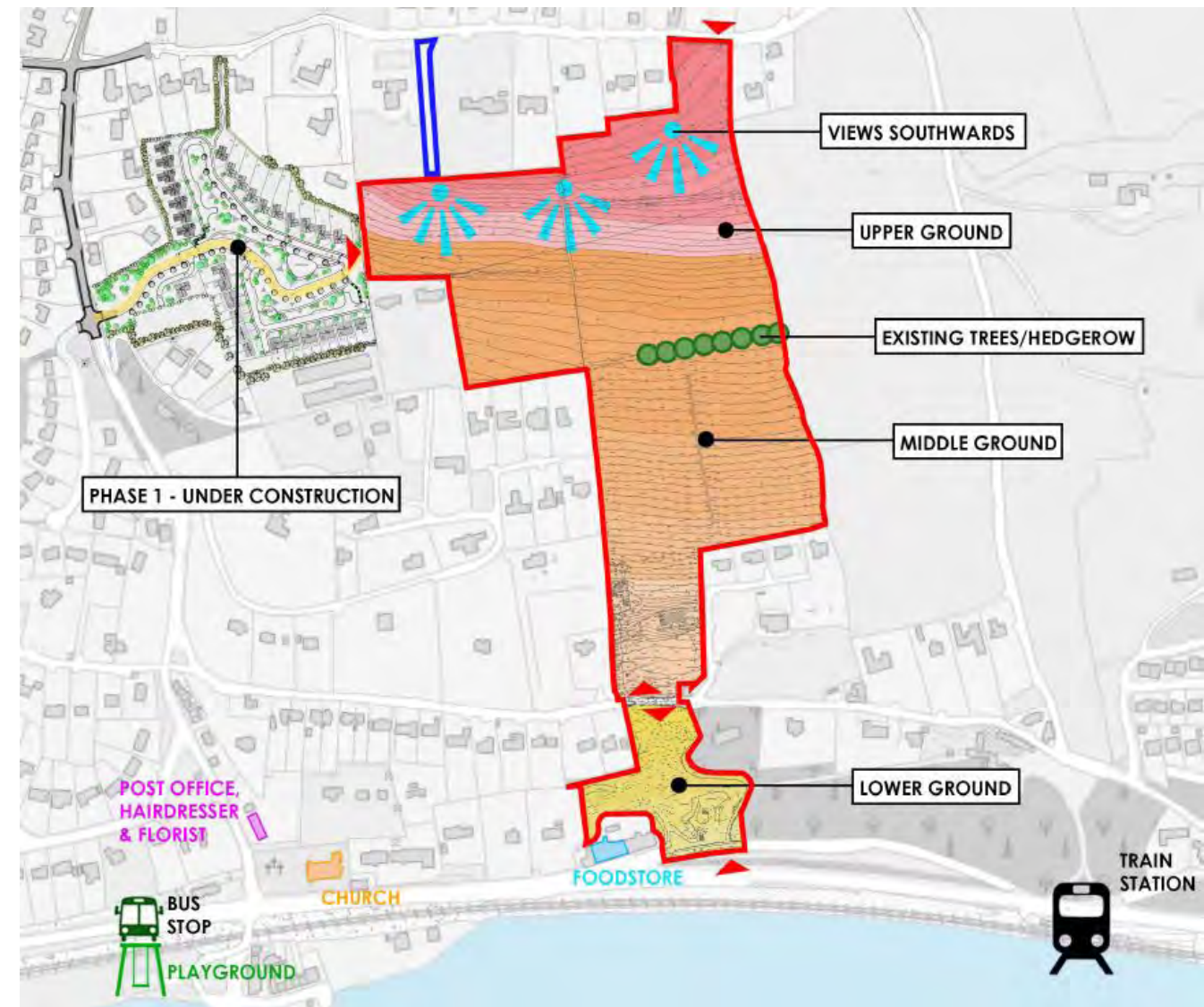
2.3.3 Proposed Layout & Landscape Strategy

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 to local services including Glounthaune railway station.
- 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 provide accessibility for all in the context of the hillside setting.
- 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 Glounthaune.
- The retention and supplementation of field boundaries, internal and boundary hedgerows where possible.

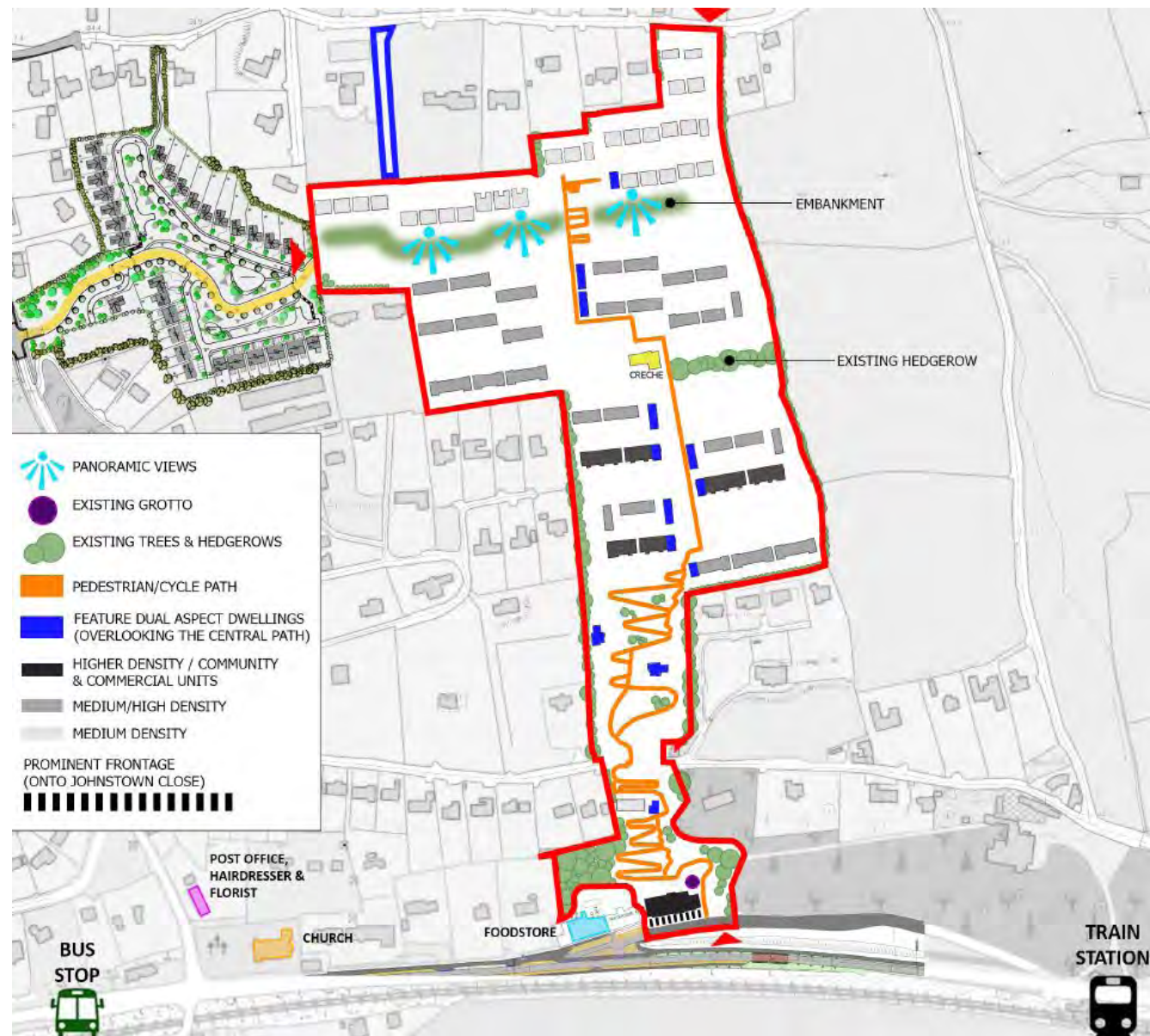
- The protection and retention of 'Champion' trees in the southern land parcel which positively contribute to the character of Glounthaune. The presence of these trees is viewed as a significant asset to the proposed development and will contribute to a unique aspect of the proposed development, assisting with the integration of the existing settlement.
- Any trees which require removal in order to accommodate the proposed three metre pedestrian/cycle path to the train station, village core and greenway will be mitigated by extensive planting of new native trees, hedgerows and landscaping treatments.

Figure 2.18 Site Constraints and Analysis



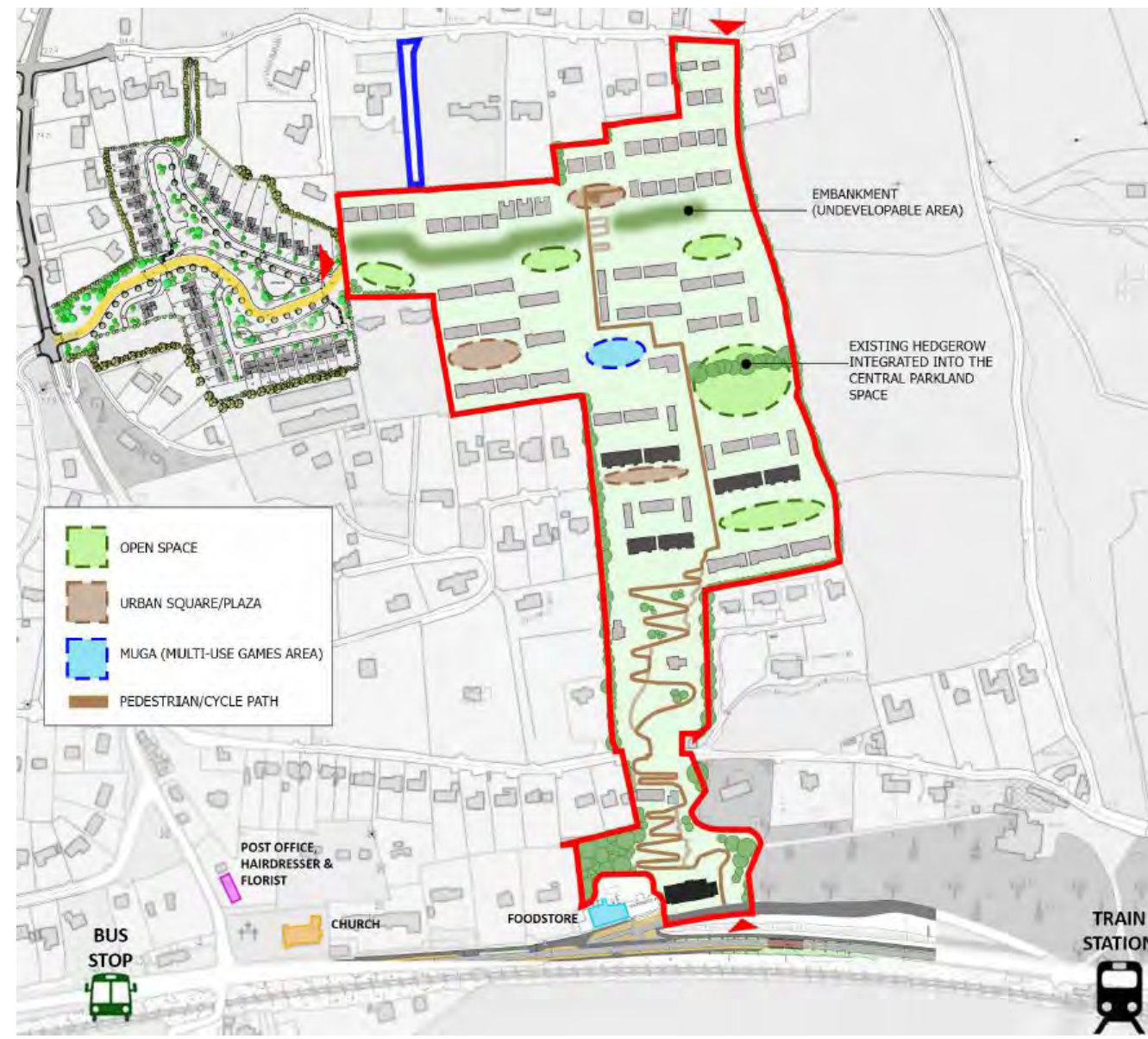
The proposed development is orientated around a primary three metre pedestrian/cycle 'spine' route through the site, allowing future residents with as direct and convenient link to the village core and train station as possible. The route and design of the proposed path is reflective of the site levels and existing tree cover, and has been designed to reduce as much cut and fill as possible. Chapter 3 of this EIAR, 'Alternatives Considered' details how the final route design of this path has been arrived at and the various alternatives forms/routes of the path considered.

Figure 2.19 Pedestrian/Cycle Wayfinding Route through the Site



The proposed development provides for a central parkland in the northern land parcel, to the southeast of the creche facility with a MUGA to the west. The layout provides for a wide range of public open spaces to serve as recreational and visual amenities for future residents, in addition to new boundary treatments and supplemental planting to mitigate the loss of existing trees and hedgerows.

Figure 2.20 Public Open Space & Amenity Strategy



The landscaping strategy for the proposed development provides for extensive replacement planting to mitigate the unavoidable loss of existing trees, hedgerows and vegetation. In order to accommodate the three metre pedestrian/cyclist path through the southern land parcel, 8 no. heritage trees, associated with the former grounds of Ashbourne House will be removed in addition to other existing trees and hedgerows across the wider site. As detailed in figure 2.21, the proposed development provides for a significant increase in planting of both hedgerows and trees across the site, including the planting of 8 no. replacement heritage trees to compensate for the loss of the existing heritage trees during construction.

Figure 2.21 Replacement/Mitigation Planting Schedule

Tree Losses		Mitigation (Replacement) Planting	
Heritage trees	4 no. category A trees	Heritage Trees	8 no. trees
	4 no. category B trees	Tree Planting	158 no. street trees
Category B Trees	56 no.		284 no. open space trees
Category C Trees	57 no.		214 no. garden trees
Category U Trees	16 no.	Woodland Type Planting	316 no. Whips/Transplants
Hedgerow Loss	593 linear metres	Hedgerow Planting	800 linear metres

2.3.4 Servicing, Infrastructure and Utilities

The Infrastructure Report prepared by AECOM (Appendix 2-1) details the proposed servicing, utilities and infrastructure details of the proposed development during the operational phase. This section should also be read in conjunction with Chapter 6 of this EIAR (Material Assets, Services, Infrastructure and Utilities) prepared by AECOM. A Confirmation of Design Acceptance (CODA) from Irish Water (Appendix A of the Infrastructure Report) confirms that the proposed development can be facilitated. Surface Water Drainage

2.3.4.1 Surface Water Drainage

As described in EIAR chapter 6, there are currently capacity issues relating to the existing surface water network in the area of 'the Terrace'. The proposed development provides for an internal surface water drainage system with sewers and attenuation tanks being located within proposed roadways and other public areas. The drainage strategy for the development provides for the discharge of surface water from the scheme to the existing outfall, located to the south of Johnstown Park and southeast of the subject development lands. To achieve this, it is proposed to lay a new 300mm surface water sewer from the southern boundary of the northern land parcel, along 'the Terrace' and Johnstown Close, which will connect to an existing manhole.

While it is proposed to discharge run-off from the proposed development to an area that is tidal in nature, rather than a stream/ river, in order to reduce the rate of run-off from the proposed development it is proposed to limit discharge from the site to the greenfield rate. It is proposed to attenuate run-off from the proposed development through attenuation tanks, with permeable pavements provided across the scheme and a green roof proposed for the mixed-use building (containing 24 no. apartments, commercial and community units) fronting onto the greenway at Johnstown Close.

2.3.4.2 Waste/Foul Water Drainage

Wastewater generated in the Glounthaune area is treated at Carrigrennan Wastewater Treatment Plant (WWTP) in Little Island. Treated wastewater from the plant is discharged through a 500m long outfall pipe to Cork Harbour at Lough Mahon. The existing wastewater networks in the area discharge to an existing pumping station on Johnstown Close (Johnstown Pumping Station). Wastewater discharge from the northern parcel will be discharged by gravity into the 225mm diameter public foul sewer to the southeast near 'The Woods' residential development. To achieve this, it is proposed to lay a new 225mm foul water sewer from the southern boundary of the proposed development along the

Terrace and connect to the existing 225mm foul water system. It is proposed to discharge the wastewater generated by the proposed development south of 'the Terrace' by gravity to the existing network to the west of the proposed mixed-use building to the south of the site.

2.3.4.3 Water Supply

It is proposed to service the proposed development via a new connection from the existing watermain along the sites northern boundary and to also connect to the existing watermain to the south of the site. To reduce the water demand generated from the proposed development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets.

2.3.4.4 Flood Risk Assessment

The Site-Specific Flood Risk Assessment (SSFRA) for the development (Appendix 8-1) has shown that the risk of the proposed development contributing to downstream flooding is very unlikely, and that the risk of inundation of the buildings within the site post construction is unlikely due to the proposed design floor levels and site layout and measures described in the SSFRA.

2.3.4.5 Electricity

Regarding the provision of electricity during the operational phase, the proposed development provides for a new MV network, supplying 4 no. ESB substations situated throughout the development. This approach is based on ESB guidelines and will be subject to ESB's assessment which will be carried out following planning approval for the proposed development. An application will be made to the ESB following approval of the proposals. An underground LV network will be provided, supplying mini pillars as required to feed the individual premises.

2.3.4.6 Natural Gas

It is proposed that Gas Networks Ireland to provide a new medium distribution network to serve the proposed development. The network can be accessed from the L-2968 and internal road network permitted by in Phase 1 to the west.

2.3.4.7 Telecommunications

New telecoms network will be provided to serve the development. Telecommunications infrastructure will consist of a network of underground ducts within the public footpaths, with individual ducts serving each dwelling. The tie in point to the existing Eir network will be developed with the NBI/Eir prior to construction.

A 'Proposed Site Layout Plan', prepared by Deady Gahan Architects is included as appendix 2-4 of this EIAR.

2.4 CONSTRUCTION PHASE

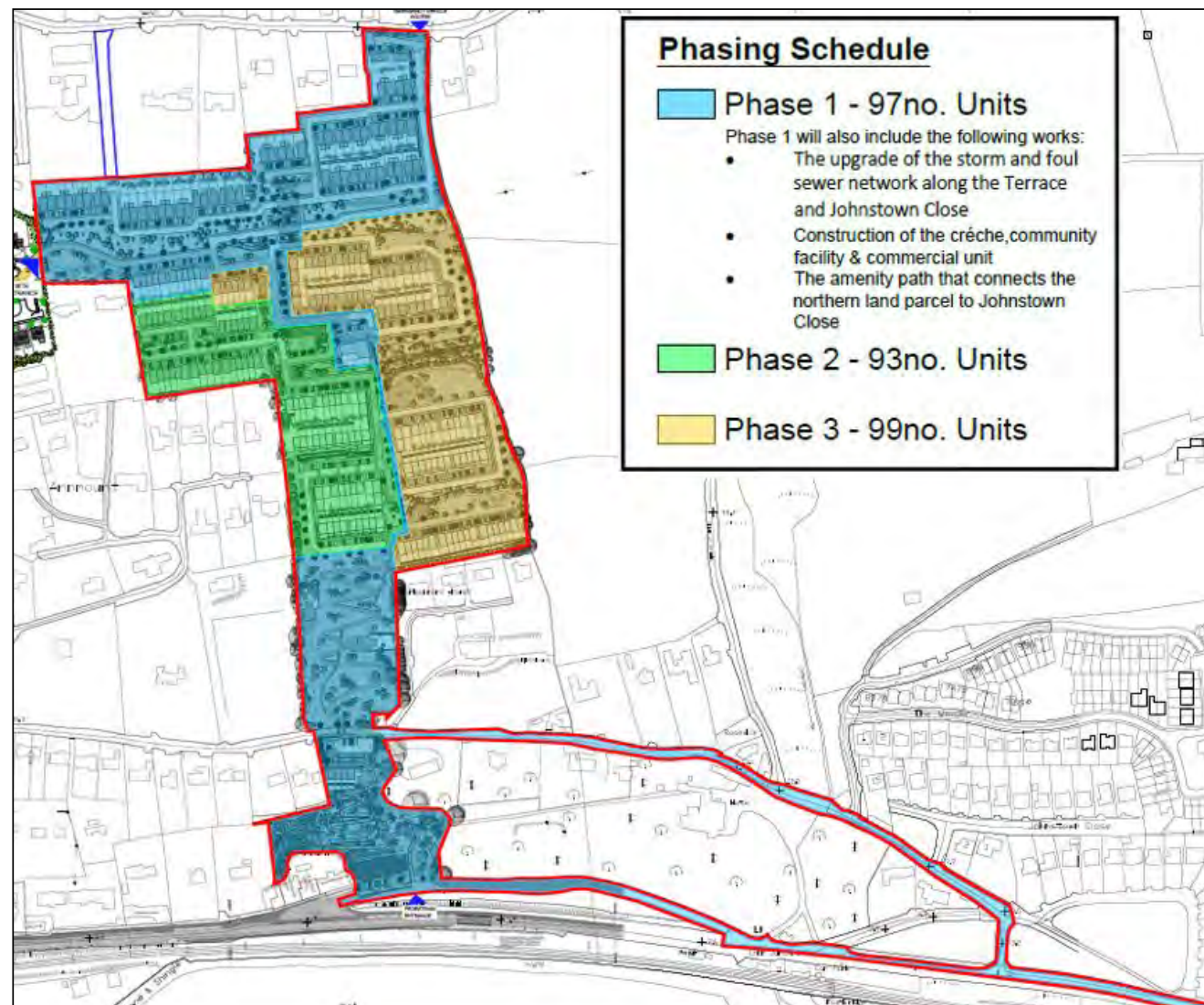
This section provides an overview of the construction and demolition phases of the proposed development. This section should be read in conjunction with the prepared 'Construction and Demolition Waste Management Plan' (CDWMP) Appendix 2-2 and 'Construction & Environmental Management Plan' (CEMP) Appendix 2-3 prepared by AECOM.

2.4.1 Construction Programme and Phasing

Vehicular access to the lands to the north of 'the Terrace' will be via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17. The estimated duration of the construction phase of this project is 48 months. It is proposed to develop the site in three phases:

- **Phase 1:** Phase 1: 97 no. units in total which includes the proposed mixed-use building to the south, creche and the demolition of existing structures in the northern parcel. Phase 1 will also provide for the full delivery of the three metre pedestrian/cyclist path through both parcels and the upgrades to the foul and surface water network along the Terrace and Johnstown Close.
- **Phase 2:** 93 Units in northern parcel.
- **Phase 3:** 99 Units in northern parcel.

Figure 2.22 Construction Phasing



No construction works relating to the proposed development will occur until the signalised junction and road upgrades permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17 are implemented and operational. These works are expected to be complete during 2022.

2.4.2 Sequence of Works

The main stages of construction will be progressed based on the following:

- Implement all recommended environmental mitigation measures arising from the preconstruction surveys,
- Confirm utility locations and divert utilities where necessary,
- Establish contractor's site compound and erection of site hoarding,
- Site clearance, demolition works and topsoil stripping,
- Cut and fill to level and re-grading works within site to formation level,
- Installation of services (drainage networks, water supply, electricity, etc.),
- Construction of roads, footpaths & hard/ soft landscaping,
- Installation of foundations/ footings for buildings and retaining walls,
- Construction of new buildings (houses, duplex units and creche),
- Connection to public services,
- Installation of substations,
- Provision of proposed road finishes,
- Provision of landscaping finishes,
- Complete all site finishes,
- Completion of any required testing and commission services within the development.

2.4.3 Site Excavations/Earthworks

Bulk earthworks and excavations associated with the site stripping, levelling and regrading will be required to accommodate the proposed residential units, road/footpath gradients and the proposed pedestrian/cyclist connection through the site. Section 3 of the CEMP details the extent and scope of the proposed earthworks/excavations with the anticipated cut and fill volumes associated with the proposed development as follows.

Figure 2.23 Envisaged Cut and Fill Volumes

Material	Volume Excavated Material (m ³)	Volume Fill Material (m ³)	Net Material Volume (m ³)
Topsoil	41,772	13,925	27,798
Subsoil	53,964	53,964	0
Rock	18,565	12,602 (crushed rock as fill)	5,963

The Site Constraints Reports prepared by AECOM (Appendix 3-2 of this EIAR) describes the context of the existing ground/site conditions, particularly in the southern areas of the site, required to deliver the proposed pedestrian/cyclist path.

2.4.4 Demolition

The CDWMP (Appendix 2-2) details the proposed demolition and waste management procedures to be implemented during the construction phase of the proposed development. This includes the demolition of 1 no. existing derelict dwelling house and ancillary outhouses to the south of the northern land parcel.

Figure 2.24 Demolition Works



2.4.5 Removal/Planting of Trees and Hedgerows

In order to facilitate the proposed development, tree/hedgerow removal will be necessary during the construction phase. As detailed in figure 2.21 the proposed development provides for the removal of circa 593 no. linear rows of hedgerow and approximately 137 no. existing trees. During the construction phase, the proposed development provides for removal of.

- A category: 4 No. trees (Also classified as Heritage Trees)
- B category: 60 No. trees (of which 4 no. are classified as Heritage Trees)
- C category: 57 No. trees,
- U category: 16 No. trees. These are trees which are not considered to be of value and some which are dead.

During construction it is proposed to provide for significant levels of replacement/mitigation planting including.

- 8 no. new heritage trees in the southern parcel.
- 656 no. new trees across the scheme.
- 316 no. whips/transplants and
- 800 no. linear metres of new hedgerow planting.

2.4.6 Overhead Lines

There are existing overhead ESB lines (10kV/ 20kV) traversing the northern land parcel. The proposed development provides for the undergrounding of these overhead lines to accommodate the proposed development.

Figure 2.25 Existing Overhead Lines (In Green) to be diverted underground.



2.4.7 Site Facilities During Construction

Construction compounds will be established, which will accommodate construction site facilities as outlined in the CEMP. Within phases 1 and 2, one central construction compound will be provided in the northwestern area of the northern land parcel with other compounds located for the construction of the 5 no. units in the southern parcel fronting onto the Terrace, and the construction of the mixed-use building fronting onto Johnstown Close.

For phase 3, a temporary construction compound will be provided in the central amenity area which will then be incorporated into the final site layout, once construction of the Phase 3 dwellings are complete.

Figure 2.26 Construction Compounds - Phases 1 & 2

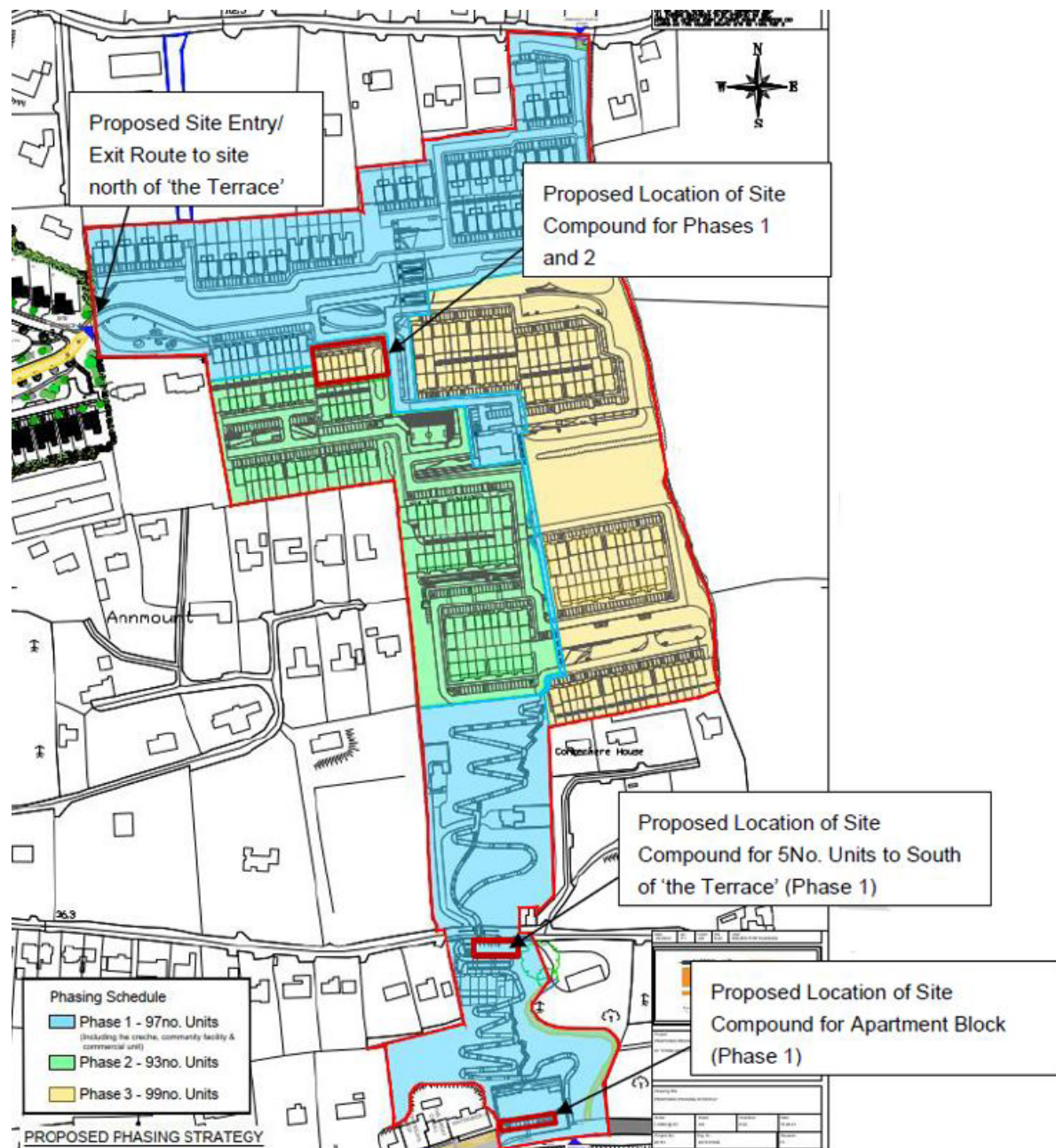
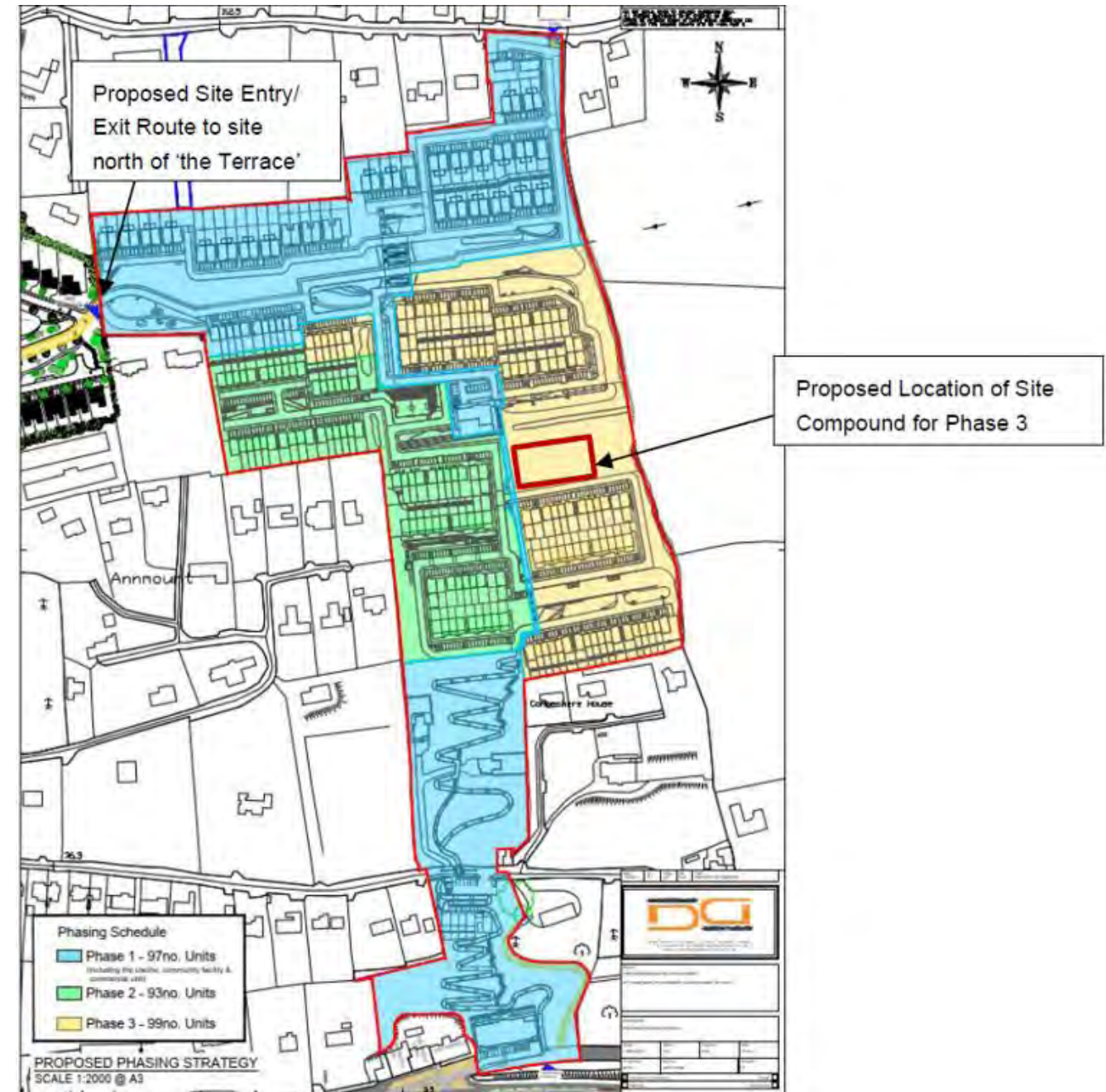


Figure 2.27 Construction Compound - Phase 3



2.4.8 Working Hours

Unless otherwise specified by the requirements of the planning permission, it is proposed that standard construction working hours will apply (7am to 6pm Monday to Friday, 8am to 2pm on Saturdays.) Approximately 50 no. staff will be required on site at any one time during the construction phase of the development.

2.5 IMPACT ASSESSMENT

2.5.1 Do-Nothing Scenario

A 'do nothing scenario' will result that the site would remain in its existing undeveloped, agricultural and woodland use. The 1 no. existing derelict dwelling and ancillary outbuildings in the northern land parcel would remain in-situ and the proposed traffic calming measures to the Terrace would not occur.

The do-nothing scenario also reflects the proposed pedestrian/cyclist path linking the northern areas of Glounthaune with the village core and greenway/train station would not be delivered, and that existing invasive species would continue to spread, potentially resulting in long-term negative ecological consequences.

2.5.2 Construction Phase

The construction phase of the proposed development will be short term in nature and will be implemented in accordance with the requirements and recommendations of the accompanying construction management plans. Without appropriate 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, waste management and impacts on mature trees.

2.5.3 Operational Phase

Once constructed the proposed development will be irreversible and permanent in nature. The proposed development will result in the construction of an additional 289 no. residential units (327 no. units when assessed cumulatively with Phase 1) with ancillary creche, community and commercial units. The 2016 Census confirms that the average household size in Cork City and Suburbs is 2.6 persons per household, which translates that the proposed development may provide for an uplift in population of approximately 850 no. persons, consistent with adopted planning policy objectives, of concentrating population growth around high frequency public transport links in existing settlements.

The proposed development will result in several positive effects in the local area by providing a broad range of housing units, which will serve all aspects of the current housing market and address the current housing shortage in the Metropolitan Cork Area. The development will support the long-term future of Glounthaune train station as well as providing employment during the construction phase of the development and other associated economic benefits. The proposed surface/wastewater infrastructure to be delivered as part of the proposed development, will also assist in accommodating future development at other lands in Glounthaune, which are currently constrained by existing infrastructural deficiencies.

The proposed increase in population has potential for significant effects on the demand for local services such as water, wastewater, roads, childcare/educational, and recreation/amenity provision, without appropriate mitigation measures. When assessed cumulatively with other developments taking place in the area (as detailed in Chapter 1 of this EIA), the proposed development will result in the increase in housing stock and population in Glounthaune, and significant positive impacts to the local pedestrian and cyclist environment in Glounthaune. The proposed development, along with the new greenway between Glounthaune and Carrigtwohill, along with the public realm upgrades and signalised junction permitted in Phase 1, will result in a safer environment for pedestrians and cyclists to access the village core and train station.

2.6 MITIGATION, MONITORING & RESIDUAL IMPACTS

Chapter 15 of this EIA, 'Summary of Mitigation Measures and Monitoring' details all proposed mitigation and monitoring procedures to be implemented during the operational and construction phases of the project.

2.6.1 Construction Phase

The relevant EIA chapters and the appended CDWMP and CEMP prepared by AECOM, detail the proposed mitigation and monitoring procedures to be implemented during the construction phase of the proposed development. The construction management plans have been prepared in collaboration and include the relevant EIA mitigation measures outlined in the EIA. The following is a short summary of proposed mitigation and monitoring measures as outlined in these documents.

2.6.1.1 Earthworks

Topsoil will be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works. During the demolition and construction phases, all excavations and exposed sub-soils in open cuts will be blinded and protected with clean broken stone as soon as possible after exposing the subsoil in order to prevent erosion.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. It is anticipated that only local/low level of stockpiling will occur as the bulk of the material will be excavated either straight into trucks for transport off site or will be reused in other areas of the site as fill. Any excavated material to be disposed off-site will go to a licensed facility. The maximum number of HGV movements during the construction phase will be 15 Heavy Goods Vehicles (HGV's) per day.

2.6.1.2 Site Security Fencing and Hoarding

Site hoarding and barriers will prevent unauthorised access to the each works area. A minimum 2.4 metre high plywood painted timber hoarding is to be provided. The contractor will regularly monitor and maintain the condition of the hoarding throughout the duration of the construction phase. Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked at any time that these areas are not monitored (e.g. outside working hours). During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to and from site onto the public roads.

2.6.1.3 Traffic Management

All deliveries will be controlled at the identified compound location and monitored by the Contractor in conjunction with Cork County Council and An Garda Síochána. A Construction Stage Traffic Management Plan in accordance with the following guidance documents for the temporary control of traffic at road works:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Sign Roadworks (2019);
- Traffic Management Guidelines, Department of Transport (2003);
- Requirements of Cork County Council.

The Traffic Management Plan will provide for the following:

- The contractor will be responsible for and make good any damage to existing roads or footpaths caused by his own contractor's or suppliers transport to and from the site.
- The contractor will at all times keep all public and private roads, footpaths entirely free of excavated materials, debris, rubbish, provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.
- The contractor will confine his activities to the area of the site occupied by the works and the builders' compound during any particular phase of the development.
- Haul routes to and from the site will be defined and agreed with the Local Authority.

- Properly designed and designated entrance and egress points to the construction site for construction traffic, will be used to minimise impact on external traffic.
- Where traffic signals are not in place, flagmen will be used to control the exit of construction vehicles from the site onto the public road.
- Existing fire hydrants will remain accessible for the duration of the works.

The designated storage area will be identified prior to taking delivery of the materials, and the driver will be directed to the compound. Site access, and the delivery of construction materials, will be carefully planned and managed throughout the construction works. Deliveries will be co-ordinated so that trucks do not block the road outside the site and do not occur at peak times. Wheel washing and road sweeping facilities will be provided to ensure that the roads are kept mud and debris free.

The following measures are proposed to minimise construction vehicular movements to and from the site.

- Construction and delivery vehicles will be instructed to use only the approved and agreed means of access; and movement of construction vehicles must be restricted to these designated routes;
- Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access locations;
- Speed limits of construction vehicles will be managed by appropriate signage, to promote low vehicular speeds within the site;
- Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material;
- Parking of site vehicles will be managed by the Contractor and will not be permitted on public road;
- A road sweeper will be employed to clean the public roads adjacent to the site of any residual debris that may be deposited on the public roads leading away from the construction works;
- On site wheel washing will be undertaken for construction trucks and vehicles to prevent any debris prior to leaving the site, to remove any potential debris on the local roads;
- All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits will be available on site. All scheduled maintenance carried out off-site will be carried out on the public highway; and
- Safe and secure pedestrian facilities will be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and will be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users including mobility impaired persons.

2.6.1.4 Material Handling and Storage

Within the site compound, a section within the area will be identified for material storage only. It is proposed that unloading bays are provided for deliveries to the site within the hoarding perimeter. Appropriately demarcated storage zones will be used to separate and segregate materials.

2.6.1.5 Spill Control Measures

It is not proposed to store any oils/fuels for the purpose of refuelling on the site. Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles will not be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor. Section 6.4 of the CEMP lists the measures which will be taken in the unlikely event of any significant spills or leaks.

2.6.1.6 Surface Water Drainage

Section 6.6 of the CEMP and EIAR Chapter 8 provide full details of mitigation measures regarding surface water during construction. All watercourses will be protected from sedimentation and erosion throughout the duration of construction. Surface water management on site will comply with the following guidelines from the 'Construction Industry Research and Information Association' (CIRIA) including

- C532 Control of Water Pollution from construction Sites, Guidance for Consultants and Contractors,
- C741 Environmental Good Practice on Site - 4th Edition.

2.6.1.7 Water Supply

A water supply will be required for various construction activities on site. A temporary potable water supply will be provided from Phase 1 of the wider development. There are existing public water mains to the north and south of the site, which could be used during the construction subject to Irish Water approval.

2.6.1.8 Noise & Vibration

Chapter 10 of this EIAR and Section 6.8 of the CEMP, provides details of the mitigation and monitoring measures during construction, to ensure that noise and vibration will not result in significant impacts on the local area. Noise and vibration levels will comply with the following guidance.

- BS 5228-1: 2009+A1:2014 Code of Practice for Noise Vibration Control on Construction and Open Sites: Noise;
- BS 5228-2: 2009 Code of Practice for Noise and Vibration control on Construction and Open Sites: Vibration;

- Environmental Protection Agency Act 1992 Sections 106-108, Local Authority's specific requirements depending on the location of the site, and
- Safety, Health and Welfare at Work (Control of Noise at Work) Regulations 2006 SI 371 (2006).

2.6.1.9 Dust & Air Quality

To ensure that adverse air quality impacts are minimised during the construction phase and that the potential for soiling of property and amenity and local public roads is minimised, Section 6.9 of the CEMP and Chapter 12 of this EIAR (Air Quality and Climate) includes a suite of mitigation measures which will be implemented during all construction activities. These include.

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.
- Wetting agents will be utilised to provide a more effective surface wetting procedure.
- Material stockpiles containing fine or dusty elements including top soils will be covered with tarpaulins.
- Dust netting and site hoarding shall be installed along the north, south, east, and western site boundaries to minimise fugitive windblown dust emissions falling on third party lands and existing residential areas.
- The implementation of a Dust Management Plan (Appendix 12.3 of this EIAR) which includes a regime for monitoring dust levels in the vicinity of the site.

2.6.1.10 Waste/Hazardous Waste Management

The appended CDWMP (Appendix 2-2), provides full details of all waste management procedures and monitoring measures during the construction phase. The waste management strategy for the proposed development will be in accordance with guidance in the EU Waste Directive which outlines that waste prevention and minimisation are the first priority in managing wastes, followed by waste reuse and recycling with disposal being considered as a last resort.

Waste minimisation measures will be implemented during construction, and Waste Audits will be undertaken by the Contractor during construction stage which will monitor the amount, nature and composition of the waste generated on the site. The Waste Audit will examine the manner in which the waste is produced and will provide a commentary highlighting how management policies and practices may inherently contribute to the production of demolition waste.

2.6.1.11 Protection of Existing Trees

Protective barriers will be installed around trees to be retained prior to the commencement of works on site. The locations of all tree protection barriers will be as shown on the Tree Protection Plan (TPP) prepared by Cunnane Stratton Reynolds and as per BS5837. These barriers will remain in place for the duration of the works.

2.6.1.12 Protection of Existing Stone Grotto

As described in detail in EIAR Chapter 11 (Cultural Heritage), there is an existing stone grotto in the southeastern area of the site, which is of cultural significance, given the sites relationship and proximity to Ashbourne House and Gardens to the east. A Conservation Method Statement prepared by John Cronin & Associates (Appendix 11.3) accompanies this EIAR and the construction methods protecting the presence of the grotto is detail in Section 4.5 of the CEMP. These mitigation measures are also listed in Chapter 15 of this EIAR.

2.6.1.13 Invasive Species

An Invasive Alien Plant Species (IAPS) Survey has been undertaken of the subject site (May 2021), Appendix 9-3 of this EIAR refers. A number of non-native invasive plant species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (i.e. species of which it is an offense to disperse, spread or otherwise cause to grow in any place) are present at the site. As recommended in the IAPS report, prior to and following commencement of the proposed development, the recommended invasive species treatment plan will be implemented.

2.6.1.14 Health and Safety

All construction works will be carried out under appropriate supervision. Works will be carried out by experienced contractors using appropriate and established safe methods of construction. All requirements arising from statutory obligations including the Safety, Health and Welfare at Work Act and associated regulations will be met in full. The Contractor must also comply with all guidelines and procedures in accordance with IÉ specification documents. All site works to be completed as per the Safety, Health and Welfare at Work (Construction) Regulations 2013. All personnel working on site must have a valid Safe Pass card and have completed PTS training.

2.6.1.15 Covid 19 Protocols

The latest Construction Industry Federation (CIF), Covid-19 safety protocols will be enforced in relation to all construction activities on site.

2.6.2 Operational Phase

Once operational it is expected that the proposed development will result in long-term positive impacts for Glounthaune and the local area. The proposed development will result in the provision of an additional 289 no. residential units at a location with unique access to high capacity and frequency public transport opportunities. The proposed development will contribute to an increase in population which can support public transport services and local businesses in the general area including Glounthaune, Glanmire, Little Island and Carrigtwohill. The proposed creche and commercial/community units will provide a diversification to the existing economy and childcare provision of Glounthaune. It is expected that the sites location, adjacent to the new greenway will result in a greater uptake of walking, cycling and public transport opportunities, underpinning national, regional and local planning objectives to improve sustainable modes of transport and reducing dependency on the private vehicle. It is considered that the proposed development is of an appropriate scale, form and quality that can make a significant positive contribution to the settlement and Metropolitan Cork into the future.

2.7 CONCLUSION

The primary direct significant environmental effects will arise during the Construction Phase. The Operational Phase of the proposed Project is not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on human beings, flora and fauna, soils, water, air and climate. The primary likely significant environmental impacts of the Operational Phase as a result of the proposed Project are fully addressed in the relevant specialist chapters of this EIAR

The proposed Project also has the potential for cumulative, secondary and indirect impacts (i.e. traffic) and can be difficult to quantify due to complex inter-relationships. However, all interactions and cumulative impacts are unlikely to be significant and have been addressed in the content of this EIAR document.

Each Chapter of the EIAR includes a cumulative impact assessment of the proposed development with other planned projects in the immediate area. The potential cumulative impacts primarily relate to traffic, dust, noise and other nuisances from the construction of the development, with other planned or existing projects, and each of the following EIAR chapters has regard to these in the assessment and mitigation measures proposed.

2.8 REFERENCES

www.cyclehoop.com

www.cso.ie

<https://www.corkcoco.ie/en/planning/traffic-transport/statutory-processes>

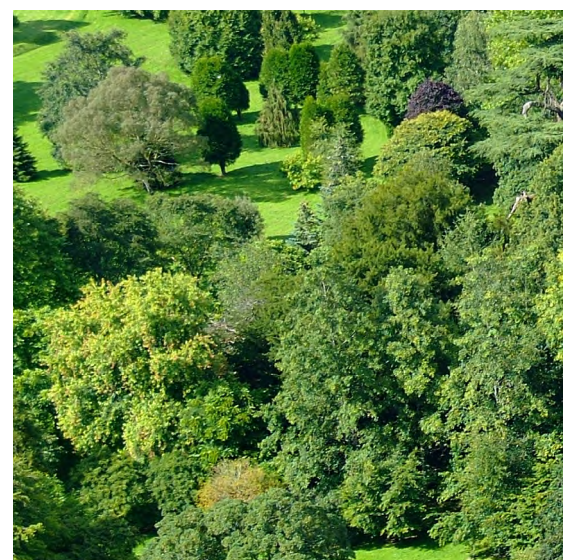
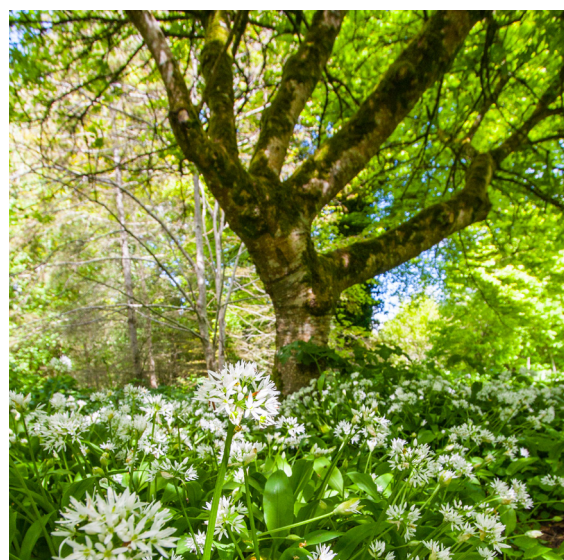
<https://www.corkcoco.ie/en/planning/planning-enquiry-online-submissions>



LACKENROE SHD

CHAPTER 3

Alternatives Considered



VOLUME II | EIAR

LACKENROE SHD

CHAPTER 3

Alternatives Considered

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3 Alternatives Considered

3.1 INTRODUCTION

3.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS Arts, MA Regional and Urban Planning, MIPi), Director at HW Planning. Harry has 22 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 the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

3.1.2 Chapter Context

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.

The purpose of this Chapter is to assess the reasonable project alternatives throughout the design and consultation phases of the project, taking into account and comparing environmental effects and illustrating how the final proposed layout has been arrived at.

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.”

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.**”*

Pursuant to section 3.4.1 of the Draft 2017 EPA Guidelines, the consideration of alternatives also needs to be cognisant of the fact that “in some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant 'alternative location'...”

Further the Draft 2017 Guidelines are also instructive in stating:

“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'”.

This chapter provides an outline of the main reasonable 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.

3.2 ALTERNATIVE LOCATIONS

Regarding alternative locations, Section 3.4.1 of the Draft 2017 EPA Guidelines, recognise that 'some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant 'alternative location'...'. Section 3.4.1 of the Guidelines continues stating.

“Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR...”

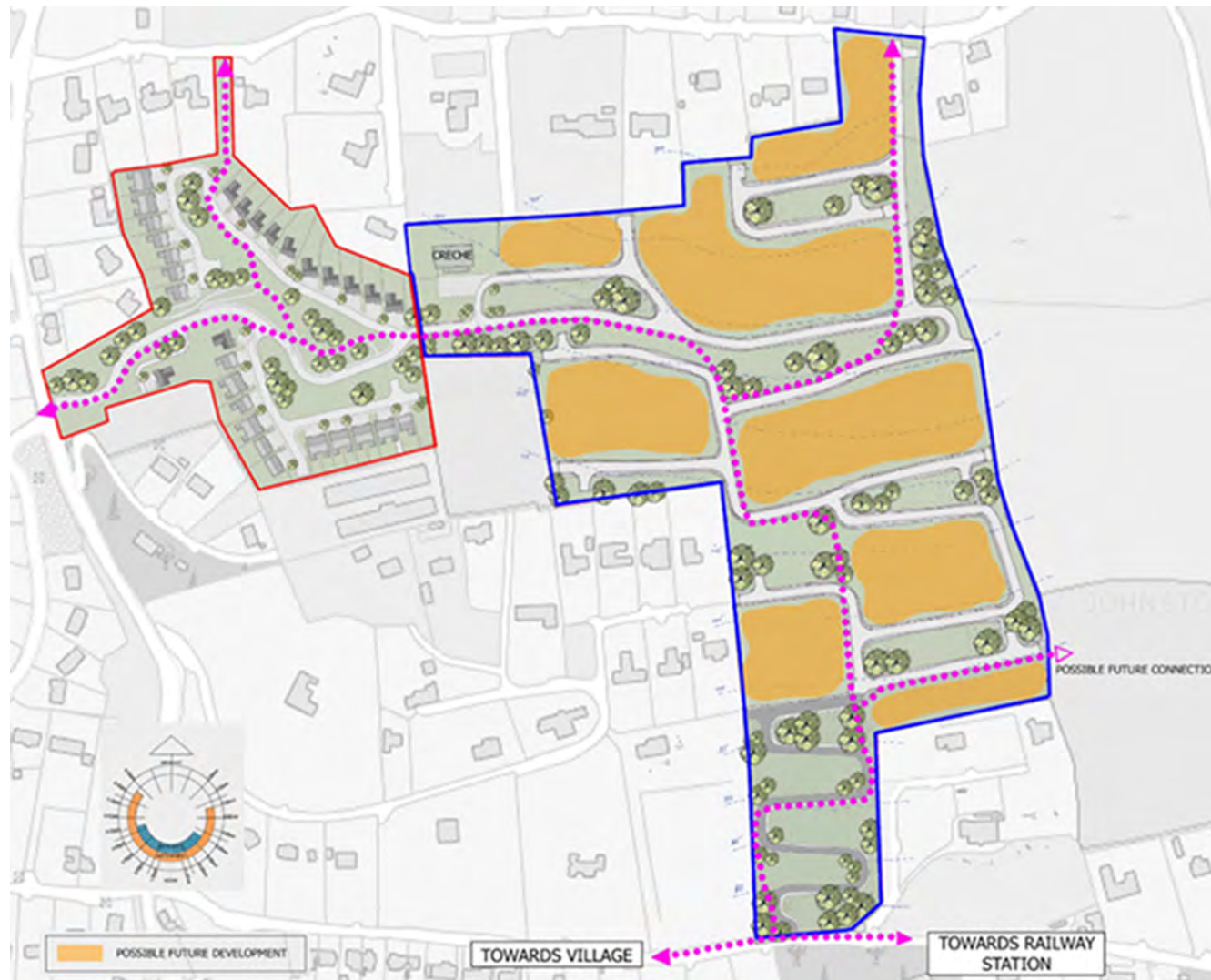
“.....It should be borne in mind that the amended Directive refers to 'reasonable alternatives... which are relevant to the proposed project and its specific characteristics'”.

The subject lands are situated within the 'Settlement Boundary' of Glounthaune as defined in the currently adopted Cobh Municipal District Local Area Plan and are the only lands within the settlement in the current ownership of Bluescape Limited. The proposed development represents the second phase and realisation of a masterplan for residential development at the wider lands. Permission was previously granted by Cork County Council at the lands immediately northwest of the site, subject to Cork Council Planning Reference 17/5699 for the.

“Construction of residential development of 40 no. 2 storey dwelling houses and all ancillary site development works. The proposed development consists of the provision of 20 no. 4 bedroom detached houses, 10 no. 3 bedroom semi-detached houses and 10 no. 4 bedroom semi-detached houses. The proposed development makes provision for the upgrade of the Knockraha road and access to the proposed development will be via a proposed signalised junction with Cois Chuain, with a pedestrian access to the country road to the north of the site.”

The decision to grant permission was then appealed by third parties to An Bord Pleanála (ABP Reference 300128-17) who upheld the Councils decision to grant permission. 300128-17 has subsequently been amended by planning references 18/6312 and 20/5864. Permission currently exists for 38 no. dwelling houses in Phase 1 and construction has recently commenced on the permitted dwellings. The initial indicative 'Lackenroe Masterplan', submitted in 17/5699 is illustrated in figure 3.1 as shown.

Figure 3.1 Lackenroe Masterplan - Planning Reference 17/5699



The 2017 Cobh Municipal District Local Area Plan and current Cork County Development Plan 2014, which are the two current statutory enforced plans for Glounthaune, have 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 in a sensitive landscape. The subject lands are situated within the 'Settlement Boundary' of Glounthaune as defined in the currently adopted Cobh Municipal District Local Area Plan.

A portion of the site to the south of 'the Terrace' was formerly within Ashbourne Garden and is considered to be within the curtilage and attendant grounds of Ashbourne House, which is a Protected Structure. As detailed in this chapter, the utilisation of these lands to provide dedicated pedestrian/cyclist connectivity to Glounthaune train station and village core is considered to be the only deliverable alternative.

3.3 DO-NOTHING ALTERNATIVE

The 'do-nothing' alternative would result that serviced and zoned greenfield lands within the defined settlement boundary of Glounthaune would remain undeveloped and remain in agricultural use. The 'do nothing' scenario would also result that the proposed public realm upgrades to the Terraces would not take place.

In the long term, the site remaining in agricultural use would result that the site would retain its agricultural functions. The southern land parcel, some existing trees which are coming towards the end of their natural lifetime will likely not survive, resulting in a loss of tree cover. The lands remaining undeveloped would result in the potential spread of invasive species across the southern site would result in negative biodiversity and landscape impacts.

A "do-nothing" scenario is considered to represent an inappropriate, unsustainable and inefficient use of these serviced residential zoned lands which are within the defined settlement boundary of Glounthaune.

3.4 ALTERNATIVE USES

The subject lands are identified specifically as being within the 'Existing Built-up area' zoning objective of Glounthaune in the 2017 Cobh Municipal District Local Area Plan. Regarding these areas, Objective ZU 3-1, of the Cork County Development Plan 2014 aims to;

'Normally encourage through the Local Area Plan's development that supports in general the primary land use of the surrounding existing built up area. Development that does not support, or threatens the vitality or integrity of, the primary use of these existing built-up areas will be resisted.'

The various land-uses in the vicinity of the site largely consists of undeveloped agricultural lands, individual residential properties and residential developments such as 'Cois Chuain', 'The Highlands' 'Thornberry', 'The Woods' and 'Harpers Creek'. The southern areas of the site are situated adjacent to existing mixed-uses in the village of Glounthaune including a residential apartment complex, Fitzpatrick's shop and the Great O'Neill pub. The southern area of the site is also situated adjacent to the recently constructed 'Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune' greenway permitted through the Part 8 process by Cork County Council. The greenway/cycleway links the southern area of the site with Glounthaune train station to the southeast of the lands.

The proposed residential development with ancillary childcare, community and commercial units is consistent with the existing character and land uses in the sites immediate vicinity and the provisions outlined in Objective ZU 3-1. It is not considered appropriate to provide land-uses such as high-intensive employment or industrial development in the sites immediate context. It is also considered that an alternative consisting of only open space, recreation, community or education uses would reflect an inefficient use of serviced lands within the development boundary of the Glounthaune. It is considered that residential use represents the most efficient use of the lands, due to the sites location proximate to a high frequency public transport link to urban and employment centres in the area. In this context, the proposed residential development with associated childcare and community spaces and a commercial unit fronting onto Johnstown Close comprises the most appropriate land-use alternative and is in accordance with the proper planning and sustainable development of the area.

3.5 ALTERNATIVE LAYOUTS

A comprehensive overview of the various Alternative Layouts and proposals is contained in this chapter. The minutes of the various Section 247 discussions which took place with Cork Council are appended in Appendix 3-1. Site Constraints studies prepared by AECOM are included in Appendix 3-2 of this EIA which detail how the detailed design of the proposed layout has responded to the sites specific challenges and characteristics.

3.5.1 Alternative A – Section 247 Meeting 1 - September 2018

Following An Bord Pleanála's decision to grant permission for Phase 1 (Reference: 300128-17) in May 2018, Bluescape Limited submitted a request to Cork County Council for consultations in accordance with Section 247 of the Planning and Development Act, 2000. A Section 247 meeting took place on 20th September 2018 regarding a proposed scheme of 234 no. residential units at the land parcel to the north of the Terrace only. Alternative A reflected a density of 30.2 units per hectare of developable site area (7.75 hectares) and 20.3 units per hectare of gross site area (11.5 hectares). Key aspects of the original layout included.

- Due to the existing topography of the lands a linear settlement pattern was adopted to reduce cut and fill across the site and retain as many original hedgerows as possible.
- Dwellings were orientated to passively survey open spaces and limit overlooking into neighbouring properties.
- North-South and East-West pedestrian links were created to promote effective circulation and promote permeability within the scheme.
- The layout divided into separate character areas with the northern areas most distant from the train station and village core generally reserved for 3/4 bedroom semi-detached/detached dwellings. A gradual increase in density was proposed with a four-storey apartment building proposed in southern most developable area of the site.
- An indicative pedestrian path was provided linking the site to the Terrace to the south. It was established from detailed surveys, that due to levels vehicular access from the Terrace to the northern areas of the site was not feasible. Vehicular access to the site would instead be provided via the signalised junction permitted in Phase 1.
- A detailed engineering study of 'The Terrace' concluded that the space available is too narrow (approx. 6m) to provide a continuous footpath from the southern boundary of the site to connect to existing footpath network at Johnstown Close.
- At this stage, the development did not include the land parcel to the south of the Terrace and referenced potential future upgrades to the Terrace including a shared surface treatment to create a pedestrian priority zone and slow vehicular traffic.

Figure 3.2 Alternative A Layout



Figure 3.3 Alternative A – Southern Access



Figure 3.4 Alternative A Statistics

Item	Statistic
Total Site Area	11.5Ha
Residential Developable Area	7.75Ha
No. of residential units	234no
Residential Density	30.2UPH
Housing Mix	210no Houses & 24no Apartments
Public Open Space (Residential Area)	12% Usable
Crèche	60no child crèche
Other Uses	N/A
Access to Residential Development	Vehicle From the west via Phase 1 and the signalised junction that was permitted under application references 17/5699 and ABP 300128-17 Pedestrian/cyclist 1) via phase 1 2) link in the north east corner onto the L-2969 3) onto The Terrace

3.5.2 Alternative B – Tripartite Meeting - June 2019

Alternative B consisted of a residential development of 301 no. residential units (151 no. dwelling houses and 150 no. apartments), reflecting a density of 32.1 units of the developable site area. The evolution of the layout from Alternative A focussed on four principal elements, specifically.

1. Pedestrian & Cycle Connectivity
2. Character Areas
3. Community Facilities
4. Visual Impact/ Response to Site Topography

Figure 3.5 Alternative B Layout



Figure 3.6 Alternative B Statistics

Item	Statistic
Total Site Area	12.27Ha
Residential Developable Area	9.37Ha
No. of residential units	301no
Residential Density	32.1UPH
Housing Mix	151no Houses & 150no Apartments
Public Open Space (Residential Area)	12% Usable
Crèche	60no child crèche
Other Uses	Community Hall forms part of the crèche building
Access to Residential Development	<p>Vehicle From the west via Phase 1 and the signalised junction that was permitted under application references 17/5699 and ABP 300128-17</p> <p>Pedestrian/cyclist 1) via phase 1 2) link in the north east corner onto the L-2969 3) onto The Terrace - Upgrades works proposed to The Terrace in order to provide connectivity to the existing train station</p>

1. Pedestrian & Cycle Connectivity

Permeability within the development was greatly enhanced with the inclusion of a central walkway running north/south through the centre of the site. This route interacted with the different open spaces within the development. A 2 metre wide ramped walkway (along with a more direct stepped route), connected the southern part of the scheme with 'The Terrace' which in turn provided connectivity to Glounthaune train station. By focusing on pedestrian/cyclist mobility within the scheme the layout has naturally become significantly less car orientated.

Alternative B also included works to the local road network and specifically, the Terrace and Johnstown Close, achieving dedicated pedestrian/cyclist connectivity to the train station and village core to the south. Due to the narrow road widths of the Terrace, it was concluded it was not possible to provide separate footpaths and cycle lanes from the site while also retaining the current two-way traffic system in the area. In order to achieve pedestrian and cyclist connectivity between the site and the village/train station the proposed development included the following works to the Terrace which were included within the red line boundary.

- The introduction of a partial one-way eastbound traffic system along the Terrace to accommodate for a continuous footpath to join with the existing footpath network to the southeast at Johnstown Close.
- A designated contra-flow westbound cycle lane from the junction of Johnstown Close and the Terrace to the southern cycle/pedestrian entrance of the site.
- A vehicular speed limit of 30km/h to be enforced.
- The installation of appropriate public lighting, signage, road marking and road surfacing treatments to prioritise cyclists and pedestrians over vehicles.
- An overview of the previously proposed works to the Terrace and Johnstown Close is illustrated in Figures 3.7 - 03.11 as shown.

Figure 3.7 Alternative B - Internal Connectivity Strategy



Figure 3.8 Alternative B - One way traffic system and contra flow cycle lane on the Terrace

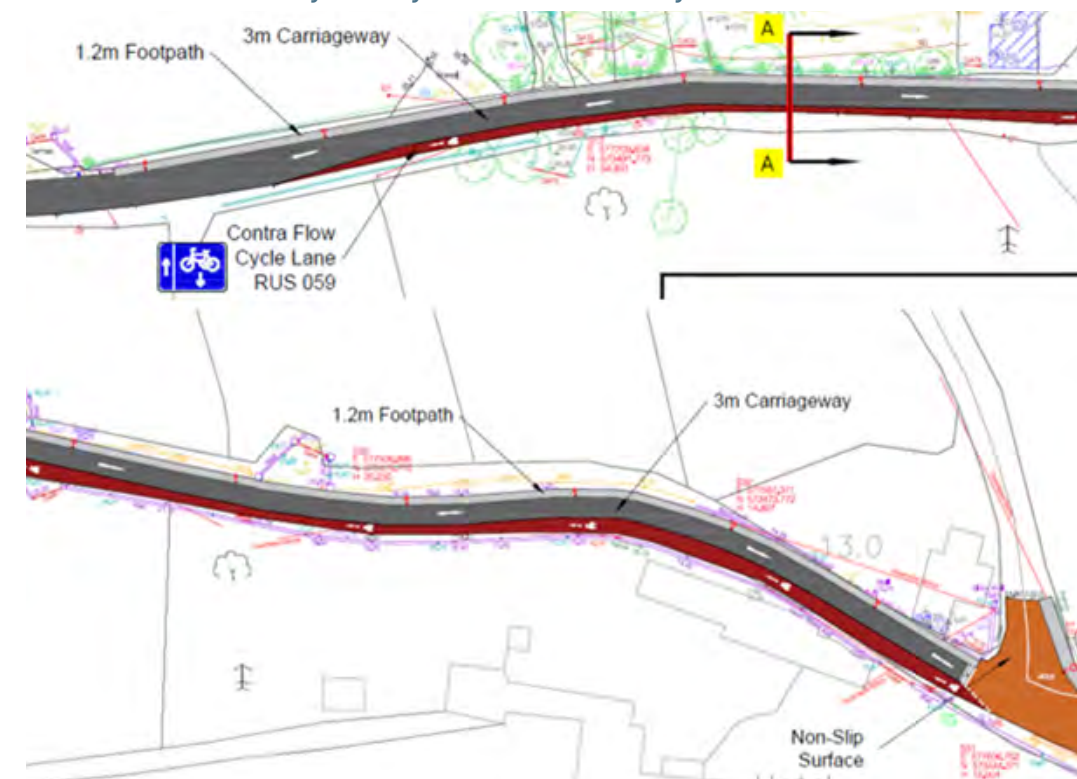


Figure 3.9 Alternative B - Cross Section of footpath, one way traffic system and contra flow cycle lane on the Terrace proposed at Tripartite Meeting stage.

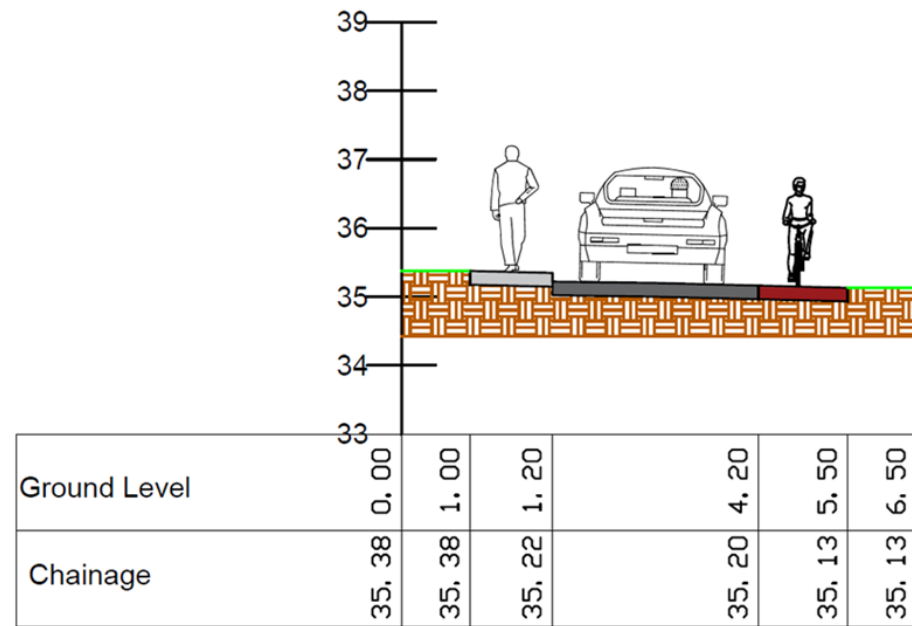


Figure 3.10 Alternative B - Junction of Johnstown Close and The Terrace

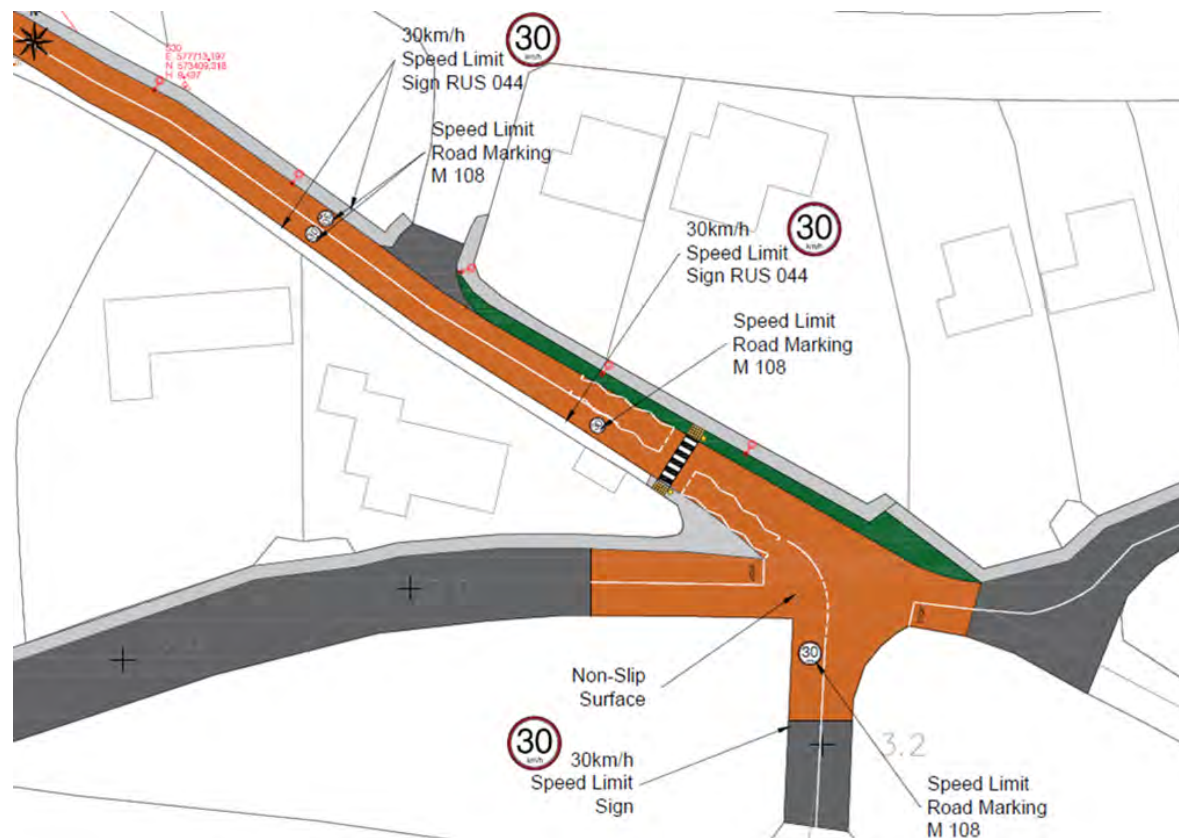
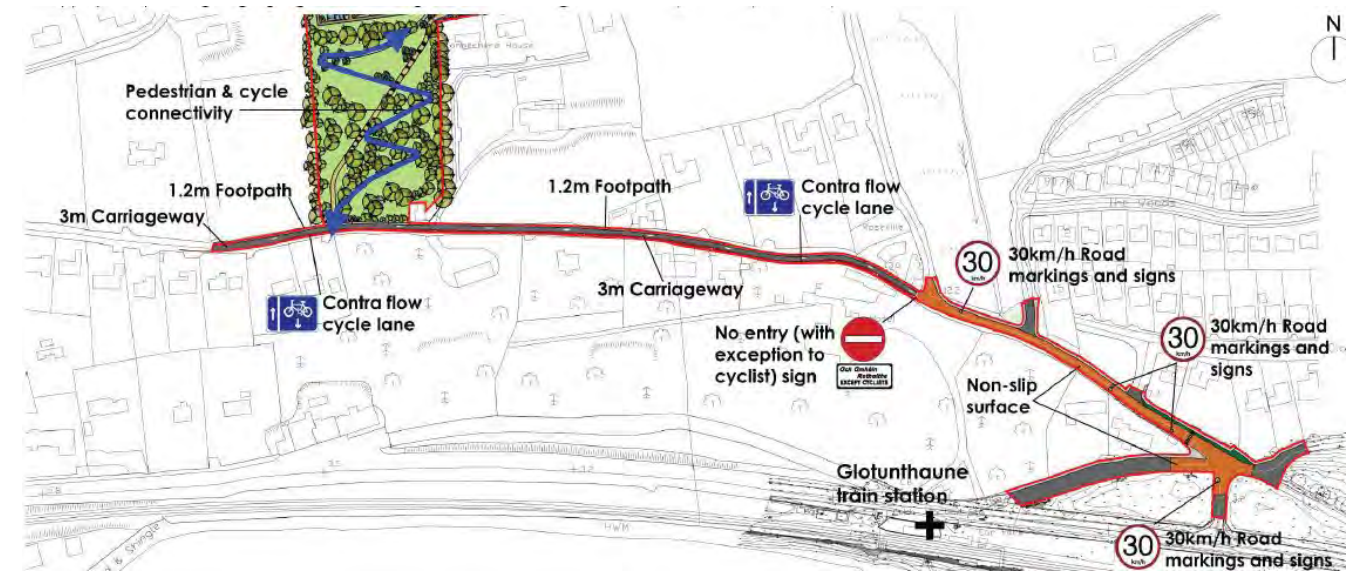


Figure 3.11 Alternative B - Overview of proposed works to the Terrace and Johnstown Close.



2. Character Areas

Alternative B proposed for 4 no. distinct character areas, which evolved naturally around the primary open spaces. Density, scale, open space landscaping and the choice of building materials all contributed to the creation of separate character areas within the overall scheme.

3. Community Facilities

In order to provide facilities that will benefit future residents of the wider community, a community hall/space was introduced at ground floor level of the proposed creche building at the north-western corner of the site, adjacent to the site entrance from phase 1.

Figure 3.12 Alternative B - Creche/Community Unit Site Plan



4. Visual Impact/ Response to Site Topography

A comprehensive visual impact assessment was prepared which influenced the project design and strategy of the proposed development. The locations of buildings and detailed landscaping proposals sought to ensure that the proposed development successfully integrated with the sites local and wider contexts. The positioning and levels of the proposed dwellings were adjusted to appropriately reflect the sites topography and setting in the landscape and to reduce cut and fill levels from previously proposed in Alternative A.

3.5.3 Alternative C – Section 247 Meeting 2 - May 2021

Following receipt of the Boards Opinion in July 2019 (Reference ABP-304468-19), it was recognised that proposals to the Terrace and Johnstown Close described in Alternative B would not be accepted, and that a revised pedestrian/cyclist connectivity strategy for the development would be required. It was also acknowledged that the undeveloped lands immediately south the site and north of Johnstown Close would represent the most direct route from the site to the village core/train station. It was subsequently decided that the feasibility for the inclusion of the additional lands should be investigated as an alternative to provide pedestrian and cycle connectivity to satisfy natural desire lines to the south.

Bluescape Limited subsequently reached an agreement with the landowner to the south regarding the acquisition of these lands, which would form part a revised development strategy for the wider development. The inclusion of the additional lands within the development represents an opportunity for a more practical and deliverable solution in achieving sustainable connectivity than previously proposed. Following confirmation that the additional lands (southern parcel) were to be included within the revised layout, the feasibility of the design of a dedicated pedestrian route though the site was investigated.

It was established that any pedestrian route proposed would need to abide by several core principles including:

- The proposed route and form of the path should be easily accessible, attractive, and safe for future users. The path should also satisfy natural 'north-south' desire lines from the site to the village core and train station.
- The route should respond to the sites existing terrain and topography. The route and form of the path should not only provide future residents with connectivity to the south but also minimise cut and fill across the site and the loss of high specimen trees.
- Any proposal would need to provide a safe crossing of the Terrace for pedestrians and cyclists and deliver necessary public realm upgrades to address any potential conflicts between motorists, pedestrians, and cyclists.
- The route will need to be useable and accessible to people of all ages and abilities and consistent with Part M and Universal Access requirements.
- The proposed route will need to compliment the wider pedestrian/cycle connectivity network in Glounthaune. The route will need to reflect the recent delivery of the new 'Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune' greenway on Johnstown Close to the south, and positively contribute to the wider pedestrian/cycle network in Glounthaune.
- The route will need to benefit from sufficient passive supervision from proposed residential units to ensure its usability and attractiveness as a viable connection to the village core and train station.
- The proposed path and layout of the southern parcel has to be respectful of the sites setting within the attendant grounds of Ashbourne House which is defined as a Protected Structure in the Cork County Development Plan 2014.
- A second Section 247 meeting subsequently took place in May 2021 regarding the development consisting of 306 no. residential units and 2 no. commercial units provided across both land parcels, with the northern parcel providing 277 no. residential units and 67 no. child creche. The southern parcel included 5 no. dwelling houses fronting onto the Terrace with a 4-storey mixed-use building provided on Johnstown Close and greenway to the south with 2 no. ground floor commercial units and 24 no. apartments.

Figure 3.13 Alternative C Layout



Figure 3.14 Alternative C Statistics

Item	Statistic
Total Site Area	12.69Ha
Residential Developable Area	8.7Ha
No. of residential units	299no (297no plus 2no replacement units)
Residential Density	34.1UPH (297÷8.7)
Housing Mix	219no Houses & 80no Apartments
Public Open Space (Residential Area)	10% Usable
Crèche	67no child crèche
Other Uses	1no Community unit & 1no Commercial unit
Access to Residential Development	<p>Vehicle From the west via Phase 1 and the signalised junction that was permitted under application references 17/5699 and ABP 300128-17. There is also a temporary emergency vehicle access with flexible bollards in north-east corner</p> <p>Pedestrian/cyclist 1) via phase 1 2) link in the north east corner onto the L-2969 3) from Johnstown Close/The Terrace with a link to the existing train station</p>

The evolution of the layout was focussed on six principal elements, specifically.

1. Site Layout - Sustainable Communities
2. Site Layout - Street Hierarchy/Wayfinding
3. Site Layout - Crèche relocation/Central feature
4. Connectivity - Additional lands
5. Connectivity - Landscape strategy
6. Connectivity - Urban edge

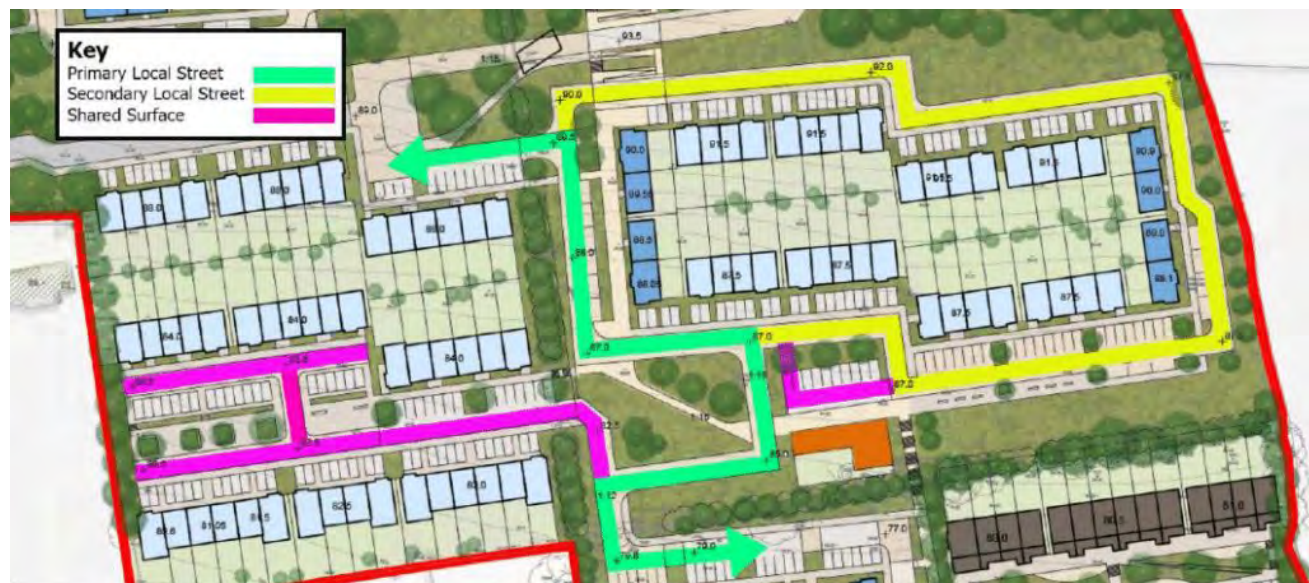
1. Site Layout - Sustainable Communities

To promote sustainable communities within the scheme, Alternative C provided for an increased emphasis on inclusivity within the layout. This was achieved by the introduction of tighter clusters of residential units that would naturally become established neighbourhoods over time. By further enhancing permeability and arranging units to overlook the public open spaces that are provided throughout the site, social interaction and a sense of ownership amongst residents were strongly promoted.

2. Site Layout - Street Hierarchy/Wayfinding

By establishing a clear street hierarchy (Primary local Streets, Secondary Local Streets & Shared Surfaces), and providing looped systems a clear and logical wayfinding strategy was established. This was further enhanced by the inclusion of varied street widths and parking formations which created distinctive and recognisable spaces.

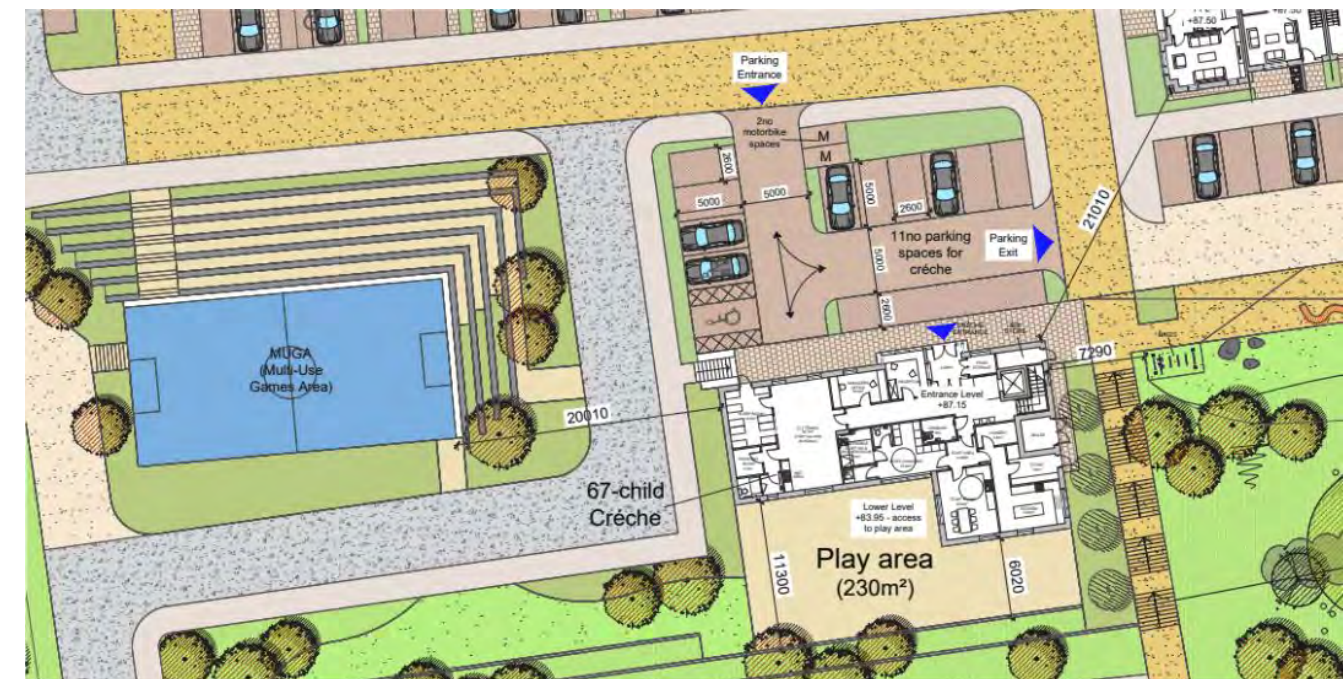
Figure 3.15 Alternative C - Site Plan Extract - Showing Street Hierarchy Strategy



3. Site Layout - Crèche relocation/Central feature

As the design strategy for the scheme continued to evolve, the position of the crèche was reassessed. Given the introduction of the pedestrian/cycle route and that higher density apartments/duplex units were proposed in the southern land parcel closer to the train station, Alternative C proposed to relocate the crèche to a more central location in the site. The proposed location of the crèche adjacent to a newly proposed Multi-Use Games Area (MUGA) resulted in a prominent central node within the site representing a communal destination point for future residents and visitors.

Figure 3.16 Alternative C - Site Plan extract - showing the relationship between the relocated crèche and the MUGA



4. Connectivity - Additional lands

The revised connectivity strategy for the site provided for a continuous and universal accessible, 2 metre pedestrian path through the site which would then join with the new greenway to the south at Johnstown Close. A pedestrian crossing on the Terrace would also be provided. Due to the challenging site levels and existing ground conditions, the route and form of the universal accessible path meandered through the site, with a more direct stepped path also provided for able bodied users.

The design and route of the proposed path was guided by an assessment of the existing topography and extensive ecological and arboricultural surveys, which established the locations of mature trees and corresponding root protection zones (RPZ's). A priority of the path design was to ensure that any tree loss in this area of the site will be offset by significant tree planting elsewhere across the wider development.

Alternative C represented a significant improvement from previous alternatives as it afforded pedestrians with a more convenient and direct pedestrian connection to the village core/train station and linked with the new greenway on Johnstown Close. The direction of pedestrians through the southern land parcel also addressed the Planning Authority's previous concerns, regarding potential conflicts between pedestrians and motorists on the Terrace.

Figure 3.17 Alternative C - Site Plan extract - showing southern land parcel and initial path alignment



5. Connectivity - Landscape strategy

The Alternative C Landscape Strategy sought to mitigate any tree removals necessary to deliver the pedestrian path, by providing generous amounts of replacement planting throughout the site. The connectivity and landscape strategies throughout all alternatives have been directly linked and it is considered the sites high quality natural features are a significant asset to the wider development strategy of the lands.

6. Connectivity - Urban edge

Alternative C proposed new four storey mixed-use building facing Johnstown Close which would serve as a landmark entry point to the site from the village core to the south. The proposed building reflected the scale of the existing apartment building to the west and contributed to a stronger urban streetscape and urban edge. Alternative C proposed the building included 2 no. commercial units at ground floor level and 24 apartments at the ground and upper floors. The proposed apartment building also provided for higher density residential development at the area of the site most proximate to the greenway, village core and train station.

3.5.4 Alternative D – Section 247 Meeting 3 - July 2021

In their assessment of Alternative C, the Planning Authority noted improvements relating to the revised connectivity strategy through the southern lands. However, it was advised that greater detail regarding the deliverability of the pedestrian path through the southern lands was necessary and that dedicated cycle connectivity should also be accommodated within the scheme to link the greenway.

The design team reviewed the recommendations of the Planning Authority and developed revised proposals (Alternative D) which were discussed at a third Section 247 meeting which took place on 29th July 2021. Alternative D comprised a development of the construction of 299 no. residential units with creche and commercial/community units in the southern apartment building.

Figure 3.18 Alternative D Layout



Figure 3.19 Alternative D Statistics

Item	Statistic
Total Site Area	12.69Ha
Residential Developable Area	8.7Ha
No. of residential units	306no
Residential Density	35.1UPH (306÷8.7)
Housing Mix	222no Houses & 84no Apartments
Public Open Space (Residential Area)	10% Usable
Crèche	67no child crèche
Other Uses	N/A
Access to Residential Development	<p>Vehicle From the west via Phase 1 and the signalised junction that was permitted under application references 17/5699 and ABP 300128-17</p> <p>Pedestrian/cyclist 1) via phase 1 2) link in the north east corner onto the L-2969 3) from Johnstown Close/The Terrace with a link to the existing train station</p>

The evolution of the layout from previous alternatives was focussed on six principal elements, specifically.

1. Path Re-Alignment
2. Separation Distance
3. Replacement Dwellings & Passive Surveillance
4. The Terrace Upgrades
5. Emergency Vehicle Access
6. Community Space

1. Path Re-Alignment

The proposed 2 metre path/walkway within the southern land parcel was realigned with the goal of enhancing tree retention and the provision of greater supervision from the southern apartment building and dwellings to the north. The realignment of the path resulted in the added benefit of the creation of a biodiversity area in the southwestern corner of the site, which could accommodate tree/shrub planting, enhancing the biodiversity and natural environment of the area.

The revised path route was informed by a detailed assessment of the sites existing natural features, including site levels, ground conditions and the presence of existing trees and RPZ's of high specimen trees. A detailed assessment of the site-specific constraints in this area of the site is detailed in the Site Constraints reporting prepared by AECOM attached in Appendix 3-2 of this EIAR.

The revised path reflected a more practical and deliverable solution than previously proposed in Alternative C. The path route has been rationalised further and is situated within the 'built envelope' of the southern site, benefiting from passive surveillance from the 5 no. dwellings to the north and apartment building to the south. This reflects that Alternative D represented a safer and more conducive environment for residents and visitors than previously proposed

Figure 3.20 Alternative C v Alternative D Southern Path Route



2. Separation Distances

Alternative D provided for increased separation distances between proposed dwellings and the eastern/western boundaries of the northern site. This was prioritised specifically for the purposes of the retention of existing vegetation and hedgerows and increased setbacks from existing dwellings in the vicinity. The existing trees/ hedgerows are a unique feature of the site and will offer a valuable visual amenity for residents.

Figure 3.21 Alternative D – Increased Separation Distances to Site Boundaries



3. Replacement Dwellings & Passive Surveillance

Alternative D provided for the introduction of 2 no. replacement bungalow dwellings in the southern areas of the northern parcel to provide additional passive surveillance of the 2 metre walkway. Historically, there were 2 no. houses located on this part of the site. One of these has already been demolished while the other remains in the form of a derelict structure, which is it proposed to demolish. The 2 no. replacement units have been positioned at similar locations as the previous dwellings to avoid any impact on the existing natural features in this area of the site. Along the full length of the proposed walkway, buildings have been carefully designed to overlook this public amenity creating a safe environment for the future residents and visitors to the site.

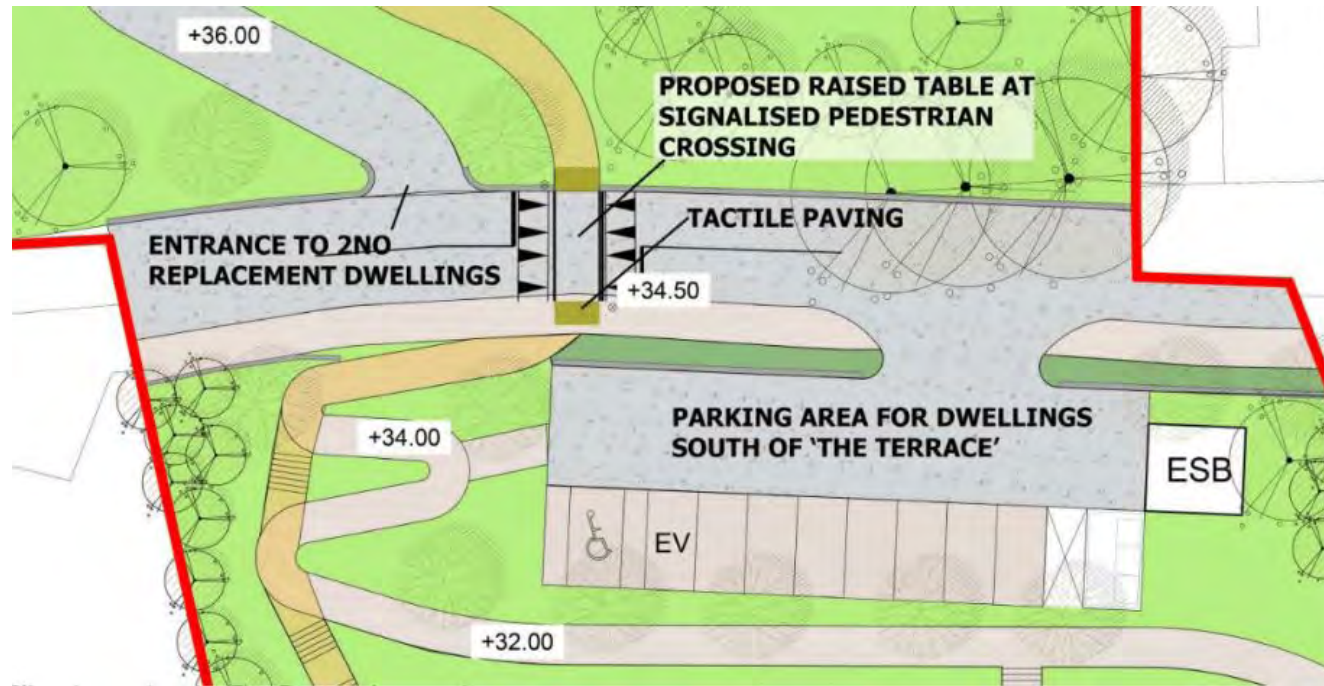
Figure 3.22 Alternative D - passive surveillance of walkway north & south of 'The Terrace'



4. 'The Terrace' Upgrades

Alternative D included a raised pedestrian crossing and traffic calming measures to 'The Terrace' which will enable residents and visitors to safely access the amenities and train station to the south.

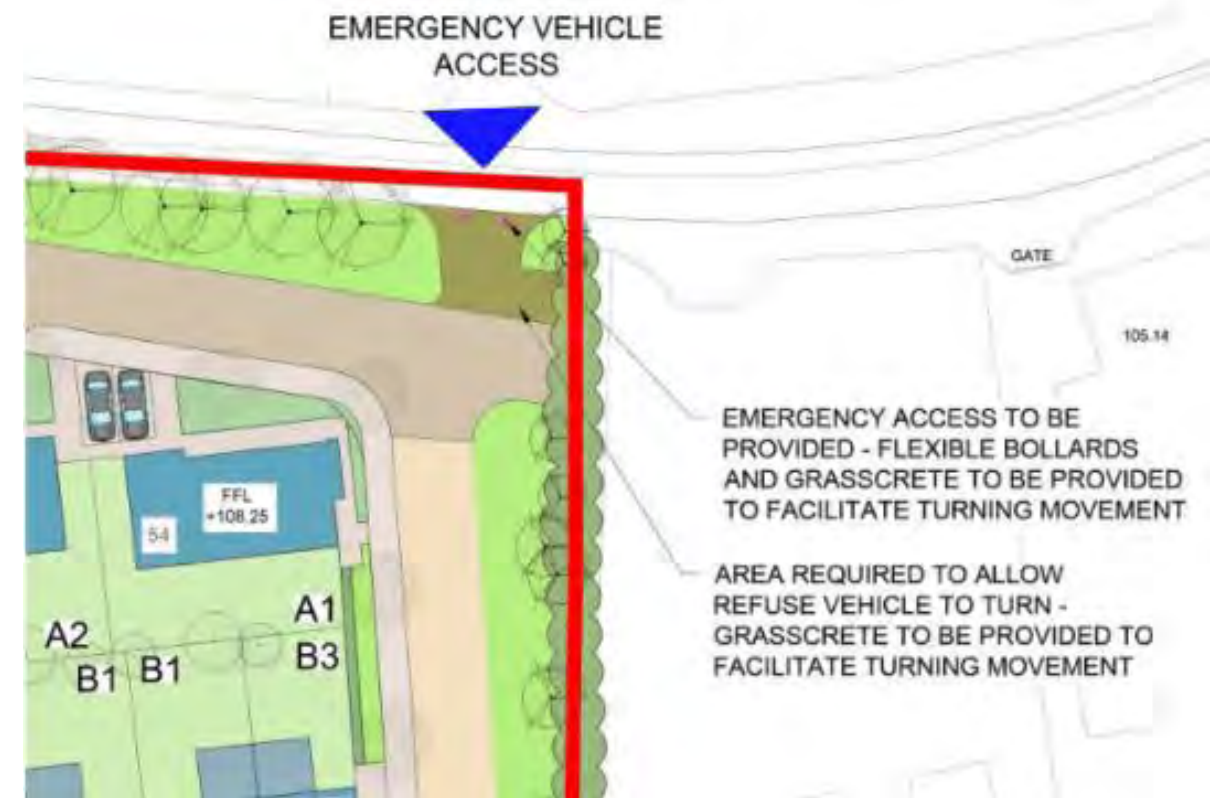
Figure 3.23 Alternative D - The Terrace Upgrades



5. Emergency Vehicle Access

To ensure that there are multiple site access options for emergency vehicles, an additional emergency access with flexible bollards has been added from the public road (L-2969) to the north of the site. This ensured that along with the main vehicle access from the west (via Phase 1), that there will be 2 no. entry points for emergency vehicles, in the event additional access is needed.

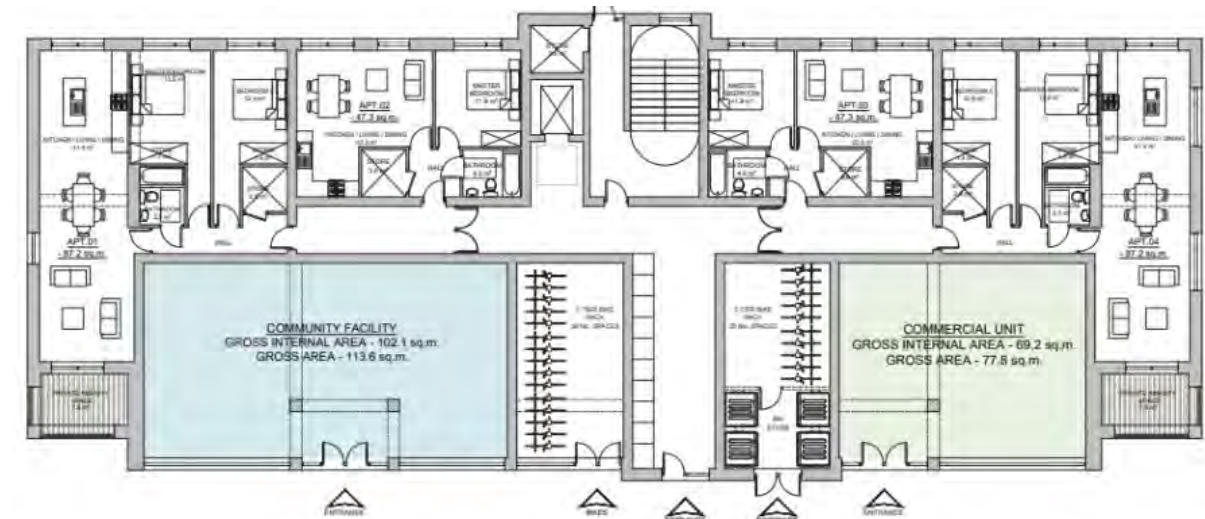
Figure 3.24 Alternative D - Emergency Access



6. Community space

Alternative D provided for a flexible community space at ground floor level of the proposed apartment building fronting onto Johnstown Close. The community space will benefit both future residents as well as the wider community of Glounthaune. It is considered the proposed location of the community and commercial units fronting onto Johnstown Close represents the most appropriate location for these uses, as a mixed-use development will consolidate the existing village core of the settlement and provide active uses fronting onto the greenway.

Figure 3.25 Alternative D - Apartment block - Community facility & commercial unit at ground floor



3.5.5 Alternative E – July – November 2021

During the July Section 247 meeting, the Planning Authority noted the loss of existing trees and requested that a comprehensive arboricultural and heritage assessment of Ashbourne House and gardens be conducted. It was advised that a rationalisation of the layout and route of the southern path should be conducted to ensure that absolute minimum loss of significant heritage/champion trees within the extended Ashbourne House gardens. EIAR Chapters 11 addresses in detail the significance of impacts of the proposed development on Ashbourne House and gardens. As referenced previously, the accompanying site constraints reports (Appendix 3-2) prepared by AECOM describes the specific constraints of the site which informed the route of the southern path and the evolution of the site layout.

In preparation of Alternative E (the proposed development) further investigations were conducted regarding the efficiency of the proposed layout and route of the southern amenity path. The end result is the proposed development of 289 no. residential units with creche, community/commercial units and public realm/connectivity upgrades.

Figure 3.26 Alternative E – Proposed Layout



Figure 3.27 Alternative E – Statistics.

Item	Statistic
Total Site Area	13.87Ha
Residential Developable Area	8.7Ha
No. of residential units	289 (287no plus 2no replacement units)
Residential Density	33UPH (287÷8.7)
Housing Mix	201 Houses & 88 Apartments
Public Open Space (Residential Area)	12.18% Usable
Crèche	67no child spaces
Other Uses	1no Community unit & 1no Commercial unit
Access to Residential Development	<p>Vehicle From the west via Phase 1 and the signalised junction that was permitted under application references 17/5699 and ABP 300128-17. There is also a temporary emergency vehicle access with flexible bollards in north-east corner</p> <p>Pedestrian/cyclist 1) via phase 1 2) link in the north east corner onto the L-2969 3) from Johnstown Close/The Terrace with a link to the existing train station</p>

The evolution of the layout was focussed on six principal elements, specifically.

1. Open Space Allocation - Central Parkland
2. Path Widening & Final Route
3. Cyclist Connectivity
4. Existing grotto retention
5. Public realm - South of apartments
6. Communal amenity space for apartments

1. Open Space Allocation - Central Parkland

It was acknowledged that the northern land parcel layout of previous Alternatives lacked a significant central open space for future residents. The final proposed layout includes a central parkland to the southeast of the proposed creche/MUGA, forming a distinctive central node point within the overall development. The proposed layout will also aid future residents/visitors by providing orientation cues for logical wayfinding through the site. One of the core principles of the final layout has been to provide variety in the public realm treatments by incorporating a mix of hard/soft landscaped communal spaces and ensuring access for all is provided to create an inclusive environment for residents of all ages, abilities and backgrounds.

Figure 3.28 Alternative E – Proposed Central Parkland.



2. Path Widening & Final Route

To accommodate both pedestrian and cyclist movements through the site, the proposed spine path was widened from 2 metres to 3 metres from previously proposed in Alternatives C/ D. This will ensure that both pedestrians and cyclists have dedicated connectivity links from the sites’ northern areas right through to the sites’ frontage with Johnstown Close and greenway. The proposed path will form part of an integrated suite of upgrades to the pedestrian/cyclist network in the area, including the recent delivery of the greenway and upgrades to the local road network permitted by Phase 1 of the Lackenroe Masterplan.

Due to the site topography in the southern parcel and the presence of heritage/champion trees associated with Ashbourne House and gardens, the route and form of the proposed path was fully reassessed. The final route reflects that despite the proposed widening and re-routing of the path through the southern land parcel, there has been a reduction in the loss of significant heritage/champion trees from that previously proposed in Alternative D. Specifically, the revised route of the path avoids the RPZ’s and removal of 2 no. champion trees associated with Ashbourne House which was previously proposed in Alternative D. This results that all 3 no. of the champion trees within the southern parcel will be retained and form part of the sites unique character and amenities. The evolution of the route of the path between Alternatives D and E is illustrated in Figure 3.29 as shown.

Figure 3.29 Evolution of Route of Southern Path



The final route and form of the proposed cyclist/pedestrian path results that of the 23 no. existing heritage trees in the southern parcel, 15 no. (including the 3 no. champion trees) will be retained and will be accessible to the public to enjoy as part of the proposed development. At present this site is not accessible to the public.

The delivery of the proposed pedestrian/cyclist link will result in the unavoidable loss of 8 no. heritage trees in the southern parcel. In order to mitigate the removal of the subject trees, the proposed the landscape strategy includes for

the planting 8 no. replacement heritage trees in the southern parcel which will contribute to a unique woodland area serving as a valuable connectivity and landscape/visual amenity area.

The proposed replacement planting of the subject heritage trees forms part of a core objective of the overall design/landscape strategy for the site to provide for significant amounts of replacement planting of hedgerows and trees to sustain biodiversity and integrate the proposed development with Glounthaunes existing pattern of development and character as detailed in Figures 3.30 and 3.31 as shown.

Figure 3.30 Alternative E - Heritage Tree Plan – Cunnane Stratton Reynolds

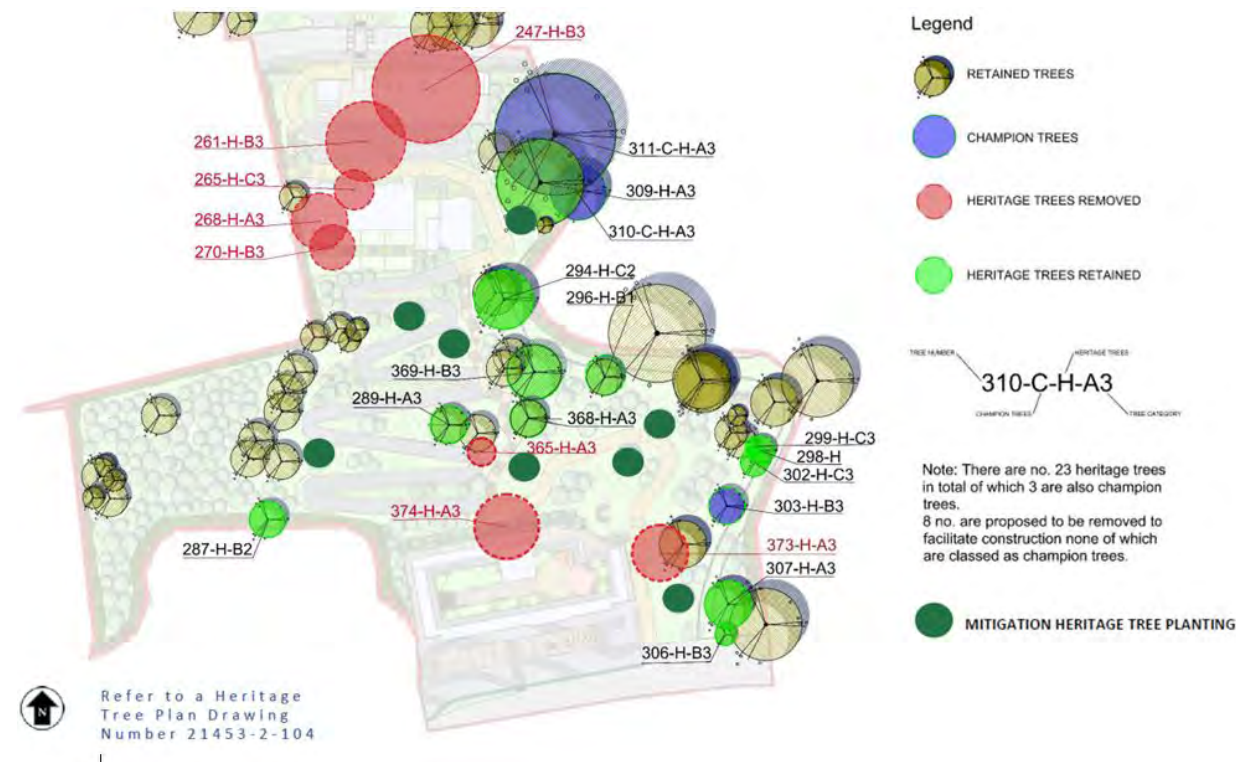


Figure 3.31 Alternative E - Tree Loss V Mitigation Planting

Tree Losses		Mitigation (Replacement) Planting	
Heritage trees	4 no. category A trees	Heritage Trees	8 no. trees
	4 no. category B trees	Tree Planting	158 no. street trees
Category B Trees	284 no. open space trees		
Category C Trees	214 no. garden trees		
Category U Trees	16 no.	Woodland Type Planting	316 no. Whips/Transplants
Hedgerow Loss	593 linear metres	Hedgerow Planting	800 linear metres

3. Cyclist Connectivity

The topography of the site is typically not conducive to efficient cyclist mobility. However, the sites location proximate to such a high frequency public transport link demonstrates the sites highly accessible location and potential to facilitate sustainable travel patterns. To overcome the sites natural constraints an innovative solution relating to the movement of bicycles is proposed. In addition to the increase of the width of the path from 2 metres to 3 metres, the proposed development provides for a bicycle wheeling ramp adjacent to the stepped footpath to accommodate future cycle journeys. This will facilitate convenient cyclist movements between the site and the greenway, village core and train station, enhancing the overall permeability and mobility strategy.

Figure 3.32 Sample Bicycle Wheeling Ramp to be provided adjacent to footpath (Source: www.lta.gov.sg)



4. Existing Grotto Retention

During detailed heritage investigations of the southern parcel, it was discovered that the remains of an grotto (stone structure) were present in the area to the north east of the proposed southern apartment building. This grotto forms part of a historic quarry/rock garden at the site associated with the former occupants of Ashbourne House to the east. The Cultural Heritage chapter of this EIAR provides a detailed historical assessment relating to the significance of this feature.

In response to presence of the grotto, the southern apartment building footprint has been re-adjusted to facilitate an increased separation distances from any proposed works and the subject grotto. A robust landscape strategy has been developed in order to enhance this existing feature and ensure it serves as a central feature in the development.

Figure 3.33 Grotto Photo



Figure 3.34 Comparison of Alternative D (top image) and Alternative E (bottom image) reflecting the evolution of the footprint of the southern apartment building, increasing separation distances to the existing grotto.

5. Public realm - South of apartments

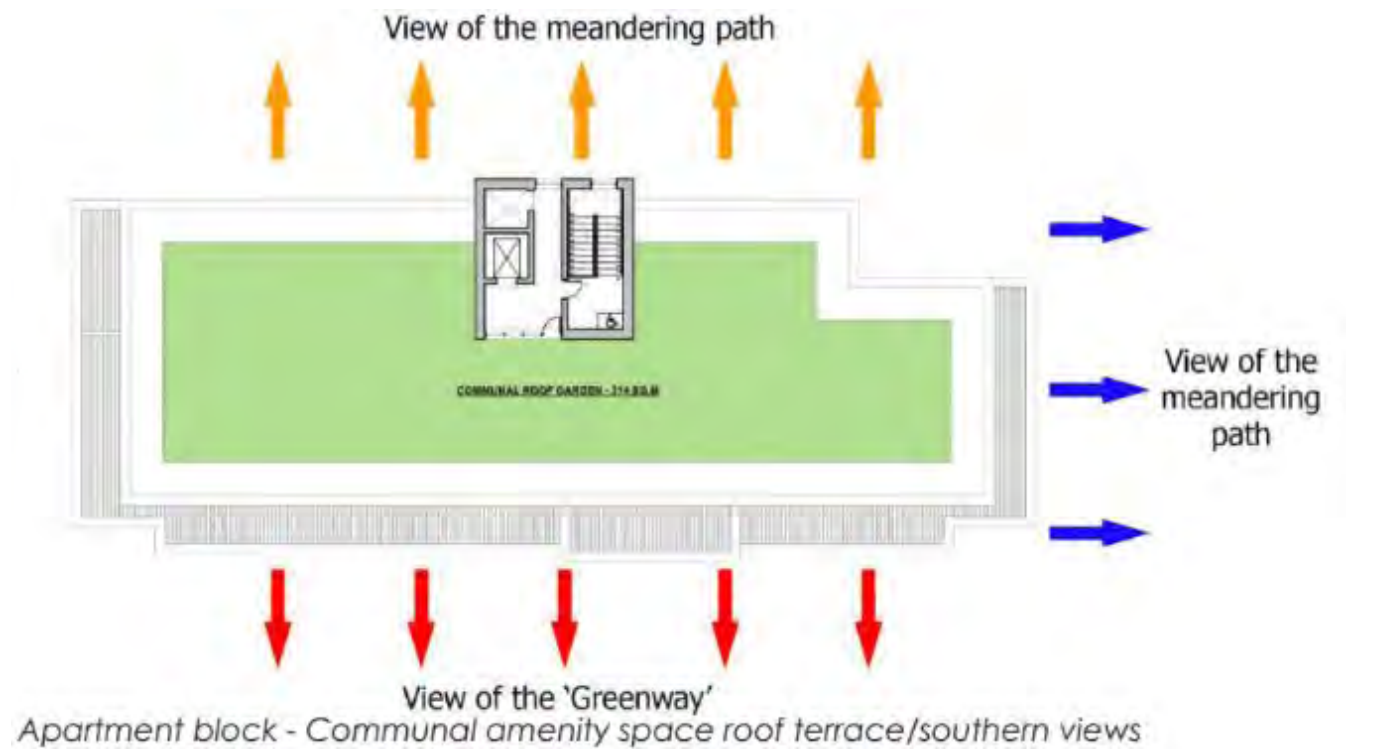
Detailed discussions have taken with Cork County Councils Traffic and Transportation Department regard the area to the south of the proposed southern apartment building. To accommodate some car parking/service areas to the front of the proposed commercial/community units, it is proposed to realign the existing greenway to accommodate motorists, pedestrians, and cyclists in this area. The proposed parking provision to the south of the apartments is considered to be sufficient given the sites proximity to the greenway and high frequency public transport link in the form of Glounthaune train station.

Due to multiple factors including the presence of the grotto to the rear of the building, the topography/tree cover in the area and the desire to maintain a strong building line onto Johnstown Close, it is not considered feasible or appropriate to remove or set-back the building any more than is proposed. The proposed development provides for a hard landscaped plaza accommodating car parking and a safe pedestrian/cyclist environment for persons availing of the greenway.

6. Communal amenity space for apartments

Given the panoramic views that exist south of the site, a rooftop terrace is proposed at the southern apartment building which will function as a high-quality private amenity space for future residents. The proposed roof terrace will also provide additional supervision over the greenway and meandering pedestrian/cycle path to the north of the building.

Figure 3.35 Rooftop Terrace on Southern Apartment Building



3.6 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. The development strategy for the subject development can be subdivided into two distinct phases, specifically.

- Alternatives A and B providing for development in the northern land parcel only.
- Alternatives C, D and E providing for development in both the northern and southern land parcels.

Due to the inclusion of the southern parcel in later alternative layouts, a comparison of environmental impacts evolved considerably throughout the design stage of the project.

3.6.1 Landscape & Visual/Cultural Heritage

The construction phase will result in the evolution of the landscape/cultural heritage aspects. The increase of residential units between Alternatives A and B would have resulted in potentially increased impacts, however the objective of reducing cut and fill across the site would likely have offset, resulting in similar impacts. The introduction of the southern parcel in Alternative C and necessary tree removal during construction phase would have resulted in increased negative impacts from the existing baseline/scenario. However, it is considered that evolution of the layout and necessary construction works in addition to increased amounts of mitigation planting across the site during the construction phase through Alternatives C – E has improved incrementally.

3.6.2 Traffic & Transportation

The increase in the number of residential units in the various alternatives (A-D) reflected a likely increase of construction traffic during this phase of the project. Alternative E reflects a development of 10 no. units less than Alternative D reflecting in a likely slight decrease in construction traffic numbers. The implementation during the construction phase of the proposed works to the Terrace and realignment of the greenway to provide for safer pedestrian/cycle and vehicular movements represents an improvement across all alternative proposals.

3.6.3 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.

3.6.4 Land & Soils

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

3.6.5 Water - Hydrology & Hydrogeology

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

3.6.6 Biodiversity

As detailed in Chapter 9 of this EIA, due to a suite of landscaping proposals to be implemented during the construction phase including the extensive replacement planting and the management of existing invasive species in the southern parcel, the proposed development will result in broadly positive impacts on biodiversity.

3.6.7 Noise & Vibration

It is not considered that construction noise and vibration levels would have increased significantly between Alternatives A-B. The introduction of the southern parcel in Alternative C would have resulted in increased potential noise and vibration matters including the safeguarding of the existing grotto to the north of the southern apartment building and impacts on neighbouring properties and residents. It is considered that the evolution of the proposed mitigation measures which include the protection of the grotto during construction phase results in an incremental improvement regarding to noise and vibration considerations generated during the construction phase.

3.6.8 Air Quality and Climate

During the construction phase alternatives, the increase in the number of residential units and inclusion of the southern land parcel would likely have resulted in increased dust and air emissions during construction. The evolution of the proposed construction mitigation measures in later Alternatives results in an incremental improvement and won't have significant negative impacts on the area during construction.

3.6.9 Population & Human Health

During the earlier construction phase alternatives, the increase in the number of residential units and inclusion of the southern land parcel would likely have resulted in increased dust and air emissions, higher levels of construction traffic, impacts on the visual amenity of the area. Conversely the delivery of public realm improvements to the Terrace and Johnstown Close would have resulted in population and human health benefits in terms of the provision of improved pedestrian/cycle connectivity with the train station and town centre. The proposed upgrades to Johnstown Close and The Terrace are proposed within Phase 1 of the Construction Phase of the proposed development.

Table 3.1 as shown provides an objective comparison analysis of the evolution of the proposed construction phase in context of the categories outlined above.

Criteria	Alternative A	Alternative B	Alternative C (Introduction of southern land parcel)	Alternative D	Alternative E
Landscape & Visual	X	=	X	✓	✓
Traffic & Transportation	X	x	✓	✓	✓
Services, Infrastructure & Utilities	X	x	X	=	=
Land & Soils	=	✓	X	✓	✓
Water - Hydrology & Hydrogeology	X	✓	=	=	=
Biodiversity	X	✓	X	✓	✓
Noise & Vibration	=	=	X	✓	✓
Cultural Heritage	=	x	X	✓	✓
Air Quality & Climate	=	x	x	✓	=
Population & Human Health	X	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 or impact is considered to be comparable with previous alternative
- X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

Table 3.1 – Comparison of Impacts -Construction Phase

3.7 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. The development strategy for the subject development can be subdivided into two distinct phases, specifically.

- Alternatives A and B providing for development in the northern land parcel only.
- Alternatives C, D and E providing for development in both the northern and southern land parcels.

Due to the inclusion of the southern parcel in later alternative layouts, a comparison of environmental impacts evolved considerably throughout the design stage of the project.

3.7.1 Landscape & Visual/Cultural Heritage

Due to the site’s proximity to Ashbourne House and gardens and the cultural landscape of the southern parcel it is considered that ‘Landscape & Visual’ and ‘Cultural Heritage’ impacts should be assessed cumulatively.

Landscape and visual impacts have formed a central component of the wider development strategy for the proposed development. It is considered that the landscape and visual impact of the northern parcel has 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, reduction of cut and fill, comprehensive replacement planting proposals and the setting back of dwellings from site boundaries to protect existing hedgerows. Although the proposed development in the northern parcel will naturally result in changes to the landscape, as detailed in Chapter 4 of this EIAR (Landscape and Visual), the impact of the development of the northern parcel is considered ‘neutral’ as the land is well set back from scenic routes and the evolving landscape in the area with Phase 1 to the west currently under construction.

The constraints of the southern parcel are acknowledged, however, to accommodate the necessary dedicated pedestrian and cycle connectivity to the train station, tree removal and impacts to the cultural landscape associated with Ashbourne House are inevitable and unavoidable. The evolution of the layout of the southern parcel through Alternatives C – E has improved incrementally, whereby.

- All 3 no. champion trees in the southern parcel associated with Ashbourne House are being retained with 15 no. of 23 no. heritage trees also being retained. 8 no. replacement heritage trees are proposed in the southern parcel in addition to significant levels of mitigation tree/hedgerow planting, resulting that the proposed development achieves in creating a high-quality landscaped environment while also delivering efficient use of lands within the development boundary of Glounthaune.
- The design stage of the proposed development has assessed all alternative routes and designs of the proposed pedestrian/cycle path to ensure its useability and the minimisation of the impact on the landscape. The final route and form of the pedestrian cycle route through the southern parcel has sought the absolute minimisation of the loss of high specimen trees, with the wider landscape strategy prioritising and comprehensive replacement planting throughout the scheme.
- Alternative E provides for both pedestrian and cyclist mobility through the site which will connect to the greenway and Johnstown Close. This will have significant benefits, not only for the future residents of the proposed development, but also for existing residents in the northern areas of Glounthaune who do not currently have dedicated pedestrian/cycle links to the train station/village core.
- The evolution of the southern apartment building to set-back from the grotto to the northeast will ensure that this feature, which is currently inaccessible to the public, will be protected and form a unique characteristic of the development respecting the historic significant of the wider Ashbourne House gardens.

3.7.2 Traffic & Transportation

It is also considered that proposed Alternative E represents a significant improvement from previous alternatives, which included extensive works to the Terrace and Johnstown Close. The provision of a signalised pedestrian crossing on the Terrace and pedestrian/cycle path through the site will promote sustainable commuting patterns, at a location which benefits from a high frequency rail service to Cork City, Little Island and other employment/urban centres. The proposed realignment of the greenway to the south of the site has also evolved through detailed investigations and engagement with Cork County Council.

3.7.3 Services, Infrastructure & Utilities

The servicing proposals for the proposed development have remained relatively consistent throughout the design phase of the proposed development. As detailed further in chapters 5 and 6 of this EIAR, the surrounding road and service network can accommodate the proposed development without significant negative impacts on local infrastructure.

3.7.4 Land & Soils

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

3.7.5 Water - Hydrology & Hydrogeology

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

3.7.6 Biodiversity

As detailed in Chapter 9 of this EIAR, due to a suite of landscaping proposals including the extensive replacement planting and the management of existing invasive species in the southern parcel, the proposed development will result in broadly positive impacts on biodiversity.

3.7.7 Noise & Vibration

It is not considered that noise and vibration considerations differ significantly between the various alternatives described.

3.7.8 Air Quality and Climate

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

3.7.9 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.

Table 3.2 as shown provides an objective comparison analysis of the evolution of the proposed development in context of the categories outlined over.

Criteria	Alternative A	Alternative B	Alternative C (Introduction of southern land parcel)	Alternative D	Alternative E
Landscape & Visual	X	✓	X	✓	✓
Traffic & Transportation	X	✓	✓	✓	✓
Services, Infrastructure & Utilities	X	✓	✓	=	=
Land & Soils	=	✓	X	✓	✓
Water - Hydrology & Hydrogeology	X	✓	✓	=	=
Biodiversity	X	✓	X	✓	✓
Noise & Vibration	=	=	=	=	=
Cultural Heritage	=	=	X	=	✓
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 or impact is considered to be comparable with previous alternative
- X Where a particular option is considered to have a more negative impact on a particular aspect of the environment than other alternatives.

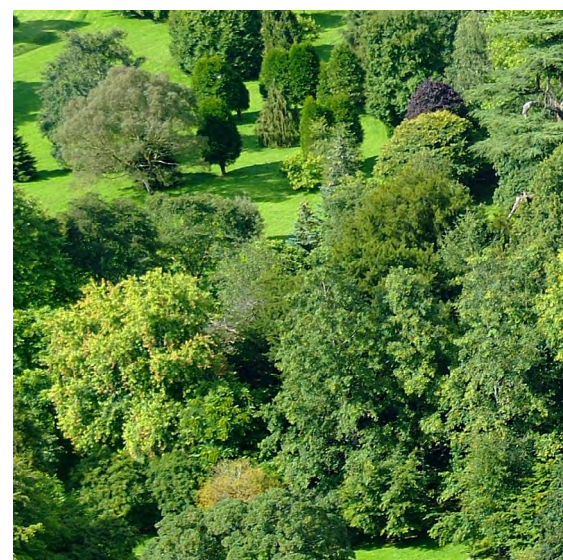
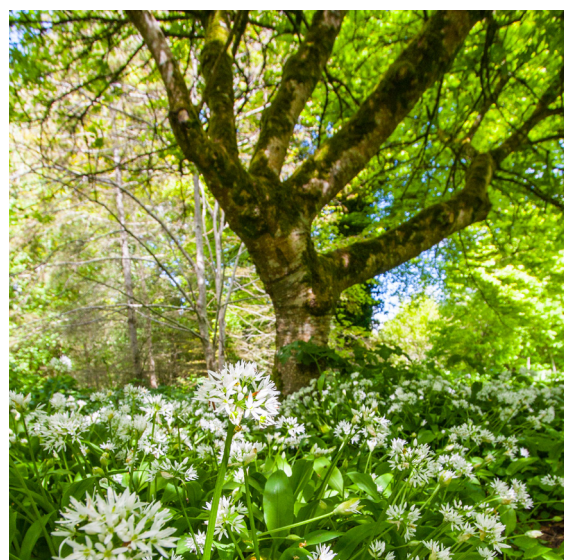
Table 3.2 – Comparison of Impacts -Operational Phase



LACKENROE SHD

CHAPTER 4

Landscape & Visual



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CHAPTER 4

Landscape & Visual

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4 Landscape and Visual

4.1 INTRODUCTION

This chapter describes the landscape and visual effects of a proposed Strategic Housing Development (SHD) in the village of Glounthaune, Co. Cork.

4.1.1 The Proposed Development

The elements of the proposal most relevant to the landscape and visual assessment is for the construction of a mixed-use residential development of 289 no. residential units consisting of 201 no. dwelling houses and 88 no. apartment/duplex units, a two storey creche, 4 no. ESB substations and all ancillary site development works. The proposed development will be constructed on lands to the north and south of the public road, L-2970, known locally as 'the Terrace'. Please refer to **Chapter 2** for a full project description.

4.1.2 Competency of the Assessor

This Landscape and Visual Assessment was carried out by Evelyn Sikora, BA MA, MILI. Evelyn has seven years' experience in Landscape and Visual Assessment (LVIA), and has worked on the Landscape and Visual assessment for a range of wind energy developments through Ireland, from single turbine developments to Strategic Infrastructure Developments. She also has experience in a range of other LVIA projects including solar energy, infrastructure, flood relief, and recreation projects. Oversight of the chapter was provided by Jim Kelly, CMLI, MILI, Director of Cunnane Stratton Reynolds.

4.2 METHODOLOGY

Ireland is a signatory to the European Landscape Convention (ELC). The ELC defines landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. This definition is important in that it expands beyond the idea that landscape is only a matter of aesthetics and visual amenity. It encourages a focus on landscape as a resource in its own right - a shared resource providing a complex range of cultural, environmental, and economic benefits to individuals and society.

4.2.1 Guidance

The *Guidelines for Landscape and Visual Impact Assessment 2013* (GLVIA) notes that as a cultural resource, the landscape functions as the setting for our day-to-day lives, also providing opportunities for recreation and aesthetic enjoyment and inspiration. It contributes to the sense of place experienced by individuals and communities and provides a link to the past as a record of historic socio-economic and environmental conditions. As an environmental resource, the landscape provides habitat for fauna and flora. It receives, stores, conveys, and cleans water, and vegetation in the landscape stores carbon and produces oxygen. As an economic resource, the landscape provides the raw materials and space for the production of food, materials (e.g. timber, aggregates) and energy (e.g. carbon-based fuels, wind, solar), living space and for recreation and tourism activities.

The GLVIA notes that Landscape is not unchanging. Many different pressures have progressively altered familiar landscapes over time and will continue to do so in the future, creating new landscapes. For example, within the receiving environment, the environs of the proposed development have altered over the last thousand years, from wilderness to agriculture and settlement or townscape.

Many of the drivers for change arise from the requirement for development to meet the needs of a growing population and economy. The concept of sustainable development recognises that change must and will occur to meet the needs of the present, but that it should not compromise the ability of future generations to meet their needs. This involves finding an appropriate balance between economic, social and environmental forces and values.

The reversibility of change is an important consideration. If change must occur to meet a current need, can it be reversed to return the resource (in this case, the landscape) to its previous state to allow for development or management for future needs.

Climate change is one of the major factors likely to bring about future change in the landscape, and it is accepted to be the most serious long-term threat to the natural environment, as well as economic activity (particularly primary production) and society. The need for climate change mitigation and adaptation, which includes the management of water and more extreme weather and rainfall patterns, is part of this.

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and on people's views and visual amenity.

The methodology for assessment of the landscape and visual effects is informed by the following key guidance documents, namely:

- Landscape Institute and the Institute of Environmental Management and Assessment (2013). *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (hereafter referred to as the GLVIA).
- EPA, 2017. *Draft Guidelines for Information to be Contained in Environmental Impact Assessment Reports*.

References are also made to the '*Landscape and Landscape Assessment - Consultation Draft of Guidelines for Planning Authorities*' document, published in 2000 by the Department of Environment, Heritage and Local Government.

The standard evaluation methodology used in the preparation of the Landscape and Visual Impact Assessment (LVIA) for inclusion within an Environmental Impact Assessment Report (EIAR) is utilised for this assessment. The following process is used:

Baseline Study: A desk based study and site visits (in June and July 2021) were carried out to establish the existing receiving environment and key landscape and visual characteristics, and to identify relevant national and local designations and policies. Scenic routes, protected views and other landscape designations were reviewed. Aerial imagery, OSI Discovery series mapping, CORINE Landcover Maps (2018) were also reviewed to gather accurate information on the study area. This allows us to identify sensitive landscape and visual receptors.

Assessment of Effects: A list of provisional viewpoints was drawn up and confirmed on the site visit. Photomontages are used to assist in the assessment of visual effects, along with review of the site layout and landscape plan and description. These photomontages are included in a booklet at the end of the chapter.

4.2.2 Assessment Criteria

Key Principles of the GLVIA

A key distinction to make in a LVIA is that between landscape effects and the visual effects of development.

‘Landscape’ results from the interplay between the physical, natural, and cultural components of our surroundings. Different combinations of these elements and their spatial distribution create distinctive character of landscape in different places. ‘Landscape character assessment’ is the method used in LVIA to describe landscape, and by which to understand the potential effects of a development on the landscape as ‘a resource’. Character is not just about the physical elements and features that make up a landscape, but also embraces the aesthetic, perceptual and experiential aspects of landscape that make a place distinctive.

Views and ‘visual amenity’ refer to the interrelationship between people and the landscape. The GLVIA prescribes that effects on views and visual amenity should be assessed separately from landscape, although the two topics are inherently linked. Visual 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.

The assessment of landscape and visual effects included a desktop study, and compilation of baseline information and a number of site visits which were carried out in June and July 2021. It also included review of the proposed development drawings and visualisations.

The GLVIA (3rd Edition) outlines the assessment process, which combines judgements on the sensitivity of the resource and the magnitude of the change which it will undergo as a result of the proposed development. These are then combined to reach an assessment of the significance of the effect. This guidance is authored by the Landscape Institute in the UK and the IEMA which contains a network of members in UK and Ireland and internationally. The GLVIA 3rd edition is used internationally and is the industry standard for LVIA in Ireland. The EPA guidance (2017) refers to the use of topic specific guidance and specifically quotes from the GLVIA 3 in relation to professional judgement. It recognises (at para 2.23) that :

“professional judgement is a very important part of LVIA. While there is scope for quantitative measurement of some relatively objective matters, much of the assessment must rely on qualitative judgements.”

4.2.2.1 Landscape Assessment

Landscape Sensitivity: Landscape sensitivity is determined by the value of the landscape, and its susceptibility to change – which is related to the proposed development.

Landscape values can be identified by the presence of landscape designations or policies which indicate particular values, either on a national or local level. In addition, a number of criteria are used to assess the value of a landscape.

Landscape susceptibility is defined in the GLVIA as the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline scenario and/or the achievement of landscape planning policies and strategies. Susceptibility also relates to the type of development – a landscape may be highly susceptible to certain types of development but have a low susceptibility to other types of development.

Landscape susceptibility in relation to housing developments can include consideration of:

- Topography and skyline –
- Landscape pattern and landcover–
- Settlement pattern – this can influence susceptibility

Landscape Sensitivity ranges from Low to Very High as outlined in **Table 4-1**

Table 4-1: Landscape Sensitivity

Sensitivity	Description
Very High	Areas where the landscape exhibits a very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The character of the landscape is such that its capacity for accommodating change in the form of development is very low. These attributes are recognised in landscape 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 character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principal management objective for the area is conservation of the existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape 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 of the landscape 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 where the principal management objective is 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 of the landscape is such that its capacity for accommodating change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, 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.

Magnitude of Landscape Change: The magnitude of change is a factor of the scale, extent and degree of change imposed on the landscape with reference to its key elements, features and characteristics (also known as ‘landscape receptors’). Five categories are used to classify magnitude of landscape change.

For the purpose of assessment, five categories are used to classify the landscape sensitivity of the receiving environment, from Very High sensitivity to Negligible. (These categories are defined in **Table 4-2:**

Table 4-2: Magnitude of Landscape Change

Sensitivity	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 (i.e. landscape receptors), 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 or compromise of important landscape receptors, 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 of landscape receptors, 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 of landscape receptors, 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 landscape receptors, and/or introduction of elements that are characteristic of the context. Such development results in no change to the landscape character.

Significance of Effects

In order to classify the significance of landscape and visual effects, the predicted magnitude of change is measured against the sensitivity of the landscape/viewpoint. The definitions used by the EPA (2017) provide a useful scale to describe the significance of the effects.

There are seven classifications of significance, namely: (1) imperceptible, (2) not significant, (3) slight, (4) moderate, (5) significant, (6) very significant, (7) profound

Table 4-3: Significance of Effect

		Sensitivity of the Resource				
		Very High	High	Medium	Low	Negligible
Magnitude of Change	Very High	Profound	Profound-Very Significant	Very Significant-Significant	Moderate	Slight
	High	Profound-Very Significant	Very Significant	Significant	Moderate-Slight	Slight-Not Significant
	Medium	Very Significant-Significant	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Moderate-Slight	Slight	Not significant	Imperceptible
	Negligible	Slight	Slight-Not Significant	Not significant	Imperceptible	Imperceptible

Note: This matrix is a guideline only, and an element of professional judgment is also applied.

With regard to landscape effects, development has the potential to improve the environment as well as damage it. In certain situations, there might be policy encouraging a type of change in the landscape, and if a development achieves the objective of the policy the resulting effect might be positive, even if the landscape character is changed.

4.2.2.2 Visual Assessment

Visual assessment considers the sensitivity of the viewers, (groups of people) and the magnitude of the changes to the composition and character of views. The assessment is made for a number of viewpoints selected to represent the range of visual receptors in the receiving environment. The significance of the visual effects experienced at these locations is assessed by measuring the visual receptor sensitivity against the magnitude of change to the view resulting from the development.

Sensitivity of the Visual Receptor

Visual receptor 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 or interest is focussed on the views or visual amenity they experience at that location.

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. by appearing in arts).

For the purpose of assessment, five categories are used to classify a viewpoint's sensitivity. These categories range from Very High to Negligible and the definitions are contained in Table 4-4.

Table 4-4: Categories of Visual Receptor Sensitivity

Sensitivity	Description
Very High	Viewers at iconic viewpoints - towards or from a landscape feature or area - that are recognised in policy or otherwise designated as being of high value or national value. This may also include residential viewers who are focussed to a large extent on the view
High	Viewers at 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 (such as views from houses or outdoor recreation features) and views which are valued by the local community. This would include tourist attractions, and heritage features of regional or county value, and viewers travelling on scenic routes
Medium	Viewers at viewpoints representing people travelling at slow or moderate speed through or past the affected landscape in cars or on public transport, where they are partly but not entirely focused on the landscape, or where the landscape has some valued views. The views are generally not designated, but which include panoramic views or views judged to be of some scenic quality, which demonstrate some sense of naturalness, tranquillity or some rare element in the view.
Low	Viewers at viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping, etc. The view may present an attractive backdrop to these activities but there is no evidence of that the view is valued, and not regarded as an important element of these activities. Viewers travelling at high speeds (e.g. motorways) may also be considered of low susceptibility.
Negligible	Viewpoints reflecting people involved in activities not focused on the landscape e.g. people at their place of work or engaged in similar activities such as shopping where the view has no relevance or is of poor quality and not valued

Magnitude of Change to the view

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, or glimpses). It also takes into account the geographical extent of the change, the duration and the reversibility of the visual effects.

Five categories are used to classify magnitude of change to a view. These range from Very High to Negligible and are defined in Table 4.5:

Table 4-5: Magnitude of Visual Change

Magnitude of Change	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 the dominant 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.

4.2.2.3 Quality and Timescale

The predicted impacts are also classified as beneficial, neutral, or adverse. This is not an absolute exercise; in particular, visual receptors' attitudes to development, and thus their response to the impact of a development, will vary. However, the methodology applied is designed to provide robust justification for the conclusions drawn. These qualitative definitions are included in Table 4-6.

Table 4-6: Quality of Effect

Definition of quality of effects	
Duration	Description
Adverse	Scheme at variance with landform, scale, pattern. Would degrade, diminish or destroy the integrity of valued features, elements or their setting or cause the quality of the landscape (townscape)/view to be diminished;
Neutral	Scheme complements (or does not detract from) the scale, landform and pattern of the landscape(townscape)/view and maintains landscape quality;
Beneficial	improves landscape(townscape)/view quality and character, fits with the scale, landform and pattern and enables the restoration of valued characteristic features or repairs / removes damage caused by existing land uses.

Impacts/effects are also categorised according to their longevity or timescale as in Table 4-7 below:

Table 4-7: Duration of Effect

Definition of duration of effects	
Duration	Description
Temporary	Effects lasting one year or less
Short Term	Effects lasting one to seven years
Medium Term	Effects lasting seven to fifteen years
Long Term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years

4.2.3 Statement of Difficulties Encountered

No difficulties were encountered.

4.3 EXISTING RECEIVING ENVIRONMENT

4.3.1 Landscape Policy Context

4.3.1.1 Cork County Development Plan 2014

The following section includes policies and objectives from the Cork County Development Plan 2017-2023, hereafter referred to as the Plan.

The following section includes policies and objectives from the Cork County Development Plan 2014 (hereafter referred to as the Plan) which relate to the site, including policies relating to town centre development, cultural heritage, landscape character, value and scenic routes.

A number of objectives relating to the landscape and developments in general are as follows:

GI 6-1: Landscape:

- Protect the visual and scenic amenities of County Cork's built and natural environment.
- Landscape issues will be an important factor in all land use 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.
- Ensure that new development meets high standards of siting and design.
- Protect skylines and ridgelines from development.
- Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatments.

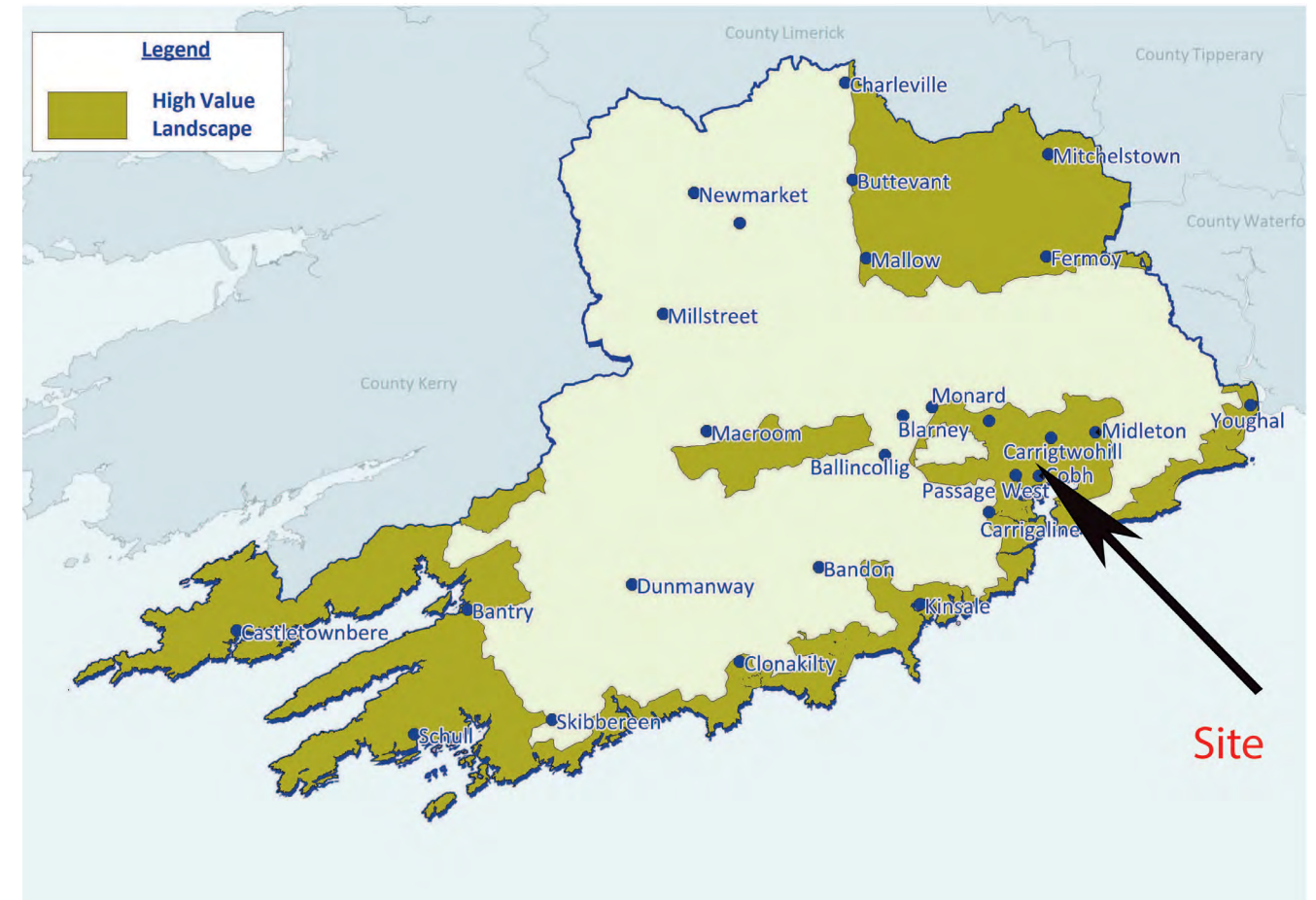
Landscape Character and High Value Landscapes

The Draft Cork County Landscape Strategy, produced in 2007, has informed the Development Plan policy, and the information in terms of landscape character areas and types are referred to within the plan. This document identified 76 character areas in County Cork, but amalgamated these into 16 landscape character types, which are a more general categorisation of the landscape based on similarities between the areas. Landscape Character Types (LCTs) are described in some detail in the Strategy, and detailed characteristics, opportunities and pressures are listed for each LCT.

The assessment also ascribes a landscape value to each character area, ranging from Low to Very High. Sensitivity of each LCT is also identified, ranging from Low to Very High. It should however be noted that as in Landscape and Visual Assessment, sensitivity is directly related to the type of development or change proposed.

Landscape Character Types which have a High or Very High Value, and High or Very High Sensitivity, and are also considered to be of County or National Importance, are classified as High Value Landscape (HVL). Figure 13.2 of the Plan contains an illustration of these areas, and indicates that the proposed development site, and the whole of Glounthaune village, and the surrounding harbour, is within an area of HVL. This is shown in Figure 4-1 below:

Figure 4.1: High Value Landscape



The Plan notes that within these areas of HVL, considerable care is needed in locating large scale developments without them becoming unduly obtrusive. It notes that such developments should generally be supported by visual impact assessment and involve an evaluation of the visibility and prominence of the proposed development in its immediate environs and in the wider landscape.

The following objective is relevant:

GI 6-2: Draft Landscape Strategy: Ensure that the management of development of the County will have regard for the value of the landscape, its character, distinctiveness and sensitivity as recognised in the Cork County Draft Landscape Strategy and its recommendations, in order to minimize the visual and environmental impact of development, particularly in areas designated as High Value Landscapes where higher development standards (layout, design, landscaping, materials used) will be required.

Draft Landscape Strategy 2007

Cork County Council prepared a Draft Landscape Strategy in 2007, which is still the adopted guidance document.

The application site falls within Landscape Character Type 1: City Harbour and Estuary. This Landscape Character Type has 'Very High' Landscape value, 'Very High' Landscape Sensitivity and is of 'National' Importance. This draft strategy aims at providing an explanation of Cork County's landscape by way of describing what the landscape actually entails,

while highlighting how areas within the county have their own distinctiveness and character. It also aims at providing a better understanding and appreciation of the county’s landscape and of the importance of managing development into the future.

Table 4-8: Landscape Character Type

Landscape Character Type	Landscape Value	Landscape Sensitivity	Landscape Importance
City Harbour and Estuary	Very High	Very High	National

The following is an extract of the ‘Landscape Description’ and ‘Recommendations’ of Landscape Character Type 1 from the County Cork Draft Landscape Character Assessment 2007;

Landscape Character

The topography and landscape components in this area, primarily the River Lee as well as the vast open and natural harbour, have provided the opportunity for human settlement and the development of a city.

Overall, the landscape of the city and harbour area comprises a mix of rural and intensely urban areas, combined with a large expansive harbour. To the south of the city, the western side of the harbour supports major industrial development, while on higher ground telecommunication masts or water storage towers punctuate the skyline. The harbour includes large islands, which, along with much of the harbour shore, comprises landscape of fertile farmland which slopes gently to the sea. It comprises a mosaic of fertile fields of mixed use on brown podzols.

The rural areas around much of the greater harbour area are now characterised by a prevalence of infrastructure such as roads, bridges and electricity power lines and some urban sprawl. The narrow harbour mouth is defined by two hilltops with old military fortifications on their summits.

Relevant Recommendations are as follows:

- Protect the north and south ridges and hillsides around the city, to ensure the protection of the visual backdrop to the city. These ridges would be adversely affected by unsympathetic development thus interfering with views of special amenity value to the city and surrounding area.
- Maintain and enhance views of the harbour. Proposals for development in the harbour should respect the sensitivity of this landscape and in particular should have regard to its rich and diverse natural heritage and concentration of Natural Heritage Areas that are designated for protection and the relationship between these and the built environment.
- Proposals for medium and large scale business, retail and industrial uses, which may impact on the character of the harbour area, must consider the landscape implications at the outset and so a landscape scheme should be submitted with planning applications.
- Manage development that will adversely affect distinctive linear sections of the Lee River Valley, especially its open flood plains, when viewed from relevant scenic routes and settlements.

Scenic Routes

The site is bordered by a Scenic Route (S42) to the north, and the Terrace road which runs east-west through the site is also a Scenic route (S41) . Selected features of the route are described as follows (extract from Volume 2, Table 5.1 of the Plan:

Table 4-9: Scenic Route Characteristics (extract from Volume 2 Table 5.1 of County Development Plan)

Scenic Route	Does route run through or adjoin High Value Landscape	Overall Landscape Value	Main Features of Land Cover	Description & General Views being Protected	Structures of Historic or Cultural Importance visible from route
41	Yes	Very High	Estuary, intermittent distant views of the harbour & Little Island, residential, trees &vegetation	R639 Regional Road & Local Road from Dunkettle to Glanmire and eastwards to Caherlag and Glounthane Views of the Estuary & Harbour, wooded landscape, open countryside & hillsides	Number of protected structures at Glanmire, some of which are visible from the scenic route
42	Yes	Very High	Extensive vegetation & tree cover, one-off housing, residential estates and the harbour	Local Road at Forest-town, N.W. Carrigtwohill and Westwards to Caherlag. Views of the Harbour, open countryside & tree lined hillsides	No Information Available

The two scenic routes are shown in relation to the proposed development site in Figure 4-2 below. Note that the site boundary is indicative.

Figure 4.2: Scenic Routes in vicinity of site (Source Bing Maps 2021)



The Plan notes that each scenic route was examined individually and their location was related to the landscape type that is traversed and the key features which make these routes attractive were identified. Those routes within High Value Landscapes are considered particularly important to protect. However, the Plan also states that while it advocates the protection of scenic routes, it also recognises that landscapes are living and changing, and that this policy should not give rise to the prohibition of development, but that development along these routes, where permitted, should not hinder or obstruct these views or prospects and should be designed and located to minimise impact.

The following policies are relevant:

GI 7-2: Scenic Routes: *Protect the character of those views and prospects obtainable from scenic routes and in particular stretches of scenic routes that have very special views and prospects identified in this plan. The scenic routes identified in this plan are shown on the scenic amenity maps in the CDP Map Browser and are listed in Volume 2 Chapter 5 Scenic Routes of this plan.*

GI 7-3: Development on Scenic Routes a) *Require those seeking to carry out development in the environs of a scenic route and/or an area with important views and prospects, to demonstrate that there will be no adverse obstruction or degradation of the views towards and from vulnerable landscape features. In such areas, the appropriateness of the design, site layout, and landscaping of the proposed development must be demonstrated along with mitigation measures to prevent significant alterations to the appearance or character of the area.*

b) *Encourage appropriate landscaping and screen planting of developments along scenic routes which provides guidance in relation to landscaping. See Chapter 12 Heritage – Objective HE-4-6.*

Green Infrastructure:

With regard to new developments and Green Infrastructure, the policies are as follows:

GI 3-1 : Green Infrastructure - New Developments

Require new developments to contribute to the protection, management and enhancement of the existing green infrastructure of the County and the delivery of new green infrastructure, where appropriate

GI 3-2 : Green Infrastructure - Significant Developments

Require significant new developments (multiple residential developments including Part 8 applications, retail, industrial, mineral extraction etc) to submit a green infrastructure plan as an integral part of any planning application. This plan should identify environmental assets and include proposals which protect, manage and develop green infrastructure resources in a sustainable manner.

Trees and vegetation

Chapter 12 notes the importance of trees and woodlands, noting that particular trees or groups of trees can be important components of the local landscape/townscape, the setting of buildings, or to the successful integration of new development into the landscape.

Objective HE2-5 states the following in relation to trees not subject to a Tree Preservation Order:

Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting and where appropriate to make use of tree preservation orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.

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

4.3.1.2 Cobh Municipal District Local Area Plan

The LAP states that the vision for Glounthaune to 2023 is to:

“Secure a significant increase in the population of the settlement (balancing the maximisation of the sustainable transport benefit offered by the railway station, with development appropriate to the character, setting and scale of the village), to retain and improve local services and facilities and to strengthen infrastructure provision.”

Glounthaune is designated as a Key Village in the LAP. The LAP notes that the settlements straddles and upper and lower road. It also notes that:

...” much of the settlement if built on a hill and most of the undeveloped lands within the boundary are very visually sensitive. Existing properties have extensive views over Lough Mahon and Fota Island.

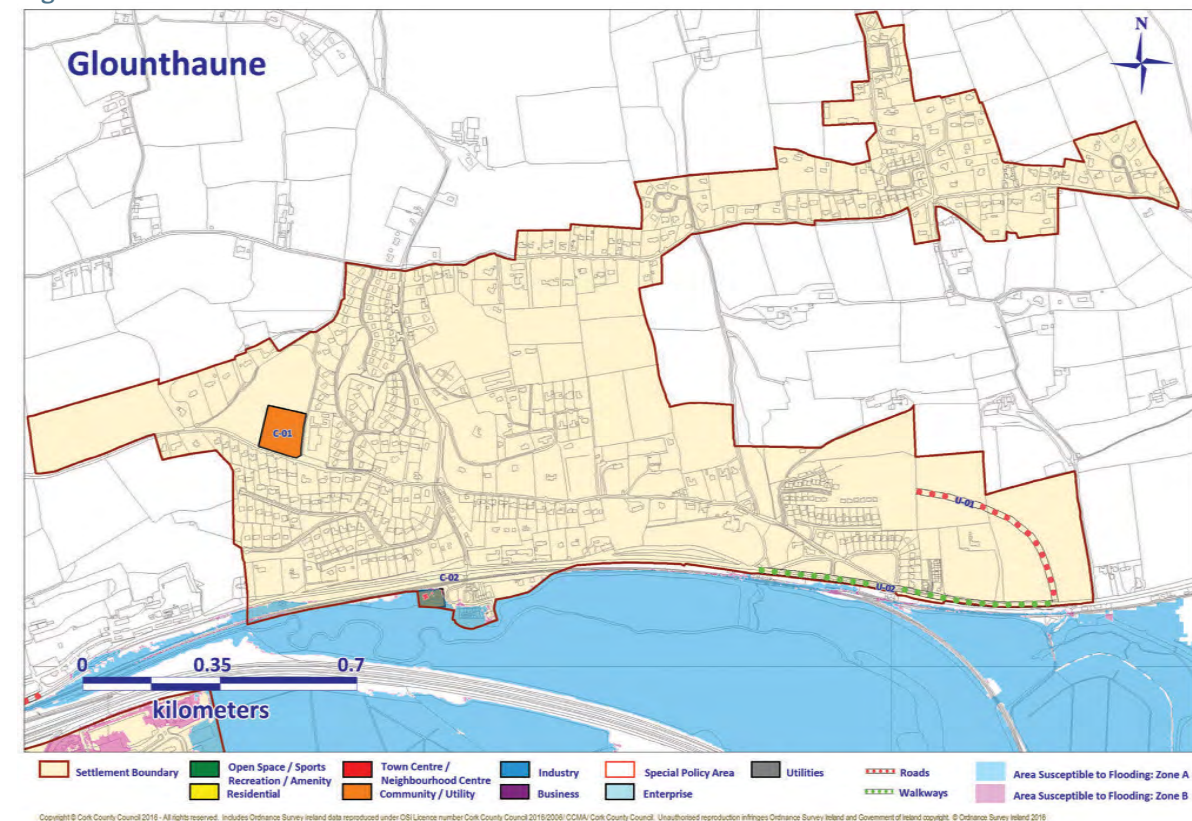
Residential Development

The LAP notes that there are a number of established residential estates off the upper road to the east and west of the village centre.

Planning Proposals for population and housing note that new development in Glounthaune up to 2023 should not exceed 400 units in total, and that individual housing schemes should not normally exceed 40 units.

Lands to the north and to the southeast of the village is considered suitable for residential development. The development boundary has been extended to the east adjacent to The Woods residential development, as well as to the northwest. The LAP states that the development boundary has been drawn to be sensitive to the topography of the locality and to avoid those areas of visual amenity. A new road connection (Objective U-01) is proposed to link the existing development with new developments on lands to the east.

Figure 4.3: Cobh MDLAP with site



Relevant Objectives for the village are as follows:

DB-01

To encourage the development of up to 400 additional dwelling units up to 2023

To implement traffic calming measures in the village which include the proper demarcation of the road edge and car parking spaces

To achieve the development of a public car park in close proximity to the railway station

U-01 Provision of new link road

U-02 Provision of pedestrian and cycle path. Development of this new route in this area should be designed to ensure compatibility with the Great Island Channel Special Area of Conservation and the Cork Harbour Special Protection Area.

4.3.1.3 Implications of Development Plan policy

County Development Plan

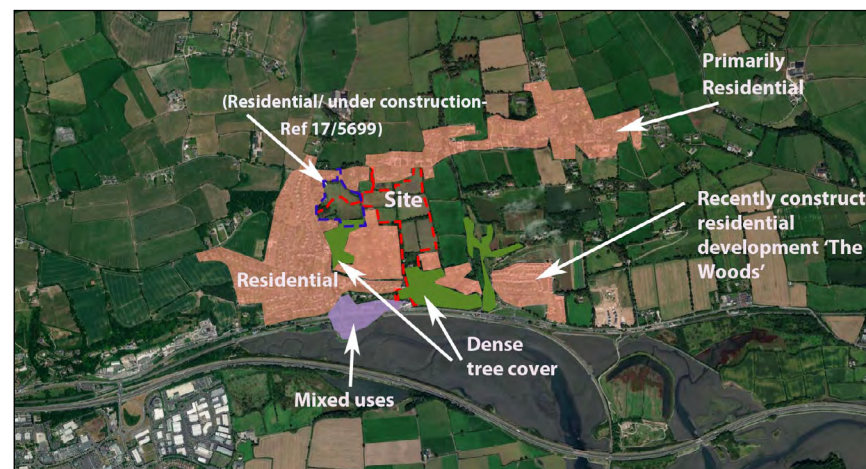
- At a high level, the Cork Harbour area including Glounthaune is an area of High Value Landscape
- Scenic Route designations exist on the roads both to the north of the site, and on the road through the site (The Terrace)
- New developments are to consider Green Infrastructure and the retention of trees and hedgerows where appropriate.
- The Cobh MDLAP indicates that the majority of the village of Glounthaune, including the site of the proposed development, is zoned residential. It is noted that existing and proposed residential areas are not distinguished.
- The MDLAP notes that the development boundary has been extended to facilitate residential development and that lands to the southeast and the north of the village are considered suitable for housing.
- Up to 400 residential units were envisaged up to 2023 and individual development should not exceed 40 units.
- A new road extension to the east of the village is proposed to link future residential areas. A pedestrian and cycle path is an objective currently under construction to the south and east of the development.

4.3.2 Landscape and Visual Character

A site visit was carried out to establish the character of the area and identify sensitive receptors.

The site and wider study area, which includes the village of Glounthaune, the shores of Lough Mahon and the N25 across the estuary are illustrated in Figure 4.4 below. It also illustrates the main features of landcover in the area which is described in Section 4.3.2.2.

Figure 4.4: Main land uses in vicinity of site



Residential land use is the most prevalent in the vicinity of the site. A permitted residential development (17/5699) to the west of the site through which the proposed development is accessed is indicated on Figure 4-4. This is of a smaller scale to the proposed development. A further pending application for 21 units (21/6851) lies immediately south of 17/699 and is also accessed through this development. A residential development immediately adjacent to the east on the grounds of Ashbourne House currently in the planning process (21/5072). A smaller scale proposed residential development to the east of Priest's Hill currently in the planning process.

4.3.2.1 Landform- Topography and drainage

Site and immediate surroundings

The site, located in the northern part of Glounthaune village is located on sloping land overlooking Lough Mahon. The elevation ranges from approximately 89 metres OD in the highest part of the site to the northeast, to approximately 5m OD near the L3004 road south of the site.

Certain parts of the site and surrounding roads, in particular the road north of the site, have open views towards Lough Mahon. This road is designated a scenic view for this reason.

There are two roads, one east and one west of the site – which are sloping roads connecting to the L3002 at Glounthaune. To the east, the Priest's Hill is a narrow road with rural character, as shown in Figure 4-5 below. Streams run along part of both roads but are not obvious features. To the west, the steep topography is accentuated by a Lackenroe Bridge, stone viaduct or 'dry bridge,

which was built as an overpass to carry an east-west route over the slope, in the 1800s. Views towards the site from these roads are available from the short section of the 'Terrace' which runs through the site though the view is restricted by the roadside mature trees. Views from the scenic route north of the site are restricted to glimpses in between houses with a view to the field on the northeast corner. Views from Priest's Hill are also restricted while no views are available from the road to the west. This is discussed in some detail in Section 4.4.5.

A number of images are taken to illustrate the landscape and visual character and some sensitive receptors. For a detailed location of the images see Figure 4-17 in Section 4.3.3.

Figure 4.5: Priest's Hill east of the site



Wider Landscape

The small centre of the historic village of Glounthaune is located on the flatter land in the immediate vicinity of the waterfront, south of the railway line, directly on the shores of Lough Mahon. The village has more recently expanded to the road north of the railway line, while several areas of primarily residential development has extended north, up the hillside.

4.3.2.2 Landcover – Built Form, Vegetation and Cultural Heritage

Site and Immediate Vicinity – Cultural Heritage

There are no Protected Structures located within the site boundary, but the southern portion of the development site does extend into lands that once formed part of Ashbourne Garden, which was developed c.1900-1930 by R.H. Beamish in the style of a woodland garden". Ashbourne extends between the

old road and the Terrace and north of this, Combermere House (immediately east of the site). The larger grounds of Anne Mount are visible to the north of the Terrace, and is immediately west of the site of the proposed development. The large areas of woodland broadly correspond with these estates. A hotel is indicated near the south-western boundary of the site

Wider Landscape

The historic maps give a good indication of the development of the present day settlement. The original village centre was at the water's edge, south of the railway line, where several quays are marked and a number of buildings are shown.

Several estates appear on the map to the east of the present day village including Johnstown House and Johnstown Villa and Killora Lodge.

Figure 4.6: Cassini inch map of site and surrounds



Vegetation and built form - Site and immediate surroundings

The landcover of the site is a combination of large agricultural fields divided by mature hedgerows and tree lines to the north of the site, as shown in Figure 4.7, and of densely wooded areas to the south of the site, extending to Ashbourne Walkway.

Figure 4.7: Agricultural land with treeline at access point at northeast corner of the site



These fields have an open, expansive character and there are glimpses (in good weather) of Lough Mahon and the landscape beyond – a vague outline of this view is seen in Figure 4.7 above at the access point from the main road to the northeast of the site. The treelines and hedgerows are relatively mature.

This road is a scenic route and there are glimpses over Lough Mahon from some parts of the road in clear weather. There are likely to be some similar view from the rear of houses where there are gaps in vegetation. A view from the field east of the site, which is more open, shows a clear view of the estuary and to Fota Island. However there are only glimpses of this view along the road due to the number of dwellings and intervening vegetation, as shown in Figure 4.8 below.

Figure 4.8: Dwellings and vegetation along scenic route north of site



Towards the south of the site, the landcover becomes dominated by mature trees and woodland in the vicinity of the Terrace and south as far as the site's boundary along Ashbourne Walk.

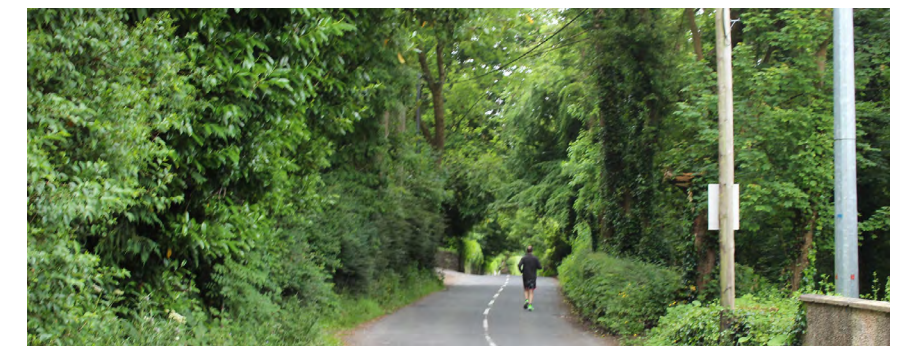
Figure 4.9 below shows the view to the west from the Terrace, approaching the site. The character of this road, also a scenic route, is created by large mature trees in close proximity, and stone demesne walls which define the properties. The gate lodge to the Combermere House (or Cottage) which lies adjacent to the site's eastern boundary, is also visible below and adds to the historic character of the area. The road is a scenic route in the Development Plan and the character of the route is remarkably different from the other roads in the area.

Figure 4.9: Looking west along the Terrace towards site with Combermere House gate lodge in foreground



Figure 4.9 above shows the view from the opposite direction, looking east, and the densely wooded character is also evident. To the west the road is more open, with much less tree cover as seen in Figure 4.9 above, while the road to the east of the site, towards Ashbourne House, has a similarly dense tree canopy to that shown in Figure 4.10 below.

Figure 4.10: View along the Terrace looking east



At the southern end of the site, the wooded character continues to the site boundary which runs along a short stretch of Ashbourne Walk, a pedestrian/cycle path. The mature trees and stone walls contribute to a pleasant, tranquil character, as illustrated in Figure 4.11 below.

Figure 4.11: View along Ashbourne Walk and site boundary



It should be noted that in the view above, the site boundary is a short section which is not walled, in the centre of the view. The stone wall, extending from the centre of the view to the right, is the boundary of the Ashbourne House estate and a planning permission is currently pending for this site. This is further discussed in Sections 4.4.7 and 4.4.8 Cumulative Effects.

The Ashbourne House estate is located to the southeast of the site, appears to have extended along this southern portion of the site, between the Terrace and Ashbourne Walk as shown in the Cassini historic map (Figure 4-6) above). A portion of the development site extends into lands that once formed part of Ashbourne Garden, which is considered significant for its original tree and shrub collection. This portion of the site includes a considerable extent of woodland, with some 23 Heritage Trees as outlined in the Arboricultural Survey by Dermot Casey (see Appendix 4-1.) The remains of a stone grotto, and evidence of R.H. Beamish's woodland garden" are evident on site and a description of this grotto and an assessment of its significance is included in Chapter 11.

The other part of the southern site boundary extends to the rear of the buildings along the main road, as well as to the east of these buildings shown in Figure 4.12 below. The mature trees are clearly visible to the rear of the buildings. (The condition of the buildings varies, and construction work was ongoing on several buildings at the time of the site visit.)

Figure 4.12: Southern boundary to rear of buildings



Vegetation and built form - Wider Landscape

Landcover of the wider area includes primarily residential areas (including both a number of large residential developments and roads lined with single dwellings) to the immediate west of the site (and some fields which are the location of a permitted residential development).

The road which lies to the north, is lined by residences as shown in Figure 4.7, and though this is a scenic route, there are only glimpses of the view over the harbour due to the buildings and vegetation.

Landcover east of the site includes several large fields, and further south, scattered dwellings are seen in among wooded areas. Along the Terrace, dwellings are scattered along the road to the west of the site while there are some to the east.

Several large estates occupied much of the area. The Ashbourne House estate is located to the southeast of the site, and appears to have extended along the lower portion of the site, as discussed above. Ashbourne house itself remains. Further to the southeast, several recent residential developments can be seen.

Directly south of the site is the local road L4003 which is the main road through Glounthaune, and provides access to the village shop and pub. A railway line is a prominent feature of the village running parallel to the road, while the railway station lies to the southeast of the site.

4.3.2.3 Landuse and settlement pattern

Site and immediate surroundings

Landuse on the site includes agricultural fields, and wooded areas with some sections of roadway.

Wider Landscape

The wider landscape includes a considerable proportion of residential areas, and a small village centre, concentrated to the southwest of the site (as shown in Figure 4.4). Other land uses include recreational (Ashbourne Walk), and transport the nearby railway station.

The roads surrounding the site (east and west) connect to the main L4003 road which runs parallel to the railway line, and connects to the village centre. It is noted that provision for pedestrians along the roads is poor, with footpaths only along some sections of road, and the road west of the site is not favourable for pedestrians.

4.3.3 Summary of Landscape Characteristics

In summary, the site has a number of distinctive features which contribute to its character. There are two distinctive character areas, as the larger fields to the north of the site, which are more open, and some fields which have good views of the harbour.

This area has a separate character to the wooded, enclosed character of the southern part of the site, part of which once formed part of the Ashbourne house grounds.

Landscape Values

The landscape values of a site can be identified through formal designations which infer landscape value, **as well as values which are not enshrined in policy but are evident on the site.** These values are listed below, and further be categorised in two ways – values which should be conserved, and those that provide opportunity for enhancement.

The two scenic routes – one to the north and one running through the proposed development – indicate that the views from these routes are highly valued. The upper (northern) route is noted for views of the harbour which are intermittent glimpses along the route close to the site, while the Terrace road appears to be valued for the 'wooded landscape' – in this location, the mature tree canopy - and also evident are historic walls and buildings, part of the various estates.

However, in addition to formal designations at international, nation and local level, the GLVIA 3rd edition (2013) recommend the use of a number of criteria which can help to describe landscape values. These are listed below and include:

Landscape Quality/Condition: The site is considered of relatively good condition, with several hedgerows and treelines surrounding open fields, and densely wooded areas to the south of The Terrace.

As trees/woodland are an important feature of the site, in particular as the site south of The Terrace was formerly part of Ashbourne Gardens two tree reports were carried out. An Arboricultural survey (by Dermot Casey Tree

Care)- see Appendix 4-1 was carried out on the lower part of the site (between the Terrace and the L-3004 to the south while another report by Arborcare was carried out on the northern part of the site (see Appendix 4-2)

The report covering the area south of The Terrace defines the 87 individual trees and groups of trees on site into four categories – Category A, B, C, and U. Category A and B trees are *'trees of high quality and arboricultural, landscape or cultural value and are highlighted as such and their protection should be paramount.*

Three of the trees surveyed were considered of High quality (Class A), and a 16 of the trees considered Class B. A further report (Arboricultural Tree Report, included as Appendix 4-3) by Tree Management Services identified a potential 23 Heritage Trees and 3 likely Champion Trees which are trees of importance and the definitions explained in the report and summarised as follows:

A Heritage Tree is a tree of biological, cultural, ecological or historical interest because of its age, size or condition.

A Champion tree is on the Register help by the Tree Council of Ireland. Inclusion criteria for the Tree Register is based on Mitchell's (1994) criteria for choosing outstanding trees.

There are no Champion/Heritage trees in the north of the site. The survey of the northern part of the site included 297 trees in total, of which 25 were Category A and 181 Category B.

Heritage/Conservation interests: The southern part of the site also has elements of heritage interest close by, including the gate lodge adjacent to the site, and the Ashbourne estate adjacent to the southeast and Anne Mount to the west. This part of the site was formerly part of the Ashbourne estate, and though at present much of this is overgrown woodland, several elements relating to its history as part of the estate are present, as set out in the Historic Landscape Assessment (see Appendix 11-2).

Scenic Quality: The site is considered to have scenic qualities, as indicated by the scenic routes, both the northern part where the fields have some views over the harbour, and the southern portion where the mature woodland confers a special character to this part of the site.

Rarity – some unusual species of trees are noted in the Arboricultural Tree Report and include Champion and Heritage trees

Perceptual aspects: Perceptual aspects include the history of the estates and their connections with well-known figures, including Richard Beamish's connection with Ashbourne House.

Recreation Value There is no public access to the site, but the site lies on either side of the Terrace road and the public Ashbourne path lies adjacent to part of the site's southern boundary.

Conservation values

The conservation values indicate those aspects of the receiving environment which are sensitive and could be negatively impacted on by the proposed development. These values form the potential landscape and visual constraints to the proposed development. These include:

- Existing mature woodland creates a unique character to the south of the site, and provide screening for buildings. This area also has connections to Ashbourne House as it is shown as part of the grounds in the historic maps, which is further explained in Chapter 11 Cultural Heritage which includes a Historic Landscape Assessment as Appendix 11-2.
- Existing mature hedgerows and tree lines denote the field patterns on site.
- Views, both towards the wooded hillside above Glounthaune, and glimpses from the higher ground north of the site towards the estuary are important parts of the character of the area also.

Enhancement Values

The enhancement values reflect change that is occurring in the landscape and its inherent robustness, and identify elements which could be enhanced.

- Enhancement of pedestrian connectivity in the wider village, with potential for the proposed development to improve pedestrian connectivity between the site and surrounding roads, and the village centre/railway station.
- Proposed development can contribute to improved legibility of the village with location of dwellings in a central location
- Opportunity for correct management of trees and vegetation
- Provision of new public access to areas, including proposed open spaces, to areas not currently publicly accessible.

The landscape value of the site can be considered in relation to the character of the two areas of the site, with the upper and lower areas having distinctive character.

The southern part of the site, the wooded area mainly south of The Terrace, is considered High, due to the mature woodland, some of which has a historical association with Ashbourne House, which is considered of high landscape value, and which also has scenic qualities. The designation of The Terrace as a scenic route, and the historic character of the road indicated a highly valued element.

The upper part of the site is bounded by a designated scenic route, though as discussed views are restricted along most of the road north of the site. Large open fields divided by mature hedgerows and tree lines have a different character to the lower portion, however these elements are also of landscape value, though of lesser importance than the southern part of the site and would be considered of medium value.

4.3.3.1 Views/Visual Amenity and Potential Visual Receptors

The section above has illustrated that the site had scenic qualities, including views from the northern part of the site towards the estuary, and pleasant views in the southern part of the site within and of the mature woodland.

In order to select viewpoints to assess visual effects, views in the vicinity of the site were visited and reviewed.

Scenic Routes

Of the two scenic routes in close proximity to the site, S42 to the north of the site, as mentioned above, has limited views along the section immediately north of the site due to the line of dwellings along the southern side of the road (as shown in Figure 4.13) as well as the topography which prevents views as one approached from the junction to the west. The most open view along this route near the site's northern boundary is that of the field entrance adjacent to the northeast corner of the site, where the ground slopes to the east, and lack of vegetation allows an open view, as shown below. However this view will not be affected by the proposed development which is to the right of the field.

Figure 4.13: View from field entrance adjacent to northeast corner of site



Further to the east beyond the junction with Priest's Hill, there are more open views to the estuary (which are represented in the Photomontage Booklet), while the road further west has fewer views towards the estuary as the topography screens the view.

The second scenic route, the Terrace, is characterised by dense tree cover where it bisects the site, and this continues to the east of the site to the junction with Priest's Hill near Ashbourne House as shown in Figure 4.14 overleaf:

Figure 4.14: Wooded character of the Terrace as far as Ashbourne House



The part of the road west of the site is more open with fewer trees, and a row of dwellings to the south of the road which obscure views of the estuary, as shown in Figure 4.15.

Figure 4.15: More open and built up character of The Terrace west of site



Figure 4.16 below indicates the location of the images included in Figures 4-8 to 4.15 in the section above.

Figure 4.16: Location of Figures 4-8 to 4-15



Potential Visual Receptors

The proposed development located on a hillside above Glounthaune village, and elements of this are likely to be seen from certain locations. This is likely to range from location where a larger proportion of the dwellings to the north of the site may be visible, to locations closer to the southern boundary where just the proposed building to the southern end of the site may be seen. Several locations in the immediate vicinity of the site may not have any visibility of the proposed development due to screening and topography. Locations across Lough Mahon from the N25 are also likely to have more distant visibility of the scheme.

Potentially sensitive receptors which were identified include:

- Receptors along Scenic Routes including residences, and those walking or travelling these routes
- Residential viewers
- Viewers engaged in walking/recreation

In this case, viewpoints have been included from both the scenic routes (north of the site and along 'The Terrace'), which represent both road users and pedestrians, as well as those living along the road. Several residential areas, both to the north along the road, and large estates on elevated ground west of the site, will also be represented by viewpoints.

Other potential visual receptors which may be less sensitive, but which are representative of typical viewers in the surrounding context. These include:

- Road users/pedestrians - both local and regional/national routes
- Viewers at popular locations, road junctions and from close to Glounthaune village

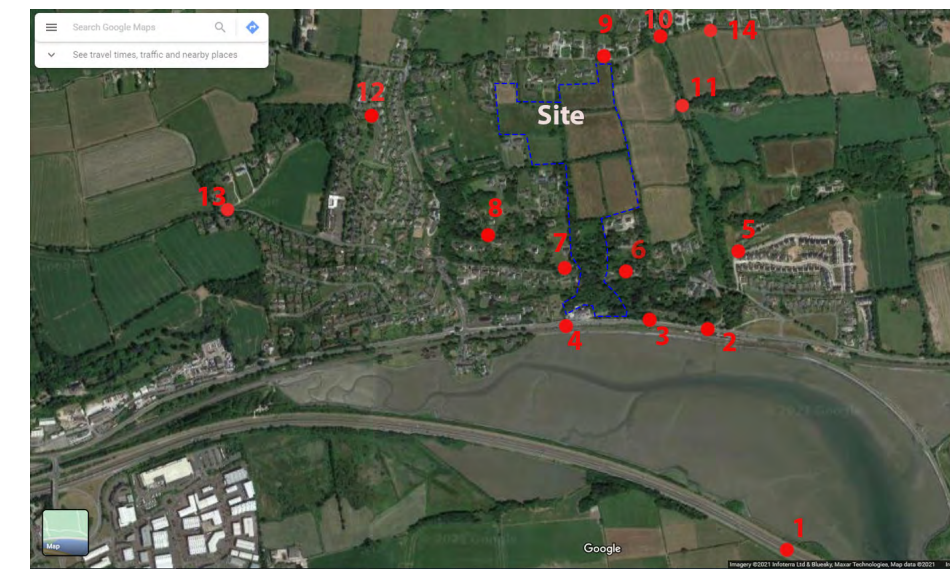
Other viewpoints selected include locations where good views of the site are available from surrounding roads. Viewpoints range from those at a high elevation to those along the estuary, and viewpoints range from very close to the site to more distance views.

A list of the 14 viewpoints taken to represent a variety of visual receptors in the vicinity is included in Table 4-9 below and an accompanying map showing the viewpoint locations is included in Figure 4.17 below and also in the Photomontage Booklet.

Table 4-10: Viewpoint Locations

Viewpoint No.	Description
1	View from N25 south of proposed development
2	View from L3004 at Glounthane, east of the proposed development
3	View from L3004 at Glounthane, east of the proposed development
4	View from L3004 at Glounthane, west of the proposed development
5	View from road in The Woods residential development
6	View from the Terrace (scenic route) , east of the proposed development
7	View from the Terrace(scenic route) west of the proposed development
8	View from the Terrace (scenic route), further west of the proposed development
9	View from local road to the north (scenic route) at site emergency access
10	View from junction of local road and Priest's Hill east of proposed development
11	View from Priest's Hill, east of the proposed development
12	View from Cois Chuain, west of the proposed development
13	View from junction at Ballynaron, west of proposed development
14	View from local road (scenic route) east of proposed development

Figure 4.17: Viewpoint Locations 1-14 (Aerial Image Source: Google Maps 2021)



4.4 LANDSCAPE AND VISUAL EFFECTS

4.4.1 Landscape Sensitivity

As set out in the GLVIA, landscape sensitivity includes judgements on both landscape value, and landscape susceptibility, which is also related to the type of development.

Valued elements in the landscape are described in Section 4.3.3 and the value of the southern part of the site (between the Terrace and L3004/Ashbourne Walk) is considered high, due to the mature trees/woodland and historic aspects of the character, while the upper part of the site has a more open character with fewer trees, but an elevated site adjacent to a scenic route, and is considered medium value.

In terms of susceptibility to the proposed development, a large scale housing development on a partially wooded sloping site, overlooking Lough Mahon would be considered to be Highly susceptible to change of this nature.

The landscape sensitivity, therefore, is considered to be **High** in the southern part of the site and **medium-high** on the northern part.

High Sensitivity is described in Table 4-1 as:

Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics. The character of the landscape is such that it has limited/low capacity for accommodating change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principal management objective for the area is conservation of the existing character.

Medium sensitivity is described in Table 4-1 as:

Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong. The character of the landscape is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principal management objective may be to consolidate landscape character or facilitate appropriate, necessary change.

It should be noted that while this chapter refers to elements of cultural heritage which contribute to the landscape character and sensitivity, The cultural heritage impacts of the proposed development are in assessed in Chapter 11.

4.4.2 Landscape Effects – Construction Phase

Magnitude of Change

Changes to the physical landscape

The construction phase will include site clearance, tree and vegetation removal, demolition of 1 no. derelict building on site.

Removal of vegetation will include removal of several hedgerows (593 linear metres) and there approximately 137 no trees to be felled. Though this will occur during construction, the effects will persist after construction is completed, and therefore are considered Operational effects and are described below.

Excavations and earthworks will be evident on site and activities on site during this phase will involve machinery entering and exiting the site.

The construction phase is likely to last for 48 months. The magnitude of change is considered Medium. It is however a localised change and will affect the site and immediate surrounds but not evident over the wider landscape.

Significance of Effect

The effects are considered Medium, and are taking place on a site where sensitivity ranges from Medium to High. The significance of effect is considered to be Moderate-Significant, and the effects are considered adverse. The duration is temporary to Short term.

4.4.3 Landscape Effects – Operational Phase

Magnitude of Change

The land cover and landform of the site will undergo considerable change to facilitate the proposed residential development of 289 units, a creche, 4 ESB substations, an emergency access to the north and a path connection the site from the southern access on the L-4003 to the northern part of the site, on a site which is currently composed of large fields, woodland areas and two buildings.

The site layout maximises the potential of the site, concentrating the majority of the built form, vehicular access and parking areas to the north and south of the site close to the existing roads (access to the buildings in the centre of the site is restricted) and providing a north-south access path in order to improve the connectivity between the site, and the village centre and train station.

In the centre of the site, the existing landscape character is enhanced, by retaining the boundary trees, and internal trees where possible and enhancing with further tree planting, while the path winds through grassed areas and trees.

There is considerable removal of trees and vegetation which will be evident during the operational phase. This includes the removal of:

- 593 linear meters of hedgerow
- 4 Heritage trees categorised as Category A (25 Category A trees retained)
- 4 Heritage trees categorised as Category B

- 56 Category B trees (201 retained)
- 57 Category C trees.

There are 16 no Trees in Category U to be removed. These are trees which are not considered to be of value and some which are dead.

It has been noted that Champion and Heritage trees occur on the southern part of the site, and efforts were made during the design stage to retain these trees where possible. Due to design changes, there are no Champion trees removed, while 15 of the 23 Heritage trees are to be retained. 8 no. replacement trees of the same species of Heritage Trees are to be planted in locations adjacent to the proposed public path and as highlighted on Landscape Master Plan Drawing No. 21543-2-101. Further details of the Champion and Heritage Trees are contained in the Arboricultural Tree Report contained in Appendix 4-3.

While tree and vegetation removal is proposed, and cognisant of the Development Plan policy on trees and vegetation, hedgerows and trees have been retained where possible as shown in the Landscape Master Plan. Mitigation planting includes the planting of considerably more hedgerow than was removed. This includes the mature hedgerow and a mature tree line to the northeast of the site, which has been retained and incorporated into the open space, and a number of Category B trees, which are shown in the Tree Removal Plan, 21543-2-103 and which is Appendix 4-4. This indicates not only the trees to be removed but also those to be retained. Tree lines along the site's western boundary north of the Terrace are shown as retained, as are the mature trees along the site's eastern boundary between the site and Combermere House. It is noted also that the proposed development increases the amount of tree cover in the northern part of the site.

In the southern section of the site, tree removal is more pronounced, where a number of trees south of The Terrace are removed to facilitate the proposed buildings and also to facilitate the access path which connects the site to the main road (L-4003). The changes to the other historic landscape elements of the site include the retention of the stone grotto and its incorporation into the proposed development, as referenced in Chapter 11 of this EIAR.

As indicated on the Landscape Master Plan Drawing No. 21543-2-101 Appendix 4-5) of the following planting is proposed:

- 800 linear metres of hedgerow are proposed
- 656 trees are proposed (open space trees, street trees, back garden trees)
- 316 woodland planting whips are proposed
- 8 no. replacement heritage trees

The magnitude of change as a result of the mature tree removal and construction (and as a result, removal of the woodland character parts of the site including the area around The Terrace, ranges from Medium in the northern part of the site, to High in the southern part of the site.

Significance of Effect

The significance of the landscape effect varies throughout the site. The northern part of the site is considered of Medium sensitivity and with a Medium magnitude of change and therefore results in a Moderate landscape effect. The effect is considered neutral as the proposed development is set well back from the existing scenic route and surrounds and will be located adjacent to a (permitted) residential development to the west. The increased pedestrian connectivity to the village centre and train station is seen as a beneficial effect

The southern section of the site (south of The Terrace) is considered Highly sensitive, and its original tree and shrub collection is of historic significance. The magnitude of change in this portion is considered High due mainly to the extent of tree removal, and the landscape effect in this part of the site is considered to be Significant and adverse. While the distinctive character and high proportion of mature trees, some of which are Category A and Heritage trees, will change, it is recognised that extensive mitigation planting and in particular tree planting will mature over time, improve the landscape setting of the development.

4.4.4 Visual Effects – Construction Phase

The construction phase is expected to last 48 months and will be carried out in four distinct phases as outlined in the CEMP, with development progressing from north to south. Visual effects associated with the construction phase will include movement of machinery, earthworks, site clearance and demolition. Hoarding and fencing will be erected and should restrict views of machinery, materials and works. The proposed temporary construction compound is proposed in the centre of the northern part of the site (as set out in the CEMP) and will not be visible from the surrounds. Though site clearance will be carried out during this stage the effects are assessed in 4.4.5 Visual Effects - Operational Phase.

During the construction phase, the significance of effect will vary depending on the viewpoints, and is considered temporary in nature. Viewpoints 2,3,5,8 show no construction phase or operational phase effects. The construction phase effects of the remaining viewpoints are likely to range from Imperceptible in Viewpoints 10, 12, 13 and Not Significant in Viewpoint 11. Viewpoints 1,9 are likely to be Slight while viewers are Viewpoints 4,6,7 are likely to be in close proximity and experience more pronounced visual effects ranging from Moderate-Significant. There are adverse in nature and temporary in duration.

4.4.5 Visual Effects – Operational Phase

Based on the desk study, review of the proposed development, site characteristics and sensitivity, as well as and visibility of the site, fourteen representative viewpoints (listed in Table 4.9) were selected to assist in the appraisal of visual effects. Photomontages were prepared by GNET 3D. These are described below, and existing photographs, proposed photomontages along with the methodology used, are provided in a separate booklet which is contained at the end of this chapter.

Photomontages

The photomontages for all views were taken using a cropped-frame Canon EOS REBEL TSi camera. The 35mm lens was chosen as default which is the closest to 50mm full frame lens. However, wider lenses of 10mm and 18mm were also used to allow the view of wider area and provide more reference points required for accuracy of photomontages. GNET have added white rectangles to these views to represent the window of the photo if it was taken using 50mm lens. The lenses used and the horizontal angles of view are shown in the photomontage booklet contained at the end of this chapter.

- Views No 3,4,5,6,7,8,10,11,12 were taken using 18mm lens
- Views No 1,2,13,14 were taken using 35mm lens.
- View No 9 was taken with a 10mm lens

Table 4-11: Viewpoints

Viewpoint 1 – View from N25 south of the proposed development
<p>Existing View</p> <p>The existing view shows the N25 road in the foreground, with hedging separating the traffic lanes. Beyond this, a glimpse of water is visible, and the land slopes up and away from the viewer. The majority of the hillside is wooded, with dense tree cover in the centre and left of the view, though built development is evident among the trees to the left. Tree cover also extends along the lower hillside to the right of the image, with several large open fields above. Several buildings are seen along the waterfront and a small number of houses are seen along the skyline to the right of the view. The image of densely wooded hillside sloping down to the water is a key characteristic of several parts of the Cork Harbour landscape.</p>
<p>Visual Receptor Sensitivity</p> <p>The view, though taken from a National road where traffic travels at speed, is one of scenic quality. The receptor sensitivity is therefore considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows several rows of dwellings visible on upper slope, above the dense woodland. Some tree removal is evident to facilitate the dwellings, but this is limited, and the southern part of the site still appears to have dense tree cover. The proposed apartment building in the southwest corner of the site is barely visible.</p>
<p>Magnitude of Change</p> <p>The change relates mainly to the addition of dwellings on the northern part of the site, along the brow of the hill. The proposed development occupies a medium horizontal extent of the view, and though clearly visible, the retained trees serve to break up the development considerably. While a large area of tree cover is retained, the development brings a suburban element onto the upper slopes of the wooded hillside. The magnitude of change is considered Medium which is defined in Table 4.5 as:</p> <p><i>Change that is moderate in extent, resulting in partial loss or alteration of landscape receptors, and introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context.</i></p>
<p>Significance of Effect</p> <p>The result of a Medium magnitude of change and a Medium visual receptor sensitivity results in a Moderate effect over the long term. Initially post-construction the planted trees may appear less prominent, but as they grow will soften the effects of the proposed development. While the tree removal is considered an adverse effect, the dwellings are integrated into the existing woodland and retained tree lines/hedgerows, and the majority of the buildings are seen against a backdrop of existing trees. It is considered Neutral in quality.</p>
<p>Cumulative Effect</p> <p>The proposed development at Ashbourne House (21/5072, which is currently pending) was reviewed, and the montages supplied with the scheme were reviewed. A view from a similar location to Viewpoint 1 shows a very minor glimpse of a building in the lower right corner of the view.. Another development currently pending (21/4622) is likely to result in a minor area of tree removal and some dwellings may be visible at the lower right hand side of the image. A permitted development (17/5699) east of the site may be partly visible. This will result in a Not Significant to Slight, adverse, cumulative visual effect</p>

Viewpoint 2 View from L3004 at Glounthane, east of the proposed development
<p>Existing View</p> <p>The existing view shows the L-4003 looking west along the main road through Glounthane, which looks towards the southern part of the site. To the right of the view, dense hedgerows and tree planting is visible, and as the road curves around, the hillside with a combination of large open fields and dense woodland, is visible in the distance. On the left of the view, a small building, a mast and some vegetation is visible. In the distance, the buildings adjacent to Fitzpatrick's shop and the O' Neill pub are just visible.</p>
<p>Visual Receptor Sensitivity</p> <p>The view is one in an urban setting, but with some scenic qualities. It represents both motorists and pedestrians travelling through the village. The sensitivity is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows that the proposed development will not be visible as it will be hidden by vegetation and structures.</p>
<p>Magnitude of Change</p> <p>No change</p>
<p>Significance of Effect</p> <p>None.</p>

Viewpoint 3 View from L3004 at Glounthane, east of the proposed development
<p>Existing View</p> <p>This view is taken further east than Viewpoint 2, and shows the road with dense trees and vegetation to the right of the image. (A pedestrian/cycle path is currently under construction). A grass verge is visible to the left. In the distance, The O' Neill pub (under construction) is visible.</p>
<p>Visual Receptor Sensitivity</p> <p>The view is pleasant view, with a high proportion of mature vegetation and little built form, though in a village. Receptors would be pedestrians, cyclists and motorists travelling at slow speeds and are considered Medium sensitivity.</p>
<p>Proposed View</p> <p>The proposed view shows that the proposed development will not be visible due to screening by vegetation.</p>
<p>Magnitude of Change</p> <p>No change.</p>
<p>Significance of Effect</p> <p>None.</p>

Viewpoint 4
<p>Existing View</p> <p>This view looks to the east along the L4003 road through Glounthaune. To the left are a number of buildings, seen against a backdrop of mature trees, while in the middle ground and background, mature trees line the road.</p>
<p>Visual Receptor Sensitivity</p> <p>The view has considerable scenic qualities due to the expanse of mature trees, though the varied built form is not considered to be remarkable. Receptors include motorists, pedestrians and cyclists travelling along the road and the sensitivity is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows a new building to the centre of the view, adjacent to the existing apartment building. Some trees have been removed to facilitate the building but the building still appears against a backdrop of trees.</p>
<p>Magnitude of Change</p> <p>The removal of the mature trees creates a small gap in the expanse of mature trees. The change as a result of the building is of limited extent, and it fits in well in terms of scale with the existing built form to create a coherent block, of simple modern design, with varied frontage and the upper storey set back breaks up the form. The magnitude of change is considered Medium:</p> <p><i>Change that is moderate in extent, resulting in partial loss or alteration of landscape receptors, and/or introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context.</i></p>
<p>Significance of Effect</p> <p>Visual effect is considered Moderate. Though it is recognised that tree removal is an adverse effect, the visual effect of the proposed building is considered overall to be neutral. The scale and form shape complement the other buildings, and the backdrop of mature trees provides a setting for the building. The proposed trees in front of and to the right of the building further improves the setting.</p>
<p>Cumulative Effect</p> <p>A montage from a similar viewpoint in the application for the adjacent Ashbourne House development shows no visibility, so no Cumulative effect from this view.</p>

Viewpoint 5 – View from ‘The Woods; development east of the site
Existing View The existing view shows the view from a road within a nearby residential development to the east. In the view is the roadway, a grass bank and a line of mature trees with some lower vegetation.
Visual Receptor Sensitivity The view from a road within a residential development is pleasant but not scenic. Viewers will be residents and those entering and existing the development and the houses which are located on the cul-de-sac. The houses in this location are all facing south (and not in the direction of the view) and the sensitivity is considered Medium.
Proposed View The proposed view shows that there will be no visibility of the proposed development.
Magnitude of Change None.
Significance of Effect None.

Viewpoint 6- View from the Terrace (scenic route) , east of the proposed development
Existing View This view shows a narrow road, with a gate lodge building and a low wall to the right of the view. Mature trees line both sides of the road, and restrict views to the surroundings.
Visual Receptor Sensitivity The view is from a Scenic Route and is considered to have high scenic qualities due to the mature vegetation and the historic gate lodge building. This view also represents residents of the gate lodge who would have a similar view. Sensitivity is considered High.
Proposed View The proposed view shows that the majority of the mature trees to the left of the view have been removed, with several remaining in the distance. The trees to the right are retained. To the left of the view, a low hedge and a new footpath borders a car park with a timber structure visible to the left of the view. Tree planting is shown to the left and the rear of the image which softens the view. A glimpse some long distance views to the centre of the view are now visible.
Magnitude of Change The change relates to the considerable extent of tree removal, which affects more than half of the view, and the construction of a car parking area and building. The horizontal extent is considerable, but the vertical extent of the change is also considerable due to the removal of mature trees. The magnitude of change is considered High which is defined in Table 4.5 as: <i>...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.</i>
Significance of Effect Professional judgement was applied to Table 4.3, so the combination of a High receptor sensitivity and High magnitude of change results in a Significant effect. The overall character of the view is considerably changed from an enclosed view dominated by mature trees, to an open, view of a more urban character with a higher proportion of hard surfaces. The quality of the change as set out in Section 4.2.2.3 is considered Adverse . Over time, the mitigation measures specified in the Landscape Master Plan and illustrated in the photomontage will ensure that the high design quality of the space, and vegetation tree growth will improve the view somewhat and provide some screening. The dense tree canopy and enclosed character remain fundamentally changed.

Viewpoint 7 - View from the Terrace (scenic route) west of the proposed development
<p>Existing View</p> <p>This view is taken looking along the Terrace, which is a narrow road with an extensive canopy of mature deciduous trees which line both sides. An entrance is visible to the left of the view, and one further to the right. Telephone or electricity poles are also visible but are not obvious elements in the view.</p>
<p>Visual Receptor Sensitivity</p> <p>The serenity of the visual receptors view on a scenic route and which is considered to have scenic qualities due to the mature tree canopy, is considered High.</p>
<p>Proposed View</p> <p>The proposed view shows a new low wall to the left of the view, with a footpath to the right of the view. Some mature trees to the right of the view have been removed. A small building is visible to the right of the wooden pole, and trees and vegetation are visible in the clearing. A pedestrian crossing/traffic table is visible across the road in the background of the view.</p>
<p>Magnitude of Change</p> <p>The change relates to the removal of mature trees which lightens the canopy but does not change the overall character. The introduction of the low wall, and the footpath and small building are noticeable, but the overall character of the view remains. Some replacement tree and shrub planting helps to compensate for the tree removal. The magnitude change is considered to be Low which is defined in Table 4.5 as:</p> <p><i>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.</i></p>
<p>Significance of Effect</p> <p>The Low magnitude of change and the High sensitivity of the visual receptor results in a Moderate degree of change as per Table 4.3, however using professional judgement it is considered that this results in a Slight, effect, however as the replacement trees contribute to maintain of the overall character of the view. The quality of the effect as set out in Section 4.2.2.3 is considered Neutral.</p>

Viewpoint 8 – View from road in Anne mount, west of the proposed development
<p>Existing View</p> <p>This view shows a narrow road in a residential area (cul-de-sac). The road is bounded by a hedge, with shrubs and trees on both sides behind the hedge. An entrance is visible to the right of the view. Mature trees are visible in the centre of the view.</p>
<p>Visual Receptor Sensitivity</p> <p>The road leads to several residences but not close to any house. Receptors would be those entering or leaving residences, motorists travelling at slow speeds, and pedestrians. The road is pleasant and has scenic qualities. The sensitivity is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows that the proposed development is not visible from this view, due to screening by vegetation.</p>
<p>Magnitude of Change</p> <p>None.</p>
<p>Significance of Effect</p> <p>None.</p>

Viewpoint 9 - View from local road to the north (scenic route) at site emergency access
<p>Existing View</p> <p>This view shows a road with an entrance to a field to the left of the view. Trees and mature hedgerow line the road. In the background, beyond the field, a glimpse of distant land (across the estuary) is visible.</p>
<p>Visual Receptor Sensitivity</p> <p>The view is a pleasant view with long distance views, and located on a scenic route. Receptors would be walkers and cyclists, and motorists travelling at relatively slow speeds. Sensitivity is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows the vegetation along the road is retained, and an entrance (surfaced with reinforced grass) is visible, with a number of dwellings seen in the centre of the view. The road surface and some trees and grass are also visible. The glimpse to the landscape beyond is obscured by the dwellings.</p>
<p>Magnitude of Change</p> <p>The proposed development is visible over a relatively small extent of the view. While the majority of the vegetation is retained, however the long distance view is obscured. The rural character of the view is somewhat changed. The magnitude of change is considered Low which is defined in Table 4.5 as:</p> <p><i>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</i></p>
<p>Significance of Effect</p> <p>A Medium sensitivity combined with a Low magnitude of change as outlined in Table 4.3 results in a Slight effect. The quality of the change as set out in Section 4.2.2.3 is considered Adverse.</p>

Viewpoint 10- View from junction of local road and Priest's Hill east of proposed development
<p>Existing View</p> <p>The existing view shows the junction to the northeast of the site in the foreground. A low hedge bounds a large arable field which takes up the centre of the view, and some large trees are seen along the road to the right of the view. In the background there are distant views to the estuary and the land beyond.</p>
<p>Visual Receptor Sensitivity</p> <p>This is a scenic route and the view is considered to have some scenic qualities, with the long distance views apparent but not dominant. The sensitivity is considered Medium to High.</p>
<p>Proposed View</p> <p>The proposed view shows a very small proportion of the proposed development will be visible in this view. A glimpse of a building is visible through the branches of the mature tree to the right of the view.</p>
<p>Magnitude of Change</p> <p>The magnitude of change is considered Negligible - the proposed development is barely noticeable. While it may be slightly more visible when the tree is not in leaf, it remains Negligible which is described in Table 4.5 as follows:</p> <p><i>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.</i></p>
<p>Significance of Effect</p> <p>Applying professional judgement, the significance of visual effect is considered Imperceptible. The quality of the effect is considered neutral.</p>

Viewpoint 11 - View from Priest's Hill, east of the proposed development
<p>Existing View</p> <p>The existing view shows the view over some roadside vegetation, towards a large arable field. Some tree lines are visible in the centre of the view, with one dwelling clearly visible and another partly screened from view.</p>
<p>Visual Receptor Sensitivity</p> <p>The view is a pleasant rural view but not considered scenic, from a narrow lane where motorists will be travelling slowly, and pedestrians also. The sensitivity is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows that some of the rooves of the proposed development are just visible over the brow of the hill.</p>
<p>Magnitude of Change</p> <p>The elements of the proposed development visible take up a very small proportion of the overall view and do not affect the character. The change is considered of Negligible magnitude as defined in Table 4.5:</p> <p><i>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.</i></p>
<p>Significance of Effect</p> <p>A combination of Medium receptor sensitivity and Negligible magnitude of change result in Not Significant effect. The quality of the effect is considered neutral.</p>

Viewpoint 12 - View from Cois Chuain, west of the proposed development
<p>Existing View</p> <p>This view is from the slightly elevated estate of Cois Chuain, which lies to the west of the proposed development. The view shows a grassed areas in the foreground, with a road and several dwellings in the middleground. In the background, the sloping hill is visible, with a combination of trees and open fields. A dense clump of trees are visible on the hill to the right and left of the view.</p>
<p>Visual Receptor Sensitivity</p> <p>This represents residential receptors in the development, and the view a pleasant view. The view s form the rear of the houses pictured would be similar. Sensitivity is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows just a glimpse of a building to the centre of the view, which is almost screened by intervening vegetation. An additional 'Proposed' view image illustrates in red the extent of the development hidden by topography and structures or vegetation.</p>
<p>Magnitude of Change</p> <p>The gable end of a house partly screened occupies a very small extent of the view, and is considered Negligible magnitude of change. This is described in Table 4.5 as:</p> <p><i>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.</i></p>
<p>Significance of Effect</p> <p>Applying professional judgement, the significance of visual effect is considered Imperceptible. The quality of the effect is considered neutral.</p>
<p>Cumulative Effect</p> <p>The permitted development, through which the proposed development is accessed, (17/5699) is likely to be visible form this location. However as the proposed development is Imperceptible, the cumulative visual effect is also considered Imperceptible.</p>

Viewpoint 13 - View from junction at Ballynaron, west of proposed development
<p>Existing View</p> <p>The existing view is taken from a junction on a hillside west of the site, and vegetation obscures views to the middleground. In the distance, a backdrop of trees is seen against the skyline, and one dwelling is visible in the upper left of the view.</p>
<p>Visual Receptor Sensitivity</p> <p>Visual receptor sensitivity, representing motorists and pedestrians on a local road with no scenic qualities is considered Medium.</p>
<p>Proposed View</p> <p>The proposed view shows the gable end of a very small number of houses to the left of the view, in the background.</p>
<p>Magnitude of Change</p> <p>The proposed development occupies a very small proportion of the overall view, does not affect the rural character, and is considered Negligible. This is described in Table 4.5 as:</p> <p><i>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.</i></p>
<p>Significance of Effect</p> <p>Not Significant. The quality of the effect is considered neutral.</p>

Viewpoint 14 - View from local road (scenic route) east of proposed development
<p>Existing View</p> <p>This view shows an elevated view from the road northeast of the development. A grain field lies adjacent to the road, which slopes to a hedgerow with mature trees (defining Priest's Hill) in the middle ground. Beyond this, the land slopes up again, and another grain field is visible. To the right of the view is a cluster of dwellings. A hedgerow with trees is visible in the background. To the left of the view, a distant glimpse of the ridge across the estuary can be seen. It should be noted that if the viewer turns to the left, long distance view over the estuary are available, which is the more obvious scenic view.</p>
<p>Visual Receptor Sensitivity</p> <p>This view represents motorists and pedestrians along a scenic route, with some long distance views. It is also close to a number of residences along the northern side of the road. The sensitivity is considered High.</p>
<p>Proposed View</p> <p>The proposed view shows the proposed development appears as a series of terraced dwellings in the centre of the view, to the rear of the houses and field boundary. The houses are slightly higher than the existing dwellings but are partly screened by the intervening (retained) trees and hedgerow.</p>
<p>Magnitude of Change</p> <p>The development occupies a medium extent in the centre of the view, and is set in well to the existing landscape. Though the ridges of the houses are higher than the existing dwellings and are seen against the skyline, they do not affect the scenic view over the estuary, which is largely to the left of the viewer and not shown in this image. The magnitude of change is considered Medium., which is defined in Table 4.5 as:</p> <p><i>Change that is moderate in extent, resulting in partial loss or alteration of landscape receptors, and introduction of elements that may be prominent but not necessarily substantially uncharacteristic in the context.</i></p>
<p>Significance of Effect</p> <p>A medium magnitude of change and a High receptor sensitivity would result in a Significant effect. However professional judgement was applied and it is considered that a Moderate effect is more appropriate. The quality of the effect as outlined in Section 4.2.2.3 is considered neutral, as the development is compact, and occupies an area already largely screened by trees and intervening vegetation and buildings and will not hinder the more scenic view to the left of the viewer.</p>

4.4.6 Summary of Visual Effects

Table 4-12 below summarises the visual effects of the 14 viewpoints. The post-construction or short term effect is included; however the medium-long term effect is referred to in the summary below:

Table 4-12: Summary of Visual Effects

Viewpoint No.	Description	Visual Receptor Sensitivity	Magnitude of Change	Significance of Effect –Post construction	Significance of Effect Medium- Long Term
1	View from N25 south of proposed development	Medium	Medium	Moderate, adverse	Moderate, neutral
2	View from L3004 at Glounthane, east of the proposed development	Medium	None	None	None
3	View from L3004 at Glounthane, east of the proposed development	Medium	None	None	None
4	View from L3004 at Glounthane, west of the proposed development	Medium	Medium	Moderate, neutral	Moderate, neutral
5	View from 'The Woods; development east of the site	Medium	None	None	None
6	View form the Terrace (scenic route) , east of the proposed development	High	High	Significant, adverse	Significant, adverse
7	View from the Terrace(scenic route) west of the proposed development	High	Low	Slight, neutral	Slight, neutral
8	View from the Terrace (scenic route), further west of the proposed development	Medium	None	None	None
9	View from local road to the north (scenic route) at site emergency access	Medium	Low	Slight, adverse	Slight, adverse
10	View from junction of local road and Priest's Hill east of proposed development	Medium	Negligible	Imperceptible, neutral	Imperceptible, neutral
11	View form Priest's Hill, east of the proposed development	Medium	Negligible	Not Significant, neutral	Not Significant, neutral
12	View from Cois Chuain, west of the proposed development	Medium	Negligible	Imperceptible, neutral	Imperceptible, neutral
13	View from junction at Ballynaron, west of proposed development	Medium	Negligible	Not Significant, neutral	Not Significant, neutral
14	View from local road (scenic route) east of proposed development	High	Medium	Moderate, neutral	Moderate, neutral

Overall, the visual effects range from Imperceptible to Significant, while in four of the views, (Viewpoints 2,3,5,8) no visibility of the proposed development can be seen. Viewpoints with visual effects at the lower end of the scale include two viewpoints (10,12) which are considered Imperceptible, and two viewpoints (11, 13) considered Not Significant. Viewpoints 7 and 9 are considered Slight, three viewpoints (1,4,14) Moderate and one (Viewpoint 6) Significant.

The quality of the views ranges from adverse to neutral. Only two of the 14 viewpoints are considered to have adverse visual effects, with the majority considered neutral. This indicates that in the majority of the viewpoints where the development is visible, the proposed development fits in well with the surroundings, as illustrated in Viewpoints 1,4,7,9,10,11,12,13,14. While viewpoints 6 and 9 are considered to illustrate adverse visual effects, it should be noted that both are evident over a short section of the road, and it should be noted that Viewpoints 6 and 7 are in close proximity to each other, and the visual effects differ greatly, with Viewpoint 7 illustrating Slight and neutral visual effects.

Visual effects from South – N25 and Glounthaune village

Visual effects from the south of the site range from No effect to Moderate and adverse. Viewpoints include one long distance view (1) from the N25 where the development would be seen when traveling west on the road, and the houses on the upper part of the hill are visible while the southern part of the site appears well screened. Visibility is only available for a short stretch of road before becoming obscured by vegetation.

A number of views were taken from the road south of the site (L4003) in Glounthaune village, and the two views from the east (2,3) show no visibility due to intervening vegetation. View 4 shows the proposed development is visible but fits in well in the setting, and is considered Moderate and neutral.

Views from the Terrace – centre of the site

Viewpoints representing viewers along the Terrace, a scenic route with a distinctive character defined by a mature tree canopy, include Viewpoint 6 and 7. Visual effects at Viewpoint 6 are considered Significant and adverse while View 7 looking to the east, in close proximity, is considered Slight and neutral. This is due in part to the retention of the mature trees on the north side of the Terrace, while tree removal is more pronounced to the south of the Terrace. While the effects in Viewpoint 6 are significant, these are localised, and do not extend far beyond the immediate vicinity. It is noted that the dense tree canopy remains very much evident in View 7 and that the change, though Significant in Viewpoint 6, occurs over a localised area of the scenic route. As the Development Plan policy relating to scenic routes notes, appropriate site layout, design and screening are important in these locations and have been considered in this instance. Proposed tree planting is also seen in Viewpoint 6 and shown on the Landscape Plan.

Views from the east

Other views from the east of the site represent viewers in the Woods development (5) and viewers in Priest's Hill (11). These viewpoints show complete screening by vegetation and topography in Viewpoint 5, and a Not Significant effect in Viewpoint 11.

Views from the west

Viewpoints 12 and 13 represent residents (Cois Chuain) and road users (13) to the west. Cois Chuain is an elevated estate representing a considerable area of residences, and visual effects for these viewpoints are considered to be Imperceptible and Not Significant – the topography and vegetation screens most of the development, with just minor glimpses available.

Views from the north

Viewpoints 9 and 10 are from the road directly north of the site, while 14 is further east along the same road. These viewpoints range from Imperceptible to Moderate, with the more elevated view (14) a Moderate visual effect, though considered neutral as it is well set into the view and the retention of vegetation minimises visual effects. Views 9 and 10 show the effect of the topography and the retention of vegetation in screening the view. The overall visual effect on the scenic route to the north of the site ranges from Not Significant (Viewpoint 10) to Slight (9) and Moderate (View 14). However it should be noted that in only Viewpoint 14 is there an encroachment on the view of the estuary and further west the views are very restricted due to the existing single dwellings. In this location, also, the retention of tree and hedgerow vegetation and appropriate landscaping Development Plan policy helps to reduce visual effects as seen in Viewpoint 14

4.4.7 Cumulative Visual Effects

Several other developments were taken into consideration. These include:

- A permitted residential development to the west of the site through which the proposed development is accessed (17/5699)
- A residential development 21/6851 immediately south of 17/699 and west of the proposed development, consisting of 21 no. dwellings.
- A residential development immediately adjacent to the east on the grounds of Ashbourne House currently in the planning process (21/5072)
- A residential development to the east of Priest's Hill currently in the planning process

We note that some of the above applications are the subject of a Further Information Request. The original planning application and visualisations have been used in this Cumulative Assessment, but we note there may be changes following the lodgement of the Further Information.

A review of the above montages shows that Viewpoint 1 (N25 south of the development), Viewpoint 4 (looking along the L4003 the main road south of the proposed development) and Viewpoint 12 from Cois Chuain are the viewpoints most likely to illustrate Cumulative effects.

Cumulative effects from Viewpoint 1 are considered to be Not Significant to Slight, and it is likely that views of the Ashbourne House (21/0572) development to the east and the permitted development at Lackenroe to the west (17/5699) will be restricted, though some tree removal may be visible from this viewpoint, to the west of the site. As one is travelling along the N25, view of the under construction Harper's Creek development is seen but this is just outside the Viewpoint 1 montage, and so some sequential effects will be experienced.

A review of a similar viewpoint to Viewpoint 4 indicated no visibility of the proposed Ashbourne House development is likely from this view. A review of Viewpoint 12 from Cois Chuain illustrates that though the proposed development is barely visible, there may be some visibility of the permitted residential development (17/5699) to the west of the site from this development however Cumulative effects are considered Imperceptible.

Sequential cumulative effects, which are effects evident as one travels along a route or through the landscape, will be evident. Residential developments and tree removal will be a feature of the road leading up the hill from Glounthaune Church, west of the site, where the entrance to the development is permitted, and increasingly as one travels along the Terrace. The proposed development will be evident over a short section of the Terrace, while the proposed Ashbourne's house development will be visible at the eastern end of the terrace while proposed development at Priest's Hill will also be evident.

4.4.8 Cumulative Landscape Effects

The landscape in the immediate vicinity of the site is undergoing a transition from a partly wooded hillside, which has scattered sub-urban style development to one which is increasingly characterised by residential estates of various sizes.

The site and its surrounds are considered in the MDLAP as areas suitable for residential development, however this does result in a change to the landscape character in parts of this area. One of the areas' defining characteristics is the topography, allowing some extensive views over the harbour, as well as the cluster of historic/estate landscapes which are characterised by areas of mature trees and stone walls and distinctive buildings.

Several developments, both existing, permitted and several proposed are to be considered. Existing developments are concentrated to the east and west of the site, while directly adjacent to the site are mainly single detached properties rather than estates. A permitted residential estate (38 units) to the west will provide access to the proposed development. To the southeast, there is a proposal for 94 units on the Ashbourne House lands, while to the east of Priest's Hill a development of 12 houses is proposed. Further east, a residential development of 159 houses is under construction (Harper's Creek). All development will involve the change in landcover and land use from agricultural/estate landscape, to residential.

The addition of the proposed development will result in cumulative landscape effects, which is of a larger scale and size than the existing, permitted and proposed developments listed above. The removal of vegetation and the increase in residential development of a sub-urban style, will result in a change to the overall character.

It is considered that the proposed development will result in a Slight and adverse cumulative effect on the site and surrounds.

4.5 AVOIDANCE, REMEDIAL OR MITIGATION MEASURES

Mitigation measures aim to avoid, reduce, and remedy or offset negative or adverse effects on the environment caused by the proposed development. This section outlines both avoidance measures taken during the design stage as well as remedial measures. Potential changes in character, visibility and land use patterns have been considered from the outset, including indirect, secondary and cumulative impacts. This has given direction to the overall site layout, avoidance measures and proposed mitigation measures, which have been discussed with the Project Design Team and incorporated into the development proposal; the subsequent assessment of likely landscape and visual impacts takes account of the proposed mitigation measures.

4.5.1 Construction Phase

Mitigation measures during construction phase include:

- Implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, delivery of materials.
- Appropriately scaled hoarding will be erected to restrict views of construction site.
- The proposed temporary construction compound and car parking area is located within the northern part of the site and away from any entrances to minimise visual effects.
- Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish).
- Tree protection measures should be implemented as outlined in the relevant Arboricultural Surveys and Reports.

4.5.2 Operational Phase

The site layout responded to the topography and existing vegetation by concentration the areas of built form and vehicular access in areas to the north and south and minimising built form and vehicular access in the centre of the site.

Throughout the design process, efforts were made to create a sense of place, prioritise pedestrian and cycle permeability and to provide a hierarchy of open spaces.

The layout aims to minimise tree removal, as the importance of the mature trees and hedgerows to the site were evident, both to maintain the landscape character, and the screening to reduce visual effects. Key elements of mitigation included:

- Retention of an important mature hedgerow and tree line in the northeast of the site and incorporation into an open space
- A total of 593 linear metres of hedgerow was removed while 800 linear metres of hedgerow planting is proposed.
- Retention of trees along east and western boundaries north of The Terrace
- Retention of several large mature trees in southeast corner of the site, near the main road at Glounthaune
- Planting of 8 no. heritage trees to replace 8 no. trees which have to be removed
- The removal of 137 trees in total is proposed, and planting of an additional 656 trees are proposed. An additional 316 smaller trees (whips) for woodland planting are proposed.
- A stone grotto located in close proximity to the proposed apartment block is to be retained and incorporated as a feature into the design.

The buildings and proposed path connecting the north and south of the site to the village centre necessitated the removal of some trees in order to achieve an acceptable gradient and width.

The importance of the southern part of the site and its historic association with Ashbourne House as detailed and assessed in Chapter 11 has led to design changes proposed to minimise landscape effects on the former woodland garden.

Removal of trees in the site's southern section was minimised, however, to facilitate the proposed building south of the Terrace, a number of trees are to be removed. Replacement tree planting is proposed on the site, both east and west of the proposed buildings, and in other areas where tree removal was necessary.

These measures are evident in the Landscape Plan and Tree Removal Plan (drawings 20543-2-101 and 20543-2-103) as well as a drawing 20543-2-104 illustrating the Heritage and Champion trees to be retained, those removed, and specific mitigation planting to replace the Heritage trees with a similar species.

4.6 CONCLUSION

This assessment considers the landscape and visual effects of the proposed development. In terms of landscape effects, the site was characterised into two main areas, north and south of the Terrace.

The proposed development is considered to have a Moderate and neutral effect on the northern part of the site. This part of the site is less sensitive, and the proposed development is generally considered to fit in well to the surrounds, is located in what are currently agricultural fields, set well back

from the existing scenic route and will be located adjacent to a (permitted) residential development to the west. The increased pedestrian connectivity to the village centre and train station is seen as a beneficial effect. Though vegetation removal is proposed in the northern part of the site, this is of a lesser extent than in the southern part of the site, and extensive tree and hedgerow planting is proposed as well as the creation of open spaces which also reflects Development Plan policy for new developments to contribute to Green Infrastructure.

The southern section of the site (south of The Terrace) is considered Highly sensitive, with a distinctive character due to the mature tree canopy and its original tree and shrub collection of historic significance. The Terrace road itself has a distinctive character where it runs through the site. The magnitude of change in this area of the site is considered High due mainly to the extent of tree removal and the resulting effect on the site's character, and while there are positive elements including the pedestrian connectivity, the landscape effect in this part of the site is considered to be Significant and adverse. While the distinctive character and high proportion of mature trees, some of which are Category A and Heritage trees, will change, it is recognised that extensive mitigation planting as described in the Landscape Design Rationale (which accompanies the Landscape Master Plan) will mature over time, improve the landscape setting of the development

Visual effects are, in general, less pronounced than the landscape effects. Due to the layout and incorporation of the development into the topography and retention of tree lines and vegetation where possible, particularly in the northern portion of the site, the visual effects are minimised in the majority of views.

Fourteen views were taken, and of these, the development is not visible in four viewpoints, and visual effects range from Imperceptible to Significant, though only one view is considered Significant.

Two viewpoints from the Terrace show different visual effects in close proximity to each other, and these effects are localised. While Viewpoint 6 from the Terrace is considered a Significant effect, the nearby Viewpoint 7 from the Terrace is considered Slight and neutral. Viewpoint 1 from the more distant N25, Viewpoint 4 from the road at Glounthaune and Viewpoint 14 from the scenic route northeast of the site show more pronounced visual effects (Moderate) but which are considered neutral in quality. The visual effects of all remaining 7 viewpoints range from Imperceptible to Slight.

The majority of the views are considered neutral in quality and in general, views from the east, west and the scenic route north of the site show minimal visual effects with the development well set into the topography and appearing in the context of other built form.



**Verified Photomontages
of Proposed Development at
Glounthaune, Co. Cork**

Date: November 2021

**Prepared by:
G-Net 3D
NSC Campus, Mahon, Cork
Tel: 021-2307043,
info@gnet3d.com**

Photomontage Methodology

Photography

The photos for all the views were taken using a cropped-frame Canon EOS REBEL T5i camera. The 35mm lens was chosen as default which is the closest to 50mm full frame lens. However, wider lenses of 10mm and 18mm were also used to allow the view of wider area and provide more reference points required for accuracy of photomontages. We added white rectangles to these views to represent the window of the photo if it was taken using 50mm lens. The lenses used and the horizontal angles of view they provide are indicated in the table to the right.

Leica System 1200 Smart Antenna was used to accurately record the viewpoint coordinates and height levels. Viewpoint locations are indicated in table to the right and viewpoint map on the next page.

Modelling

Preparation of an accurate 3D model of the proposed residential development including landscape and infrastructure.

Setup

The following information is used to accurately position the model of the proposed development into the photographs:

- Site survey,
- Photographs,
- Verified viewpoint coordinates and height levels are accurately marked on the location OSi map.

To match the 3D camera view with the photograph we take the following steps:
The camera height is taken from information gathered on the levels from where the photos are taken (table below). The height levels of the proposed development are outlined on the site. Focal length is based on the photograph EXIF info.

This data is imported into our 3D software and the 3D camera is matched with the selected photographs. To match the 3D camera accurately we use all the above data, and the reference 3D models. The reference 3D models are existing structures i.e., buildings, roads, lamps, etc which are visible on the photographs. These items are modelled based on the survey information. After all the above conditions are fulfilled and we are satisfied that the camera matches correctly, we proceed to the next step.

Rendering

We apply the materials and textures prior to rendering the photomontage images. Light settings are adjusted to match the brightness of the photographs and sun is positioned according to the date and time the photo was taken.

Post processing

This process means incorporating a 3D image of the proposed development into the photograph to achieve the result.

Viewpoint info

View No	Easting	Northing	Orthometric Height (m)	Camera focal length	Camera Horizontal Angle	Date of photography	Time (24h)
V1	577932.4284	572595.1318	7.9973	35mm	37°	13-06-2021	09:59
V2	577620.0794	573312.1499	4.3654	35mm	37°	19-07-2021	11:51
V3	577433.4594	573324.1339	2.7933	18mm	66°	13-06-2021	10:24
V4	577174.9633	573323.1163	3.1617	18mm	66°	13-06-2021	10:28
V5	577678.3643	573531.5608	20.6589	18mm	66°	13-06-2021	10:38
V6	577267.5959	573502.5411	35.9895	18mm	66°	19-07-2021	12:05
V7	577200.9957	573499.7270	36.4565	18mm	66°	19-07-2021	12:01
V8	576954.7890	573587.4923	55.3877	18mm	66°	13-06-2021	11:09
V9	577308.8453	574105.3968	107.6915	10mm	99°	13-06-2021	15:01
V10	577455.8685	574178.6336	95.4454	18mm	66°	13-06-2021	15:09
V11	577496.7985	574064.9906	86.1171	18mm	66°	13-06-2021	11:40
V12	576595.9950	573922.8493	81.8570	18mm	66°	13-06-2021	15:23
V13	576164.0686	573668.3358	90.5647	35mm	37°	19-07-2021	12:31
V14	577678.0506	574195.2224	107.6548	35mm	37°	19-07-2021	12:42

PHOTOMONTAGE VIEWPOINT MAP



View 1. Existing



View 1. Proposed



View 2. Existing



View 2. Proposed. Red outlines indicate the location of proposed buildings

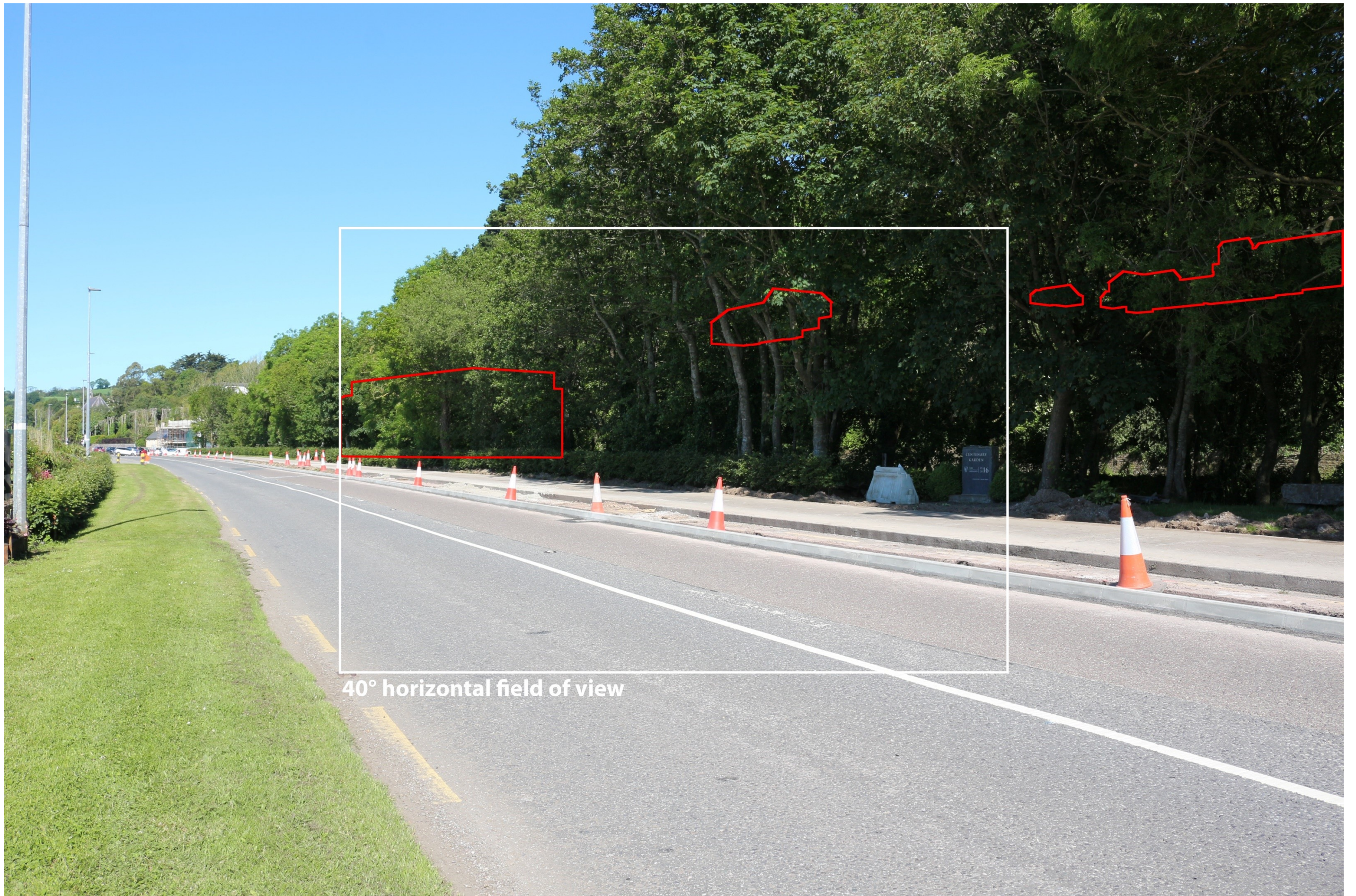


View 3. Existing



40° horizontal field of view

View 3. Proposed. Red outlines indicate the location of proposed buildings



View 4. Existing



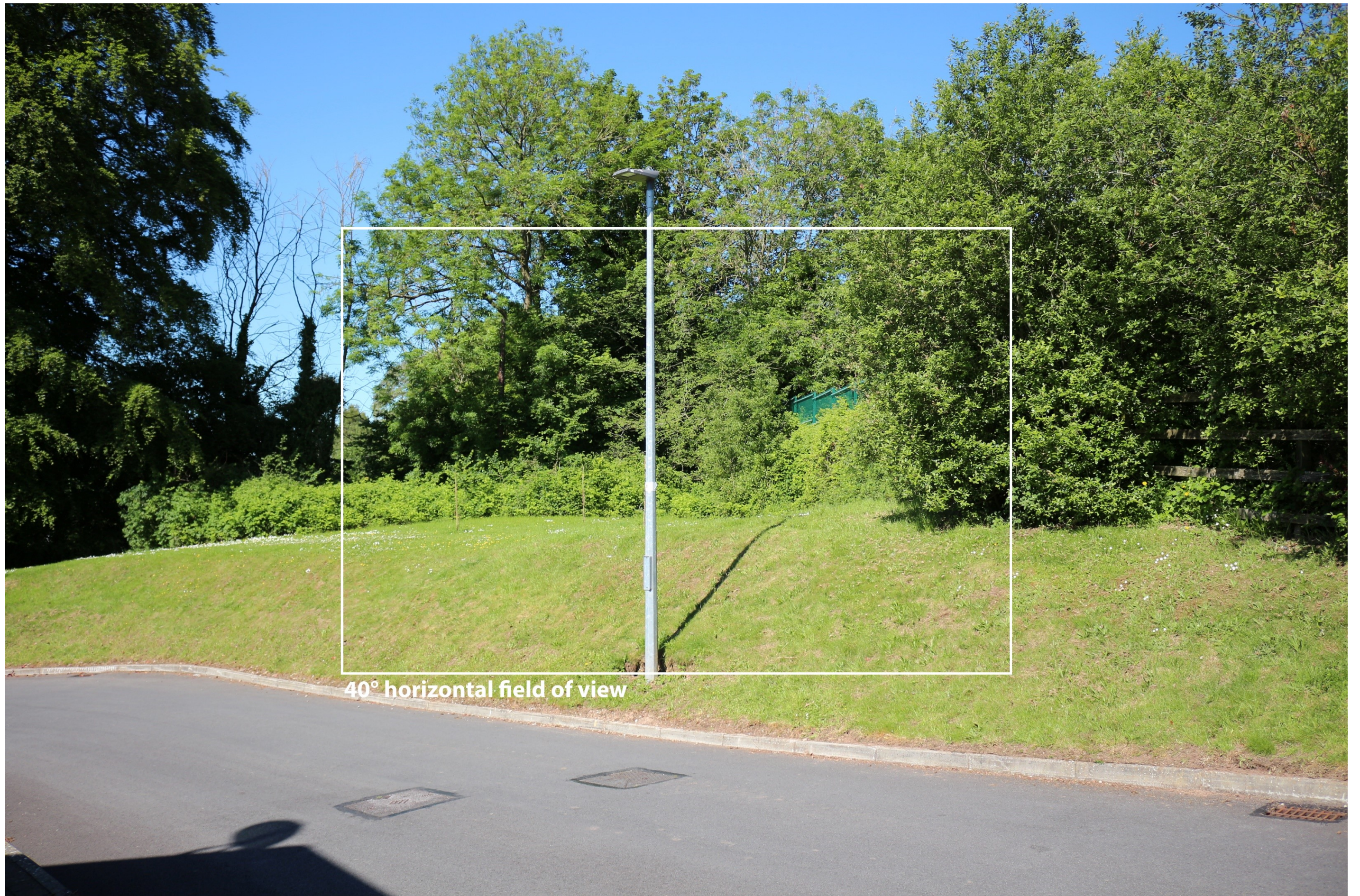
40° horizontal field of view

View 4. Proposed



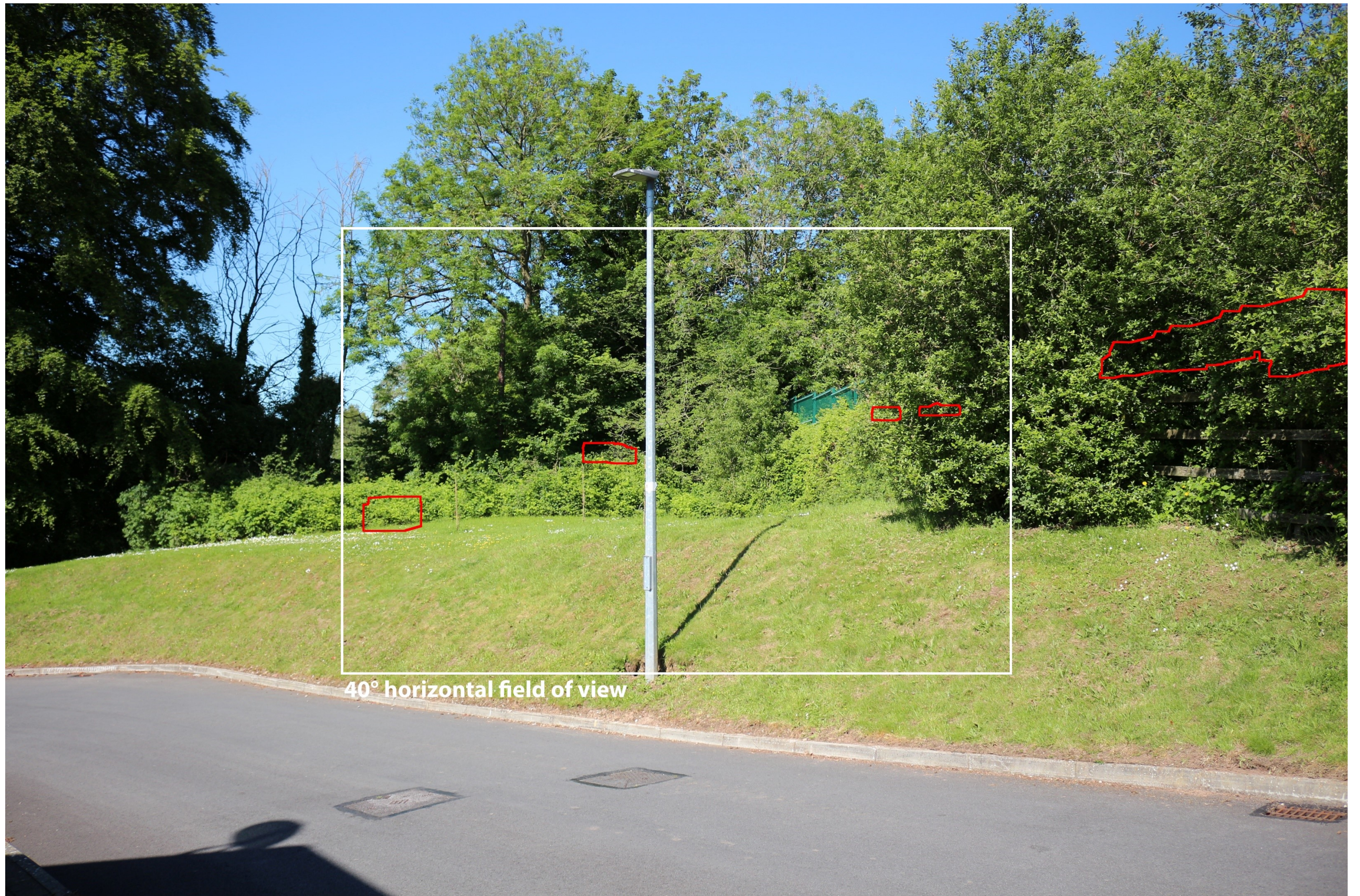
40° horizontal field of view

View 5. Existing



40° horizontal field of view

View 5. Proposed. Red outlines indicate the location of proposed buildings







40° horizontal field of view

View 7. Existing



40° horizontal field of view



40° horizontal field of view



40° horizontal field of view

View 8. Proposed. Red outlines indicate the location of proposed buildings



40° horizontal field of view



40° horizontal field of view



40° horizontal field of view

View 10. Existing



40° horizontal field of view



40° horizontal field of view

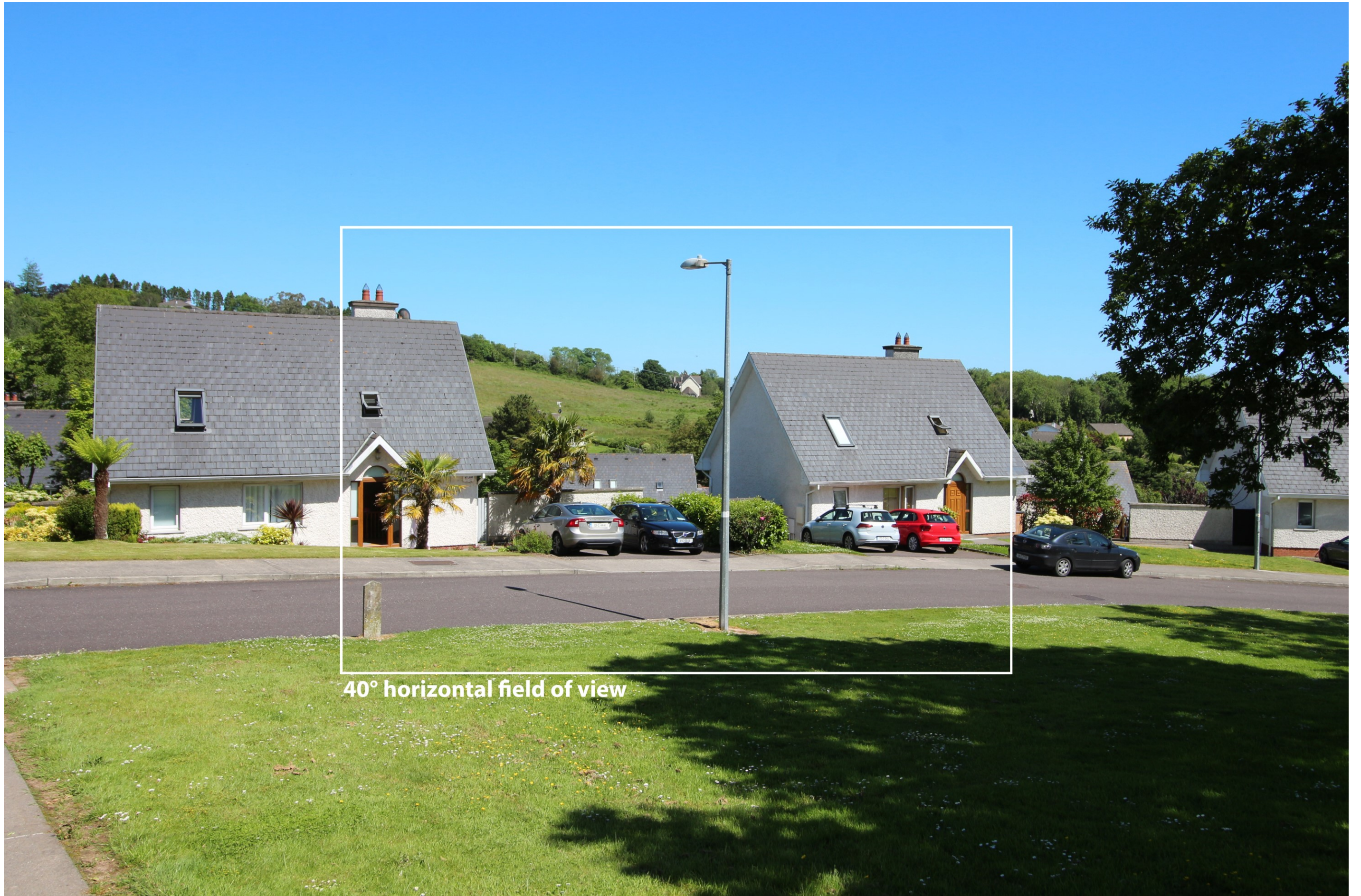


40° horizontal field of view

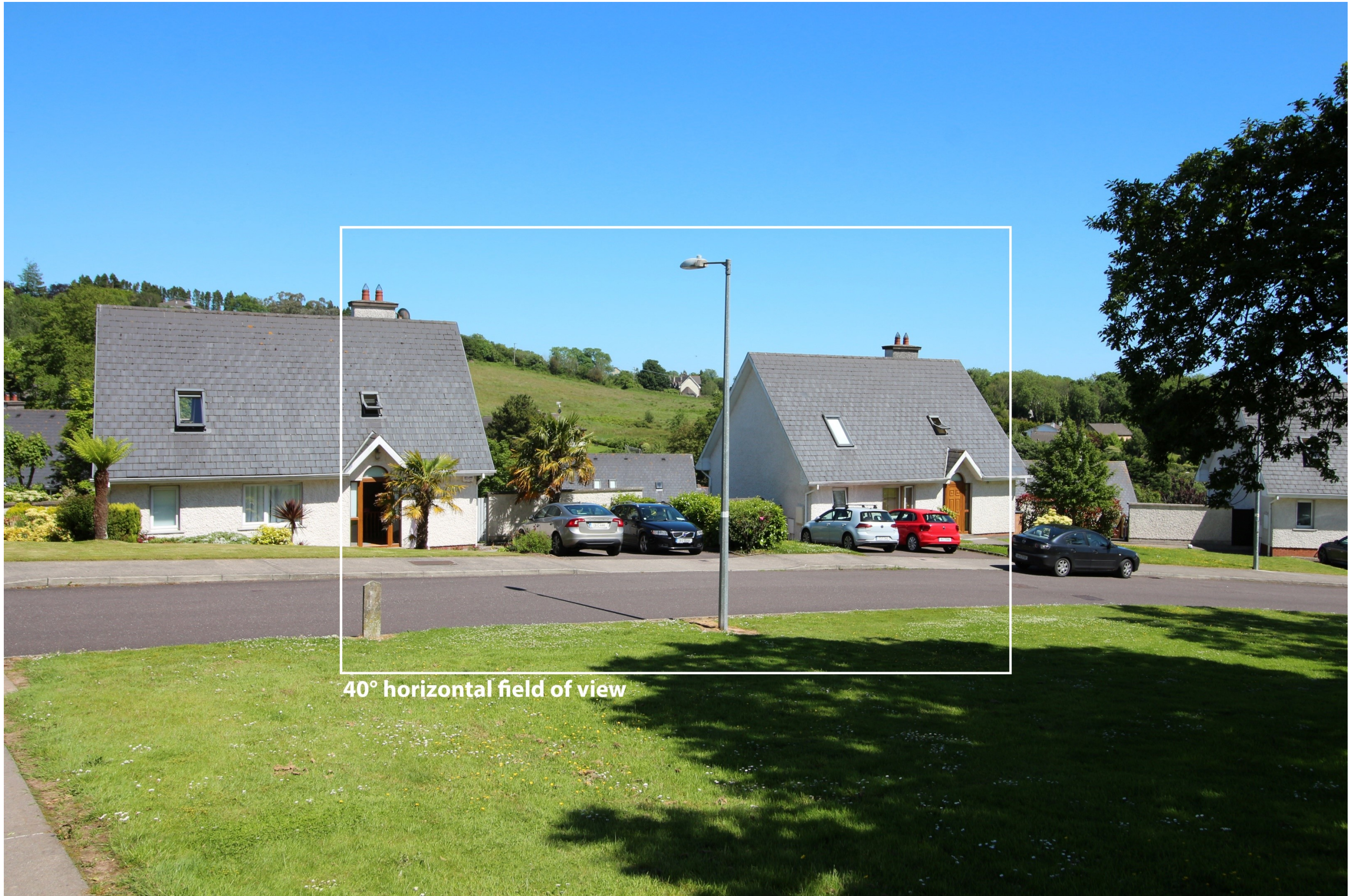


40° horizontal field of view

View 12. Existing

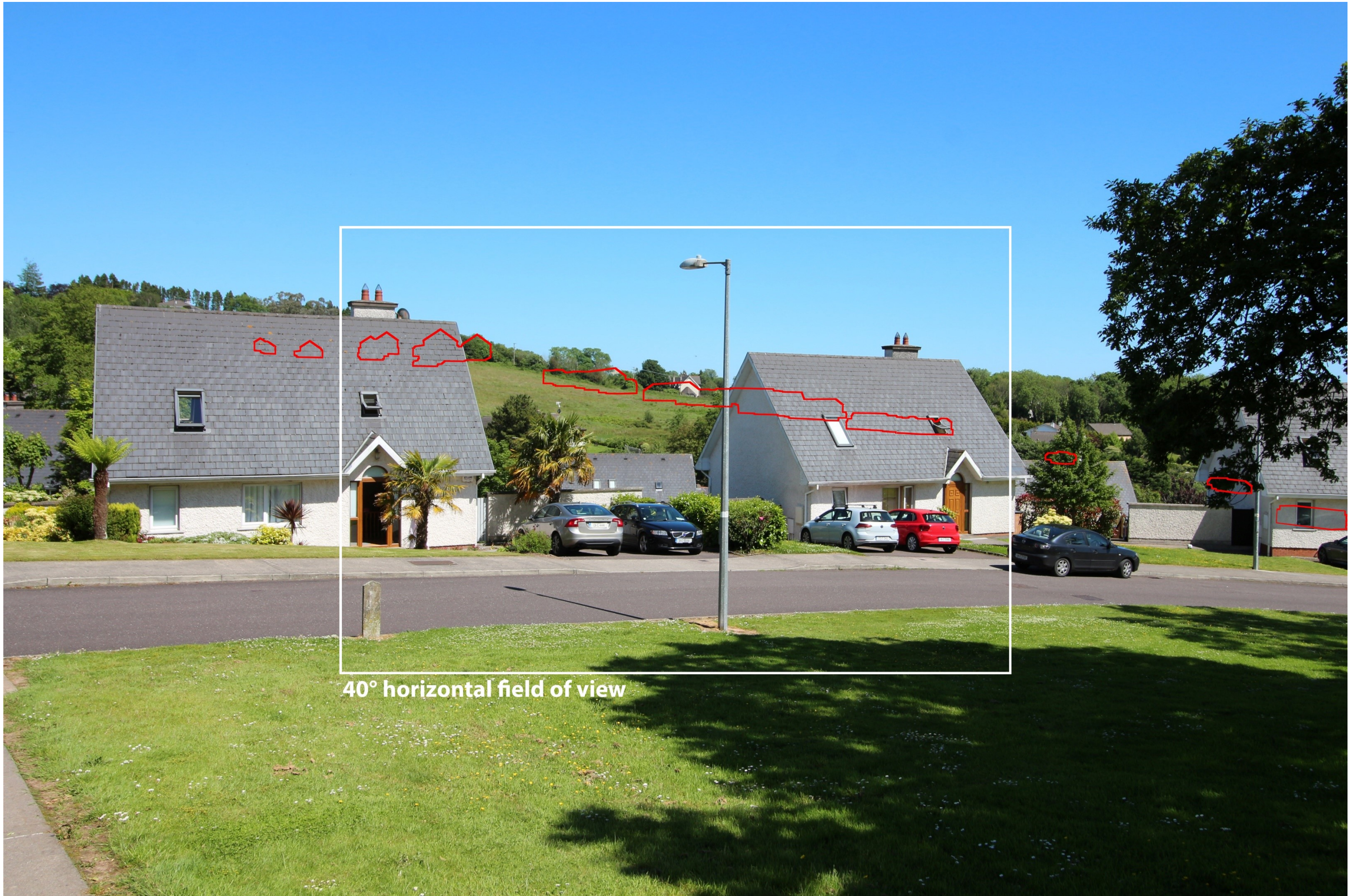


40° horizontal field of view



40° horizontal field of view

View 12. Proposed. Red outlines indicate the location of proposed buildings



40° horizontal field of view

View 13. Existing



View 13. Proposed



View 14. Existing



View 14. Proposed

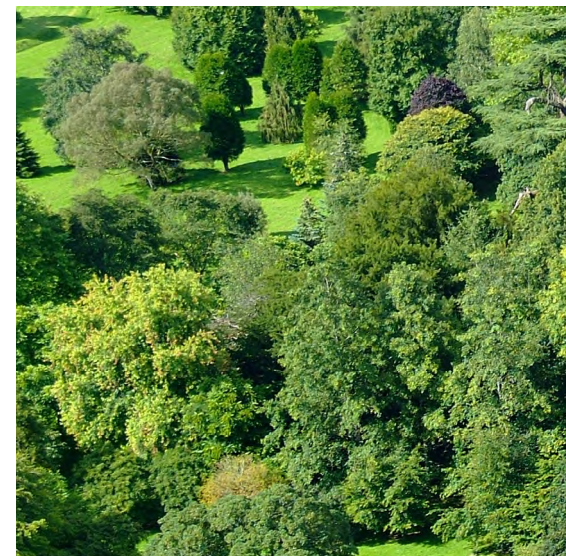
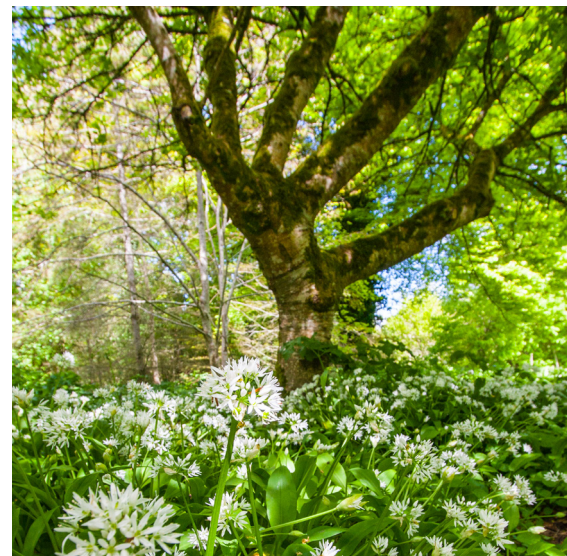




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CHAPTER 5

Material Assets – Traffic & Transportation



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CHAPTER 5

Material Assets
– Traffic & Transportation

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5 Material Assets – Traffic & Transport

5.1 INTRODUCTION

The proposed development consists of the construction of **289** residential units consisting of **201** no. dwelling houses and **88** no. apartment/duplex units, a two storey creche (with capacity for **67**no. children), **4** no. ESB substations and all ancillary site development works.

5.1.1 Author Information and Competency

This chapter was prepared by Ken Manley BE CEng MIEI HDip Env Eng FConsEI of MHL Consulting Engineers. Ken has been involved in the preparation of Traffic & Transportation Schemes for over 20 years and is fully competent in the use of traffic modelling software used as part of this assessment, namely Junctions 9: PICADY, LINSIG Traffic Signal Design and TRICS (Traffic Generation Software).

5.1.2 Reference to Guidelines Relevant to Discipline

The structure of this Traffic and Transportation Assessment (TTA) is in accordance with TII Document, Traffic and Transport Assessment Guidelines, 2014 and is developed using data from independently commissioned traffic counts at key junctions/locations, and local data extracted from the 2016 National Census, the National Cycle Manual; and the Design Manual for Urban Roads and Streets (DMURS), and the Trip Rate Information Computer System (TRICS) database for residential and creche land use sub-categories.

5.2 METHODOLOGY

A draft Traffic and Transportation Assessment (TTA) has been prepared in accordance with the NRA's 2014 publication "Traffic and Transport Assessment Guidelines" and the "Guidelines for Traffic Impact Assessments" as published by the Institution of Highways & Transportation U.K. in 1994. The purpose of a TTA is to assess the traffic impact of a development on the existing road network and propose any necessary mitigation measures to best accommodate the expected traffic volumes generated by the proposed development. It is also a requirement to ensure that proposals promote more efficient use of investment in transportation infrastructure, reduce travel demand and promote road-safety.

The scope of this study has been agreed with Cork County Council's Traffic & Transportation Department. Key parameters relating to the traffic modelling carried out including, junctions to be assessed, trip generation, modal shift targets, trip distribution, assessment years and the presentation of results have been discussed and agreed with the Local Authority. A total of 5 turning count surveys were undertaken as part of the study on Thursday 27h May 2021, these surveys were carried out simultaneously using video cameras at each of the junctions for a 12-hour period. The junction counts will form the basis for analysing the affected junctions for the identified peak periods.

The aim of this TTA is to identify the characteristics of the application site and surrounding area, examine the likely transport implications, ensure sustainable accessibility is maximised and appropriate infrastructure provided to accommodate the proposed development.

The key issues that need to be addressed within this TTA, with reference to the size and location of the development proposal are as follows:

- Review of the site location, composition, and local roads network.
- Analysis of Road Safety data.
- A review of the relevant planning and transport policy, refer to section 5.3.
- Description of the development proposal.
- Forecast trip generation as agreed with the Local Authority.
- The use of appropriate and agreed traffic modelling software for the assessment of individual junctions.
- Provide With/Without Development assessment for each of the critical junctions.
- Assess significance of development generated traffic upon the surrounding transport infrastructure and identify any necessary mitigation.

The TTA concludes that the proposed development, in traffic and transportation terms is acceptable, and there are no traffic and transportation reasons that should prevent the Planning Authority from recommending approval of this application.

The opening year is the year of expected completion of the scheme, including the creche and is taken to be 2026. In accordance with the NRA's "Traffic and Transport Assessment Guidelines", a traffic analysis is required to be undertaken for the **Base Year – 2022, Opening Year – 2026, Opening Year +5 – 2031 and Opening Year +15 – 2041.**

5.3 EXISTING ENVIRONMENT

An initial desktop study was conducted of the area surrounding the development site, identifying the existing transport links and road junctions with the potential to be affected by the proposed development. This was followed by a site visit to confirm the existing characteristics and conditions of these links and junctions. As part of the initial appraisal, a review was conducted of statutory planning documentation and other relevant public sector transport development proposals to determine whether any such development objectives would have an impact on the developments site's receiving environment. This review encompassed the Cork County Development Plan, the Local Area Plan and the Cork Cycle Network Plan.

Of relevance to the site from a transport point of view is the recently completed (July 2021) section of the IU-1 Inter-Urban Greenway between Fitzpatrick's Shop and the Elm Tree Restaurant. The current status of the overall scheme is at Construction Stage to complete from Dunkettle to Carrigwohill. Funding has also been approved for the section between Carrigwohill and Midleton. The future completion of this Inter-Urban Greenway will promote sustainable transport solutions for future residents along its route driving a positive change in terms of modal shift in line with national policy. Planning Policy reference LI-U-06 refers to the upgrade of the Dunkettle Interchange to the west of Glounthaune which is expected to significantly increase the capacity of the National Roads Network (N8, N25). These works are currently at construction stage.

In addition to the rail link to the City Centre, the recently published BusConnects Plan (*Extract from BusConnects below*) for Cork includes proposals to increase the frequency of the Midleton/Cork bus route which serves Glounthaune to 30mins. This will provide another sustainable transport solution for future residents of the scheme again supporting an increase in modal shift used in future year traffic models.

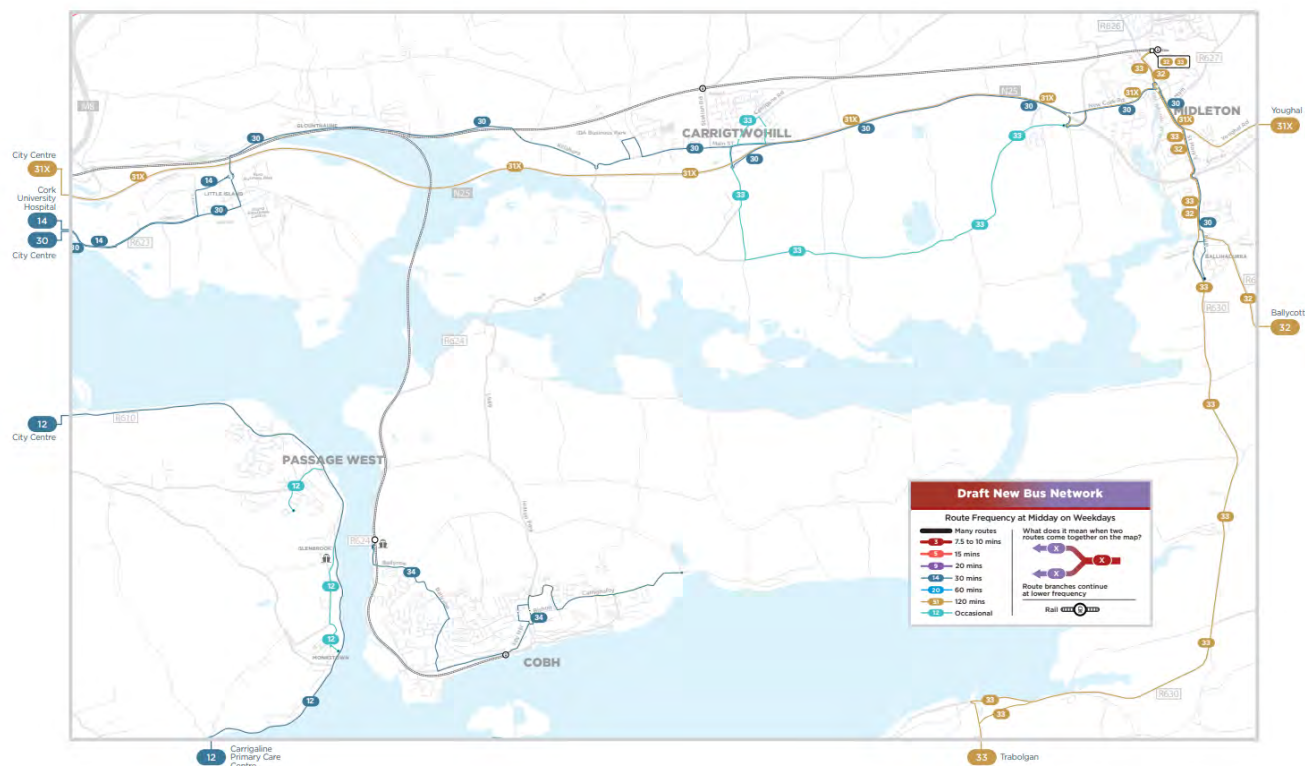
The Cork County Council online planning enquiry system was reviewed in conjunction with the Local Area Plan and the following sites were noted as being in the immediate area and relevant to the scheme in terms of having the potential to contribute to vehicular traffic.

Figure 5.3.1 Extract from the Cork Cycle Network Plan



Figure 5.3.2 Extract from BusConnects

Your area Network Map - Cork Outer East - How BusConnects gets you where you want to go.



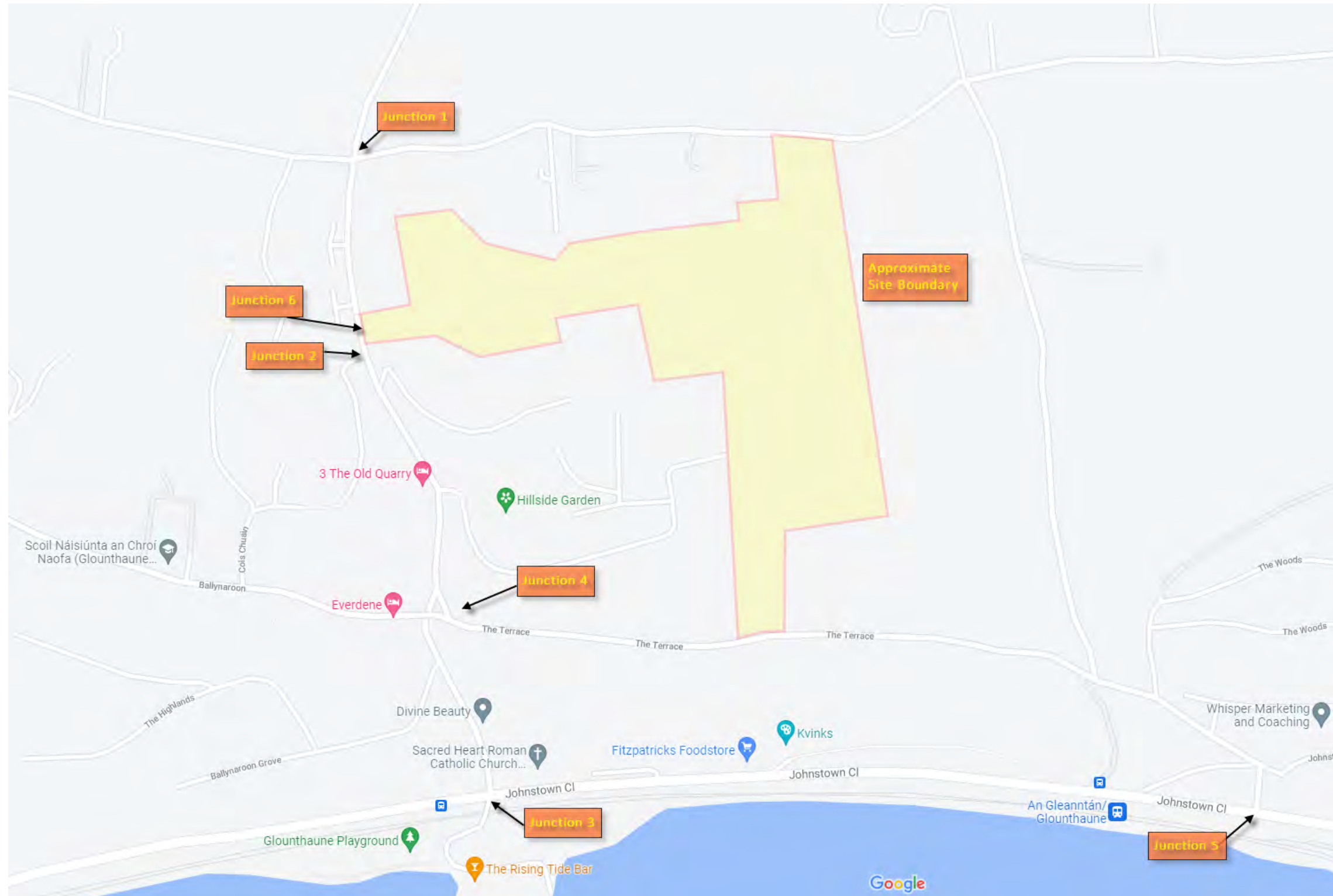
Planning Reference 21/6851 refers to a 21-unit development in Phase 1. Traffic from this phase has been allocated to the development junction in accordance with the TRICS database in addition to the development traffic the subject of this application.

The identified junctions affected by the possible future development of the other identified sites are Junctions 3, 4 and 5. As part of the traffic analysis, recorded network traffic flows have been factored for future year scenarios using the TII Project Appraisal Guidelines (ref. Table 5.5.1). These factors allow for future developments contributing vehicular traffic to be accounted for in the modelling process. To further ensure a robust assessment is carried out no increase in modal shift for future year scenarios is applied to the factored recorded flows.

Application Reference	Applicant(s)	Description	Outcome/Current Status
Part 8 Development	Cork County Council	Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtohilly via Glounthaune	Under Construction/Partially Complete
21/6851	Citidwell Developments Limited	Demolition of 2 no. farm buildings and a derelict dwelling and the construction of 21 no. units.	Application currently pending a decision from Cork County Council.
21/5072	Barlow Properties Ltd	Construction of 94no. residential units	Application currently pending a decision from Cork County Council.
21/4622	Glounthaune Homes Trust	Construction of 12 no. residential units	Application currently pending a decision from Cork County Council.
18/6250	Keta Products Ltd.	Demolition of The Great O'Neill Public House and construction of a two-storey extension of the existing Fitzpatricks shop to the east to replace the demolished public house, for use as an extended retail.	Under Construction - Nearing Completion
17/5699 (ABP Reference 300128-17) Amended by 18/6312 & 20/5864	Bluescape Ltd	Phase 1 of Proposed Development. Construction of 38 no. residential units & upgrade of local road network	Construction recently commenced
ABP-301197-18	O'Mahony Developments Limited	Strategic Housing Development Construction of 174 number residential units	Under Construction with initial phases occupied.

Table 5.1 Development Sites in the vicinity of the site

Figure 5.3.3 Junction Locations



The following site-specific characteristics are noted:

- The application site is located on the L2968 in the village of Glounthaune within a 50kph speed limit zone.
- The site is bounded by the residential estate of Cois Chuain to the west with an existing footpath on the western side of the road serving the development lands.
- It is within a 5-minute walk to Scoil Náisiúnta an Chroí Naofa through the Cois Chuain Estate, a hair salon within the Village and Glounthaune Catholic Church.

The following key junctions were identified to be assessed within the study.

Junction 1: The junction of the L-2968/L-2969

Is a four-arm crossroads junction of the L-2968/L2969 and serves as a local vehicular access road.



Image 5.3.1: Image for Junction of the L-2968/L-2969

Figure 5.3.4: The junction of the L-2968/L-2969– Recorded AM Peak Hour Flows

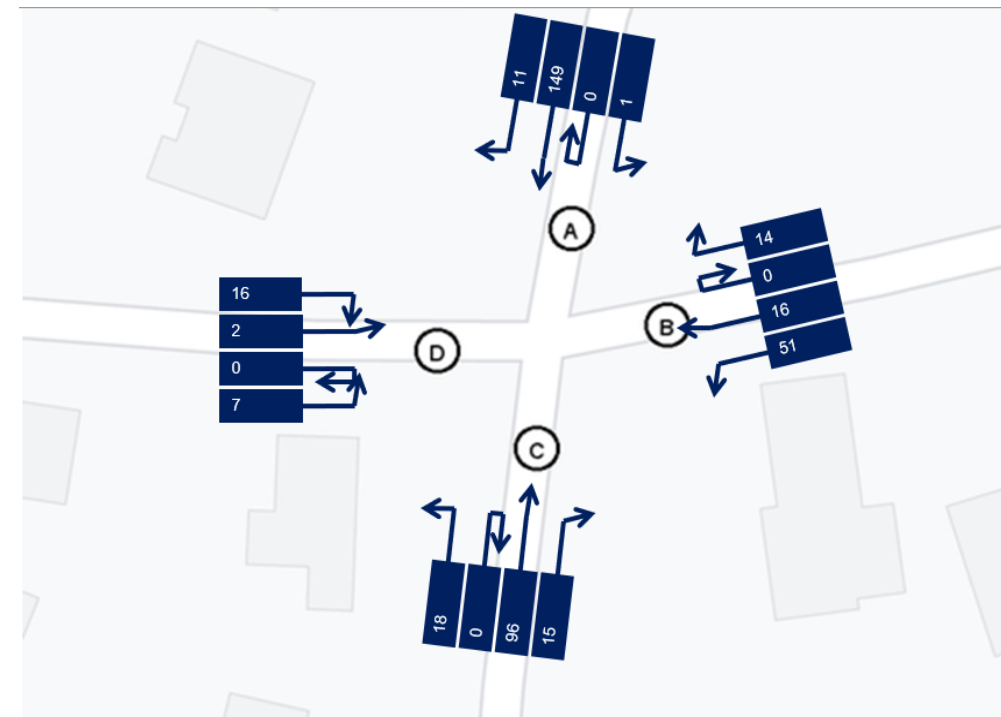
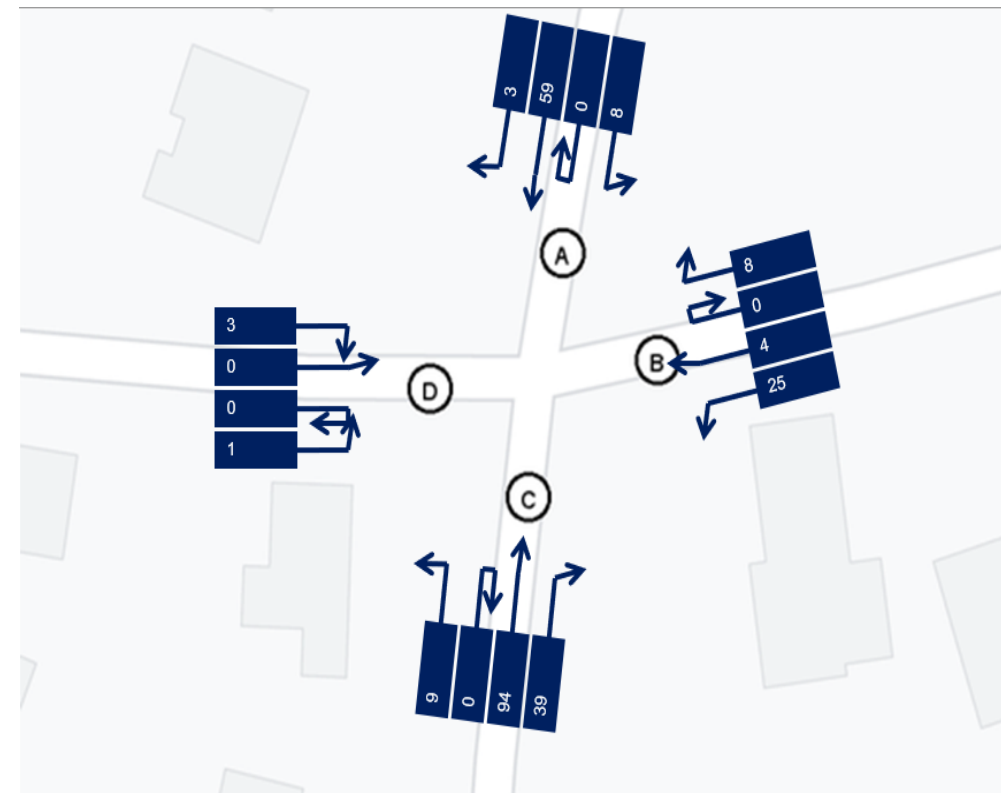


Fig 5.3.5: The junction of the L-2968/L-2969– Recorded PM Peak Hour Flows



Junction 2: Access to Cois Chuain from the L-2968

This Priority Junction serves a 15-unit development accessing directly onto the L2968 Ballynaron Road.



Image 5.3.4: Image of Junction 2: Access to Cois Chuain from the L-2968

Figure 5.3.6: Access to Cois Chuain from the L-2968 – Recorded AM Peak Hour Flows

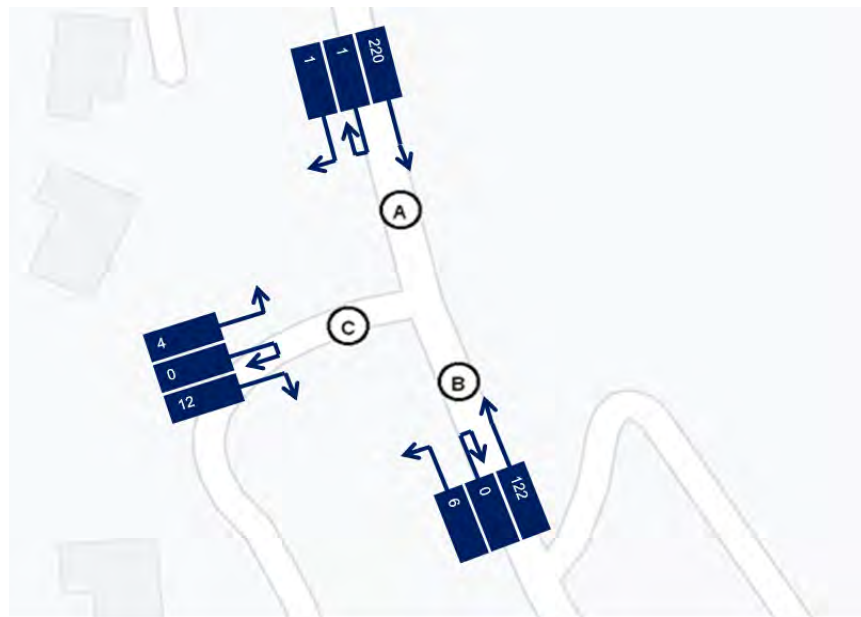
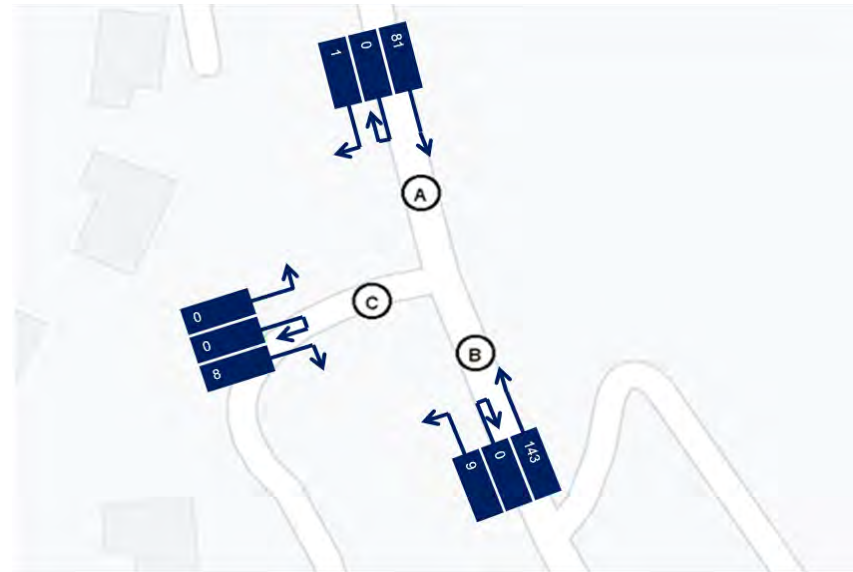


Figure 5.3.7: Access to Cois Chuain from the L-2968 – Recorded PM Peak Hour Flows



Junction 3: Glounthaune Road/ Johnstown Close

This priority-controlled junction provides secondary access to Glounthaune Community Centre, Glounthaune playground as well as a Post Office, hairdresser, Preschool, restaurant and two churches. This junction serves as an important vehicular access between East Cork and the greater Cork City urban area including its use as a link to the N25 Cork/Waterford Road.



Image 5.3.7: Glounthaune Road/ Johnstown Close

Figure 5.3.8: Glounthaune Road/ Johnstown Close – Recorded AM Peak Hour Flows

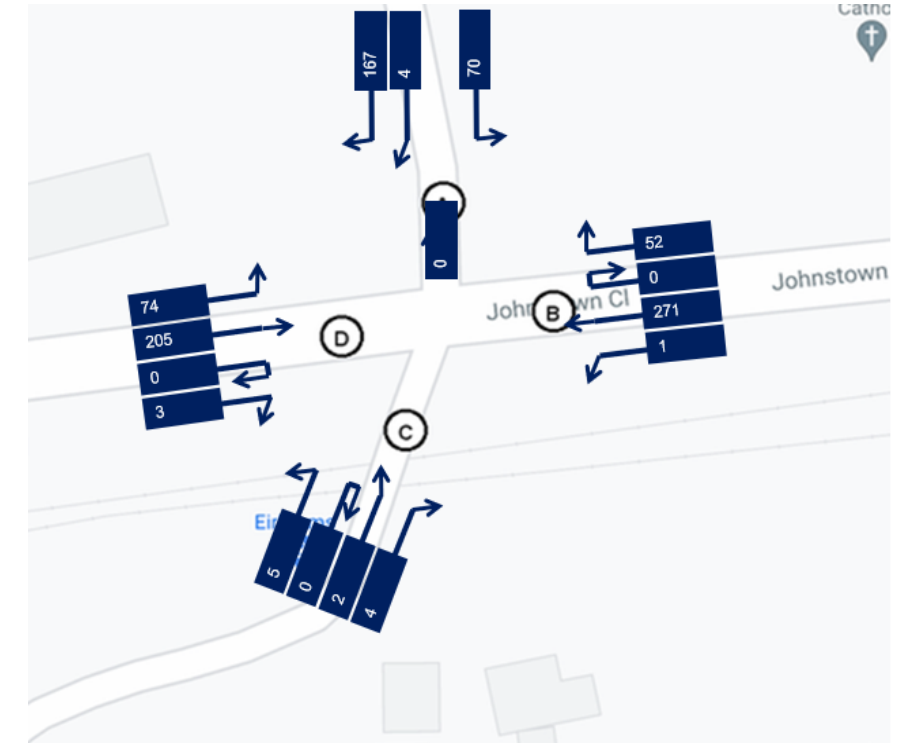
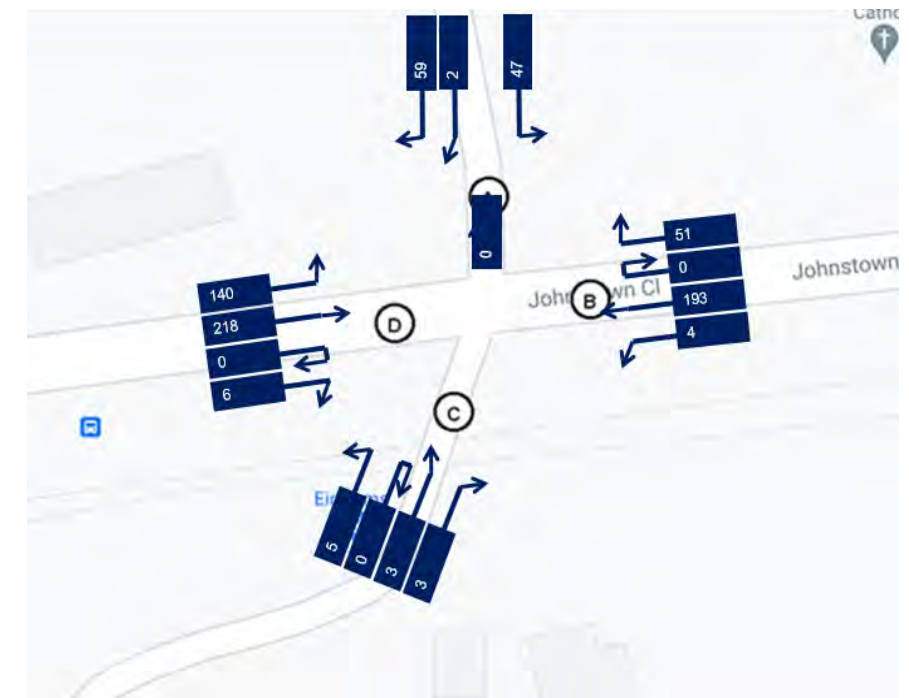


Figure 5.3.9: Glounthaune Road/ Johnstown Close – Recorded PM Peak Hour Flows



Junction 4: 'The Terrace'/L-2968

This priority junction links the L-2968 minor road to 'The Terrace' priority road providing access to the individual housing developments on this road.



Image 5.3.10: 'The Terrace'/L-2968

Figure 5.3.10: 'The Terrace'/L-2968 – Recorded AM Peak Hour Flows

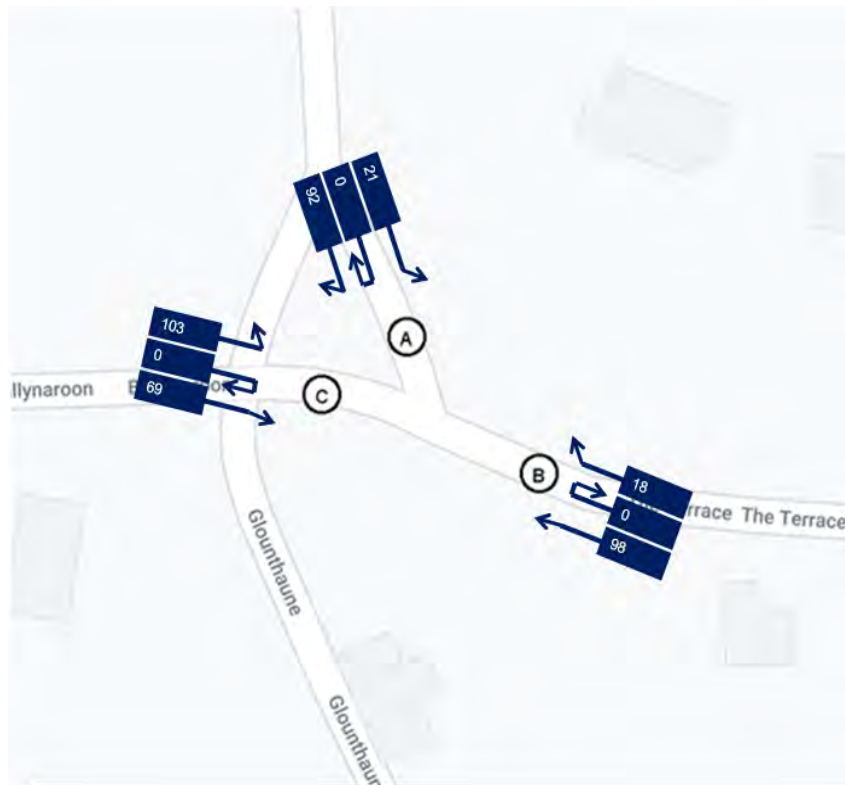


Figure 5.3.11: 'The Terrace'/L-2968 – Recorded PM Peak Hour Flows

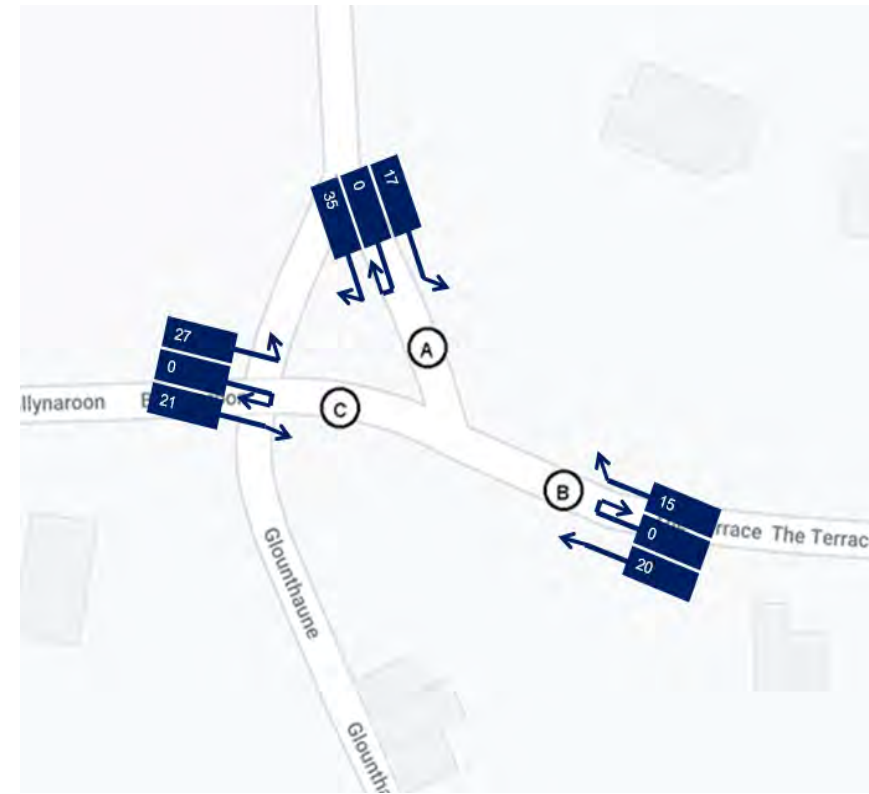
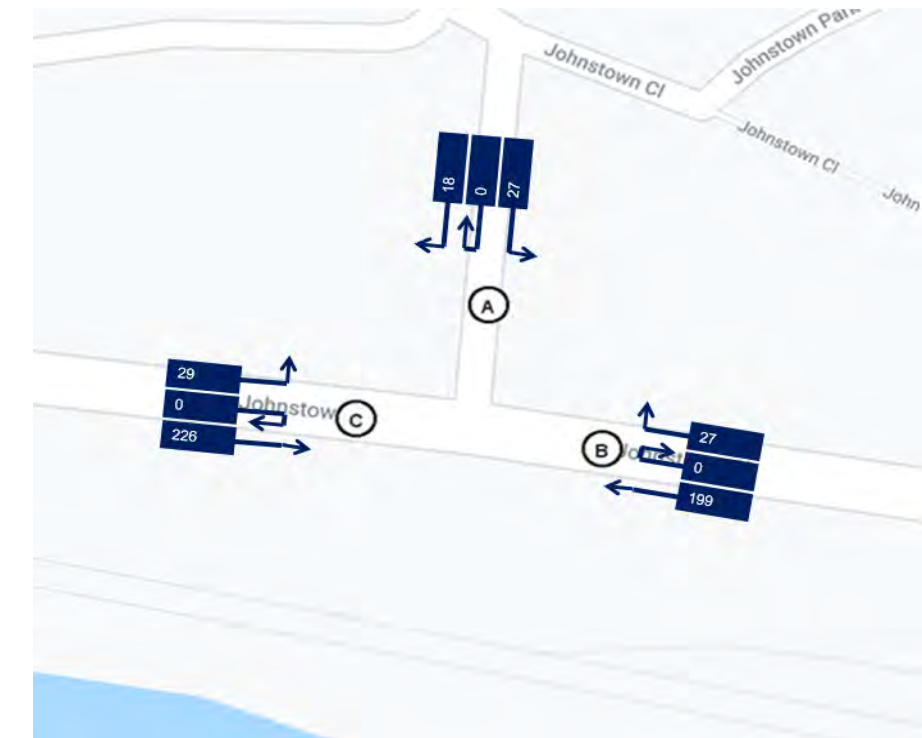


Figure 5.3.12: Johnstown Close/'The Terrace' – Recorded AM Peak Hour Flows



Figure 5.3.13: Johnstown Close/'The Terrace' – Recorded PM Peak Hour Flows



Junction 5: Johnstown Close/'The Terrace'

This priority junction serves as a vehicular access for The Woods residential estate and Johnstown Park to the Johnstown Close Road. This also links to the N25 Cork/Waterford Road at Cobh Cross.

Image 5.3.13: Johnstown Close/'The Terrace'



5.3.1 Existing Public Transport & Pedestrian/Cycle Facilities

The general area is served with a high frequency train service, Cobh/Midleton Service, which will be accessible from the development by means of an off-road cycle/pedestrian facility linking through the site to the existing greenway facilities on Johnstown Close. This service currently operates on a 20min frequency and links to the City Centre. Existing residents of the Cois Chuain Estate do not have access to continuous pedestrian provision to avail of this public transport option (approximately 300m of on-road with no footpath).

The Cork Cycle Network Plan¹, January 2017, shows the site in the context of the proposed extension to the existing City Greenway. The Glounthaune section of the Interurban Cycle Route, IU-1 has been recently completed and ultimately will provide a link both west and east.

The nearest bus service is located on Johnstown Close, the 260-Route with a daily frequency of 5 arrivals, serving Little Island and Cork City.

5.3.2 Existing Traffic Conditions

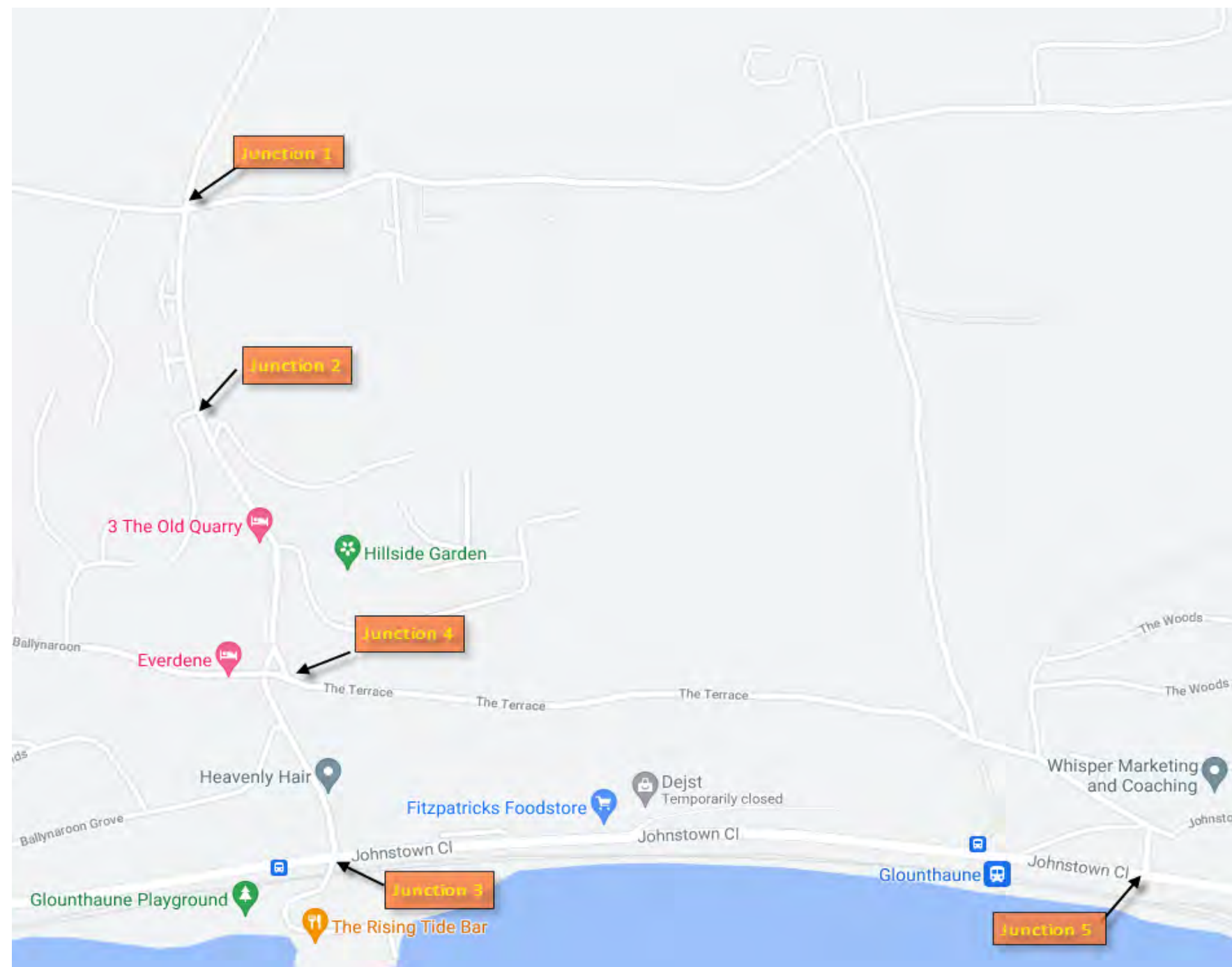
As part of the pre-application process the extent of data collection and the critical links and junctions was agreed with the Local Authority.

A variety of different data sources have been used, including:

- 12-hour classified turning counts (5 sites, refer Figure 5.3.16);
- Background OS Mapping and aerial photography;
- On-site junction measurements including saturation flows, link speeds, queue length measurements, pedestrian movements at signalled crossings and geometric data for each of the modelled junctions.

A total of 5 turning count surveys were undertaken as part of the study on Thursday 27th May 2021 (refer Figure 5.3.16). On-site measurements including lane widths, junction turning radii, lane lengths and saturation flows were undertaken by MHL and were incorporated in the constructed models.

Fig 5.3.14: Traffic Count Survey Locations



¹ <https://www.corkcoco.ie/sites/default/files/2018-02/Final%20Published%20CMA%20Cycle%20Network%20Plan%20Jan%202017.pdf>

The following figures present the recorded 12-hour traffic profile, percentage of classified vehicles and turning movements for each of the modelled junctions carried out on Thursday 27th of May 2021:

Figure 5.3.15: Junction 1: The junction of the L-2968/L-2969

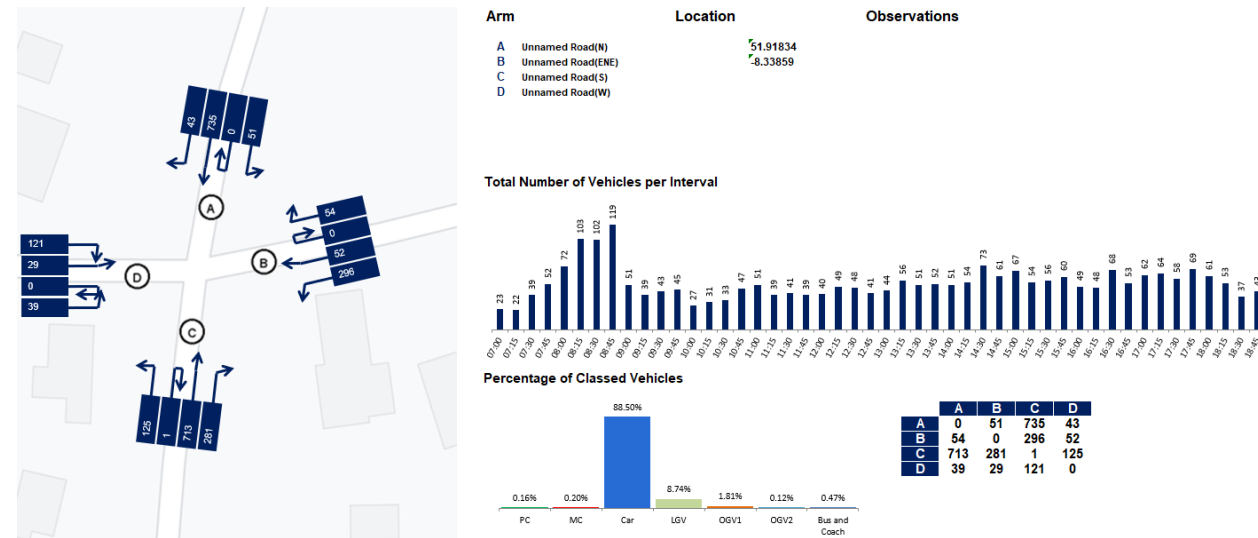


Figure 5.3.16: Junction 2: Cois Chuain (Residential Development)

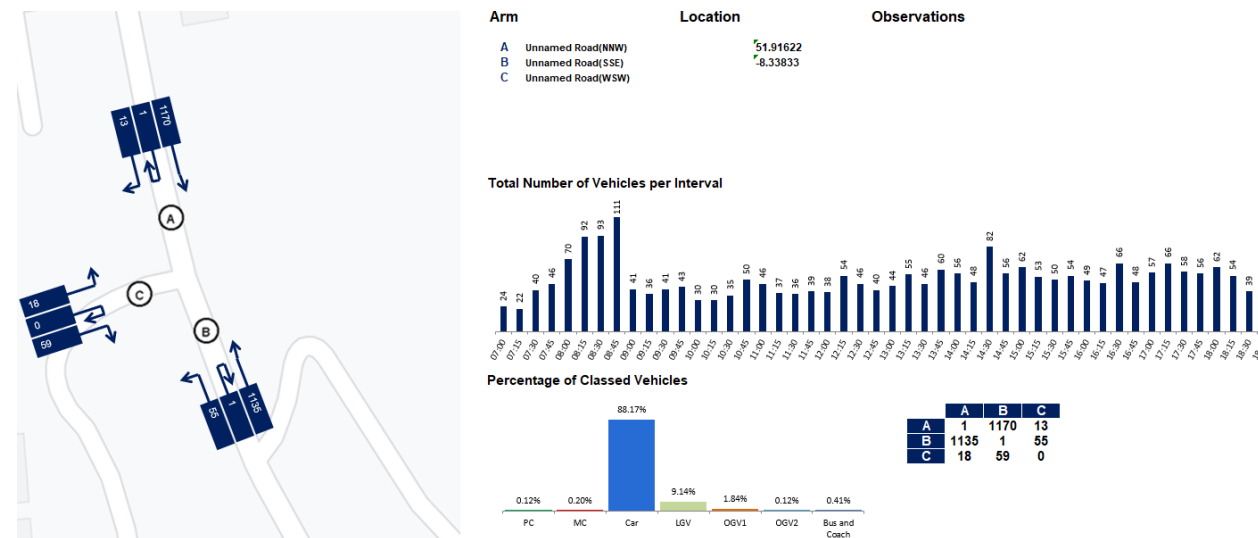


Figure 5.3.17: Junction 3: Glounthaune Road/ Johnstown Close

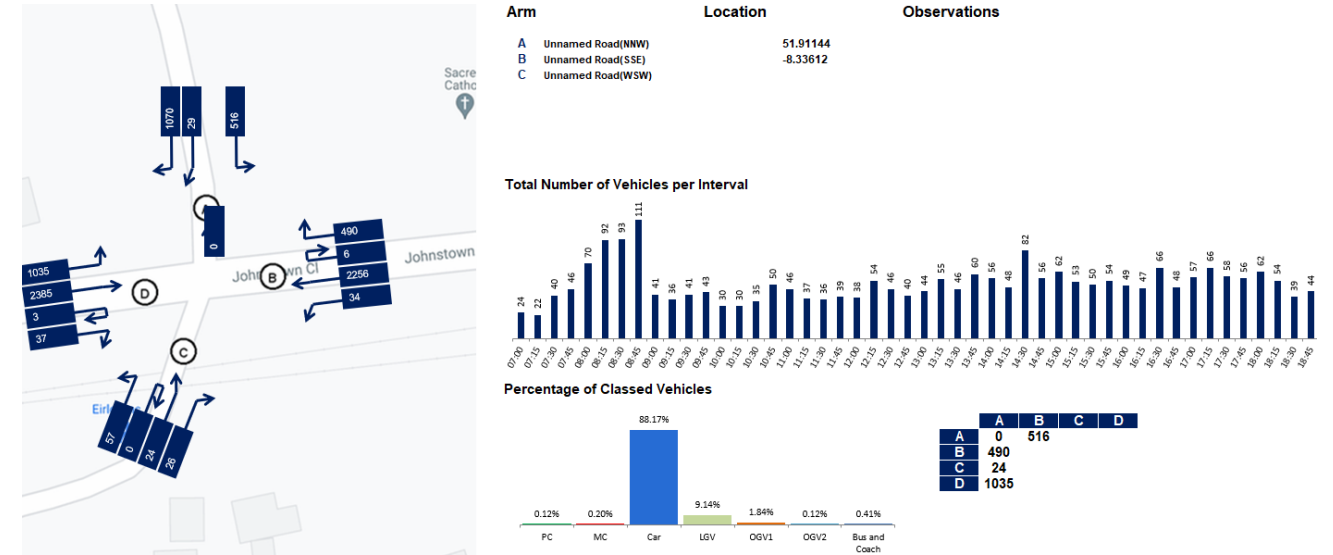


Figure 5.3.18: Junction 4: The Terrace/L-2968

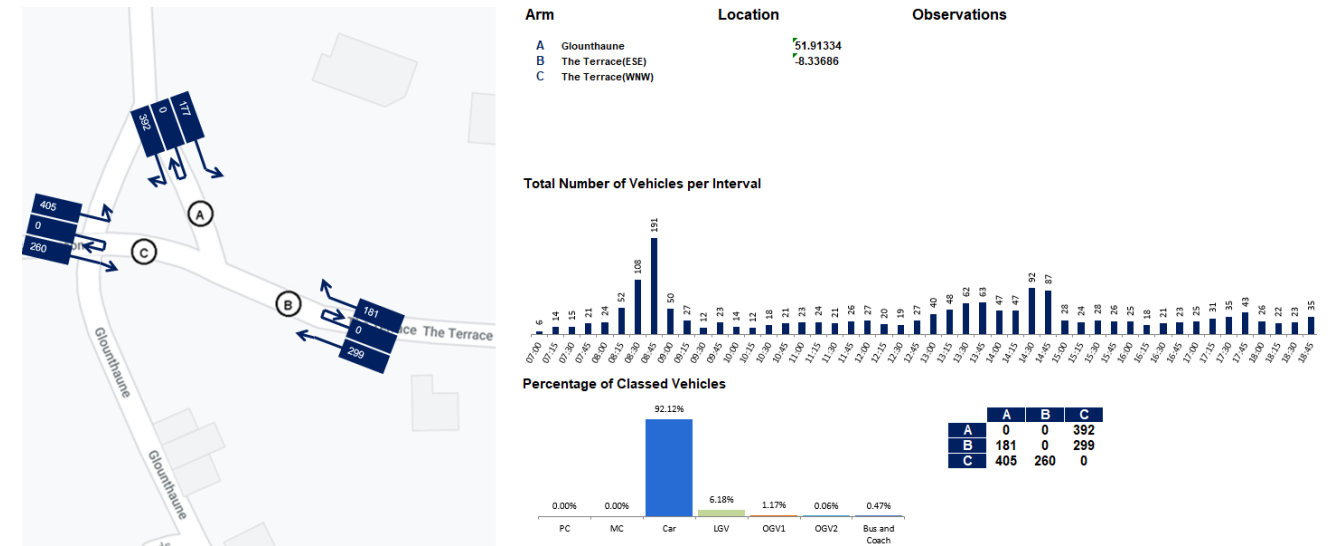
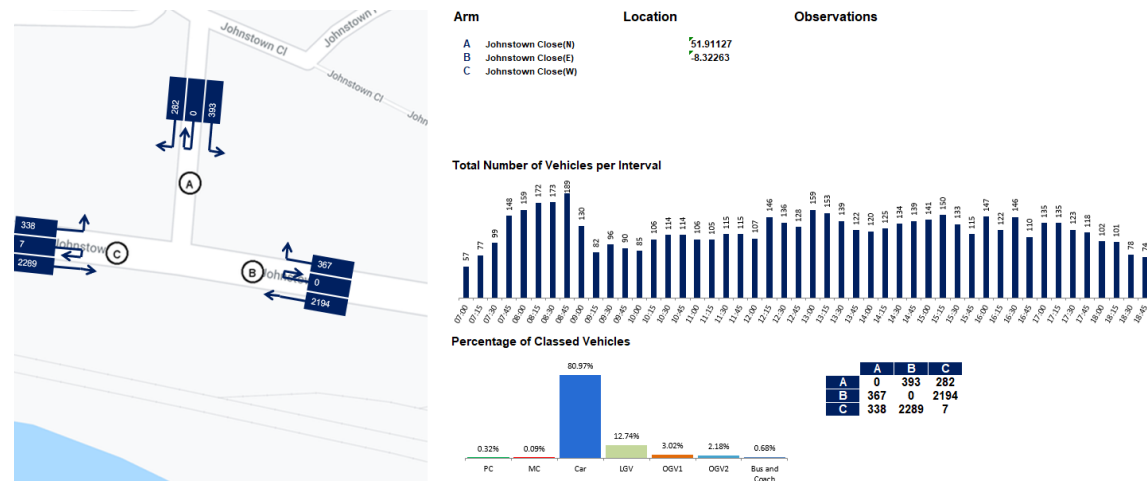


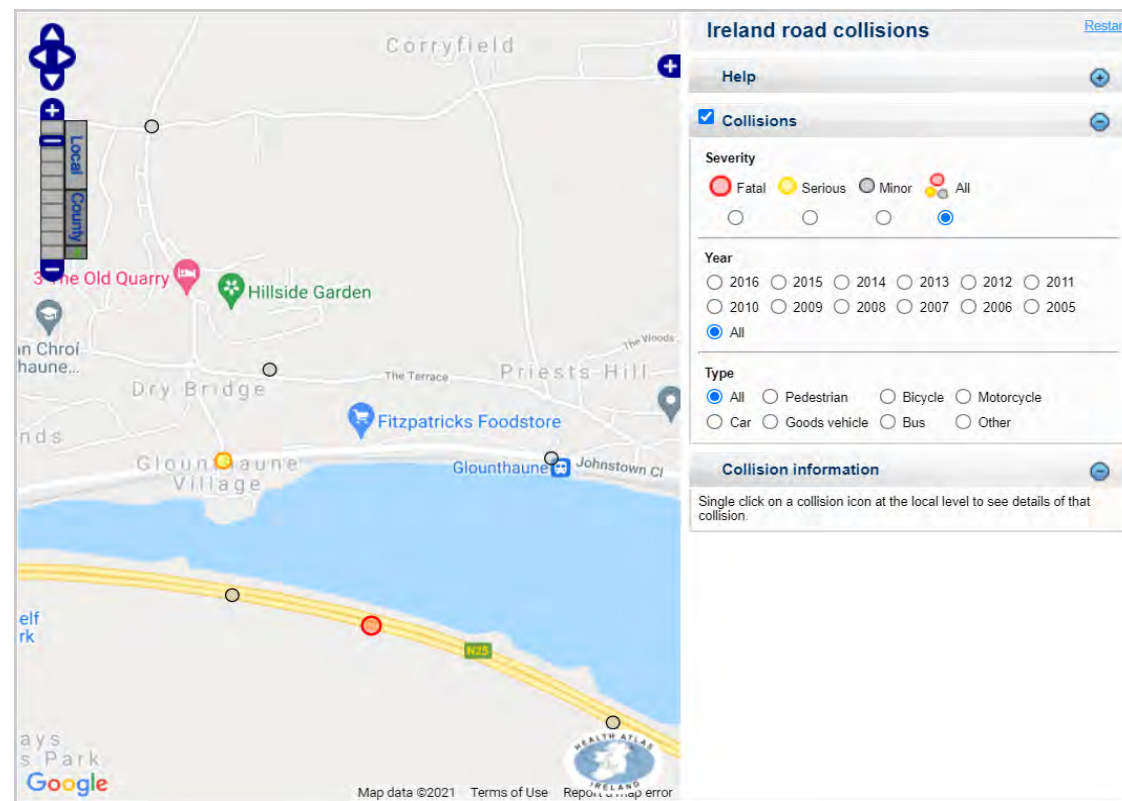
Figure 5.3.19: Junction 5: Johnstown Close/ 'The Terrace'



The data presented in the above figures show the peak hour traffic periods for both morning and evening respectively as being 08:00-09:00 and 17:00-18:00. For the purpose of the modelling analysis, each of the above peak hour traffic periods are included in order to obtain the worst-case traffic build-up results. This ensures a robust analysis of the road network is conducted.

The percentage of classified vehicles was used within the generated traffic models to reflect existing conditions more accurately.

Fig 5.3.20: RSA Collisions Database for Surrounding Area



5.3.3 RSA Collision Data

From accessing Ireland's road collisions database produced from the Road Safety Authority, included as shown in Figure 5.3.22, it can be seen that there have been a number of road traffic incidents in the greater area of the proposed development from 2005 to 2016. Two minor collisions occurred in the area in 2005 and 2007. A serious incident occurred at junction 3 between the Glounthaune Road and Johnstown Close in 2015. This incident notes to have involved a car.

5.4 PROPOSED DEVELOPMENT

5.4.1 Description of Proposed Development

The proposed development consists of the construction of **289** residential units consisting of 201 no. dwelling houses and 88 no. apartment/duplex units, a two storey creche (with capacity for **67**no. children), 4 no. ESB substations and all ancillary site development works.

The proposed development will be constructed on lands to the north and south of the public road, L-2970, known locally as 'The Terrace'.

The proposed development to the south of 'The Terrace' provides for 29 no. residential units comprising of 5 no. dwelling houses and 24 no. apartments with ancillary bicycle parking and bin stores. The proposed apartments are provided in a 4-storey building containing a ground floor community unit and a commercial unit with apartments at upper floor levels.

The proposed primary access to the northern site is from the L-2968, traffic signal-controlled junction. This junction is currently being developed to serve phase 1 of the scheme (21-units). The junction includes pedestrian facilities providing safe connectivity to the Cuais Chuain Estate to the west which includes a pedestrian footpath connection to the local primary school.

The proposed development includes pedestrian/cycle access through lands acquired south of 'The Terrace'.

The following Figure 5.4.1 presents the scheme layout, the subject of this application. Details of parking provision, both vehicular and cycle, are provided in Architectural Drg. 20151/P/006 and Drg. 20151/P/011 respectively.

Fig 5.4.1: Proposed Site Layout



5.4.2 Phasing of Proposed Scheme

The proposed development consists of the construction of **289** residential units consisting of **201** no. dwelling houses and **88** no. apartment/duplex units, a two storey creche (with capacity for **67**no. children), **4** no. ESB substations and all ancillary site development works and would be completed in three phases starting in 2022 and finishing by 2026. The retail elements of the scheme will also be delivered in this timeframe. The Traffic Impact Assessment includes the proposed opening year of 2026, the opening year +5 (2031) and the design year +15 (2041).

5.5 IMPACT ASSESSMENT

The predicted impact, the mitigation measures required, and the residual impacts are considered under the following headings:

Do Nothing Scenario

- Construction Phase
- Operational Phase
- Cumulative Impacts

5.5.1 Do Nothing Scenario

The local roads network has been assessed for the Do-Nothing Scenario and is presented as the 'without dev' results for the modelled junctions. The results tables generated by the Junctions 9 Picady traffic modelling package have been constructed to make it easy to make a direct comparison between the with/without scenarios for each of the years and peak periods, refer to Section 5.5.2.6 Network Modelling Results. As the site currently is a greenfield site the potential impacts associated with the 'Do Nothing' scenario are not significant in relation to Traffic & Transport.

5.5.2 Construction Stage Traffic Impact

As part of this application a Construction Environmental Management Plan (CEMP) has been developed which includes a proposed Construction Stage Traffic Management Plan. This traffic management plan has identified the optimum route for construction access and quantifies the expected volume of materials to be imported/exported from site. It has been determined from a junction capacity assessment perspective that the operational phase of the scheme will generate more traffic during the peak traffic periods than the construction stage. Operational phase junction models therefore present a worst-case scenario in terms of impact for the modelled network.

The recorded HGV (Heavy Goods Vehicles) content on the L-2968 is 1.93%. The development of the site will see this percentage increase to 7%, a maximum of 15 HGV's importing to site daily. The developed CEMP proposes mitigation measures to minimise the impact of this increase.

5.5.2.1 Mitigation Measures

The re-use of excavated materials generated on-site to reduce the total volume of imported material thereby reducing traffic generation.

- Defining delivery times to site to avoid background traffic peak periods.
- Construction stage site staff starting at 07:00 and ending at 18:00 to avoid the recorded peak periods.

- Site Staff encouraged to car-pool and to use public transport.
- Road cleaning and wheel-wash systems put in place.

5.5.2.2 Residual Impacts

Residual impacts will not be significant following the implementation of proposed mitigation measures.

5.5.3 Operational Stage Traffic Impact

In order to assess the impact of the proposed development on the identified study area, the key junctions have been assessed for standard KPI's (Key Performance Indicators) described in Section 5.5.3.5, Network Modelling Results, both with/without development traffic for both AM and PM peak hours. Results are presented starting in 2026, 5 years after the scheme is complete, 2031, and 15 years after the full operation start 2041.

The traffic data recorded shows the morning and evening peak hour traffic periods for all junctions to be 08:00 to 09:00 and 17:00 to 18:00, refer to section 5.3 Existing Conditions.

5.5.3.1 Traffic Forecasting

The TII Guidelines have been followed when forecasting growth rates for background traffic for the area. Recorded background traffic was factored using TII (Transport Infrastructure Ireland) Project Appraisal Guidelines (PE-PAG-02017) for use in future year scenarios to reflect the cumulative impact of additional development in the area. The following table presents the factors used on recorded PCU's based on Link Based Growth Rates (Central Growth) for Cork County.

	Cars/LGV	HGV	Combined
Count %	96.5%	3.5%	100%
2022 to 2026	1.069	1.123	1.071
2022 to 2031	1.152	1.276	1.157
2022 to 2041	1.246	1.438	1.252

TII Project Appraisal Guidelines for National Roads Unit 5.3
Travel Demand Projections (PE-PAG-0217-02)

Table 5.5.1, Background Traffic Growth Rates Per Annum

5.5.3.2 Modal Shift

This section describes the current level of modal shift (the use of sustainable modes of travel) based on available data and compares these to national targets.

The 2016 Census online SAP data was used to assess current modal shift patterns in the Caherlag Area which encompasses the site. **16.5%** of people in this area said they were commuting on foot, bike or using public transport.

Means of Travel	Work	School or College	Total
On foot	98	320	418
Bicycle	27	5	32
Bus, minibus or coach	64	247	311
Train, DART or LUAS	63	55	118
Motorcycle or scooter	12	1	13
Car driver	2,626	89	2,715
Car passenger	128	1,186	1,314
Van	160	1	161
Other (incl. lorry)	12	1	13
Work mainly at or from home	98	2	100
Not stated	76	68	144
Total	3,364	1,975	5,339

Table 5.5.2: 2016 Modal Shift by means of travel to work, school or college.
(Electoral Division of Caherlag)

A modal shift of 40% (implying an anticipated increase in public transport or active travel in the immediate area of 23.5%) for future year models is deemed to be reasonable. This modal shift increase, of 23.5% will be applied to proposed development traffic from the opening year (when the development is fully completed) 2026, up to the design year 2041. It will not be applied to background network traffic to ensure a robust assessment is carried out.

5.5.3.3 Trip Generation

This section describes the traffic generation from the development based on the TRICS database for the different land-use categories.

As the proposed development site currently generates no traffic no reduction has been applied to account for pass-by trips, transfer trips or diverted trips from the residential element of the scheme. As outlined in section 5.5.3.2 an increase in the use of sustainable modes of travel is anticipated hence a reduction in traffic generation of **23.5%** has been applied to this element of the scheme.

It is assumed that a significant portion of the creche will be used by residents of the new development and that a reduction in traffic generation based on a new stand-alone creche is justified. In order to carry out a robust assessment of the development impact on the roads network it has been assumed that 60% of creche traffic is external to the site and are new trips on the surrounding roads network.

The following table presents the expected trip rates and associated peak hour flows which have been distributed across the roads network as outlined in the following section.

Glounthaune Residential Scheme		AM PEAK		PM PEAK	
		Arrivals	Departures	Arrivals	Departures
New Residential Trip Generation - based on TRICs database (per unit)					
290	Peak Trips Trip Rates Per Unit	0.176	0.546	0.477	0.283
	Peak Trips No. Units	51	158	138	82
	TOTAL	209		220	
New Creche Trip Generation - traffic external to new development					
67	Factor of creche traffic external to dev.	0.6			
	Peak Trips	9	10	6	8
	TOTAL	19		14	

Table 5.5.3: Proposed Peak Hour Development Traffic in 2026 (Note: the 290 units is made up of 269 units plus 21 units from planning ref. 21/6851 using the proposed development Junction)

5.5.3.4 Trip Distribution

Traffic flow matrices have been developed for each Junction for the following scenarios:

- 2026 AM/PM With/Without Dev (Full scheme)
- 2031 AM/PM With/Without Dev
- 2041 AM/PM With/Without Dev

Junction 1: The junction of the L-2968/L-2969

Origin	Destination				
	A	B	C	D	Tot
A	0	1	172	13	186
B	16	0	59	19	94
C	111	17	0	21	149
D	8	2	19	0	29
Tot	135	21	250	52	458

Origin	Destination				
	A	B	C	D	Tot
A	0	9	68	3	81
B	9	0	5	29	43
C	109	45	0	10	164
D	1	0	3	0	5
Tot	119	54	76	43	293

Table 5.5.4: Junction 1: 2031 Without Development AM/PM Peak Hour Traffic Movements

Origin	Destination				
	A	B	C	D	Tot
A	0	1	175	13	189
B	16	0	60	19	95
C	142	22	0	27	191
D	8	2	19	0	29
Tot	167	25	253	58	503

Origin	Destination				
	A	B	C	D	Tot
A	0	9	97	3	110
B	9	0	18	29	57
C	120	50	0	12	182
D	1	0	5	0	6
Tot	131	59	120	44	354

Table 5.5.5 Junction 1: 2031 With Development AM/PM Peak Hour Traffic Movements

Origin	Destination				
	A	B	C	D	Tot
A	0	1	187	14	202
B	18	0	64	20	101
C	120	19	0	23	162
D	9	3	20	0	31
Tot	147	23	270	56	496

Origin	Destination				
	A	B	C	D	Tot
A	0	10	74	4	88
B	10	0	5	31	46
C	118	49	0	11	178
D	1	0	4	0	5
Tot	129	59	83	46	317

Table 5.5.6 Junction 1: 2041 Without Development AM/PM Peak Hour Traffic Movements

Origin	Destination				
	A	B	C	D	Tot
A	0	1	189	14	204
B	18	0	65	20	103
C	154	24	0	29	207
D	9	3	20	0	31
Tot	180	28	274	63	545

Origin	Destination				
	A	B	C	D	Tot
A	0	10	105	4	119
B	10	0	19	31	60
C	130	54	0	13	197
D	1	0	5	0	6
Tot	142	64	129	48	382

Table 5.5.7 Junction 1: 2041 With Development AM/PM Peak Hour Traffic Movements

Table 5.5.6 Junction 1: 2041 Without Development AM/PM Peak Hour Traffic Movements

Junction 2: Access to Cois Chuain from the L-2968

Origin	Destination			
	A	B	C	Tot
A	0	220	1	221
B	122	0	6	128
C	4	12	0	16
Total	126	232	7	365

Origin	Destination			
	A	B	C	Tot
A	0	81	1	82
B	143	0	9	152
C	0	8	0	8
Total	143	89	10	242

Table 5.5.8 Junction 2: 2021 Existing AM/PM Peak Hour Traffic Movements

Origin	Destination			
	A	B	C	Tot
A	0	236	1	237
B	131	0	6	137
C	4	13	0	17
Total	135	249	7	391

Origin	Destination			
	A	B	C	Tot
A	0	87	1	88
B	153	0	10	163
C	0	9	0	9
Total	153	95	11	259

Table 5.5.9 Junction 2: 2026 Without Development AM/PM Peak Hour Traffic Movements

Origin	Destination			
	A	B	C	Tot
A	0	341	3	344
B	177	0	6	183
C	4	13	0	17
Total	181	354	9	544

Origin	Destination			
	A	B	C	Tot
A	0	146	3	149
B	242	0	10	252
C	0	9	0	9
Total	242	154	13	409

Table 5.5.10 Junction 2: 2026 With Development AM/PM Peak Hour Traffic Movements

Origin	Destination			
	A	B	C	Tot
A	0	254	1	256
B	141	0	7	148
C	5	14	0	19
Total	146	268	8	422

Origin	Destination			
	A	B	C	Tot
A	0	94	1	95
B	165	0	10	176
C	0	9	0	9
Total	165	103	12	280

Table 5.5.11 Junction 2: 2031 Without Development AM/PM Peak Hour Traffic Movements

Origin	Destination			
	A	B	C	Tot
A	0	376	3	379
B	194	0	7	201
C	5	14	0	19
Total	199	390	10	599

Origin	Destination			
	A	B	C	Tot
A	0	94	1	95
B	165	0	10	176
C	0	9	0	9
Total	165	103	12	280

Table 5.5.12 Junction 2: 2031 With Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C		
Origin	A	0	275	1		277
	B	153	0	8		160
	C	5	15	0		20
	Total	158	291	9		457

		Destination				Tot
		A	B	C		
Origin	A	0	101	1		103
	B	179	0	11		190
	C	0	10	0		10
	Total	179	111	13		303

Table 5.5.13 Junction 2: 2041 Without Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C		
Origin	A	0	407	4		411
	B	210	0	8		218
	C	5	15	0		20
	Total	215	422	11		649

		Destination				Tot
		A	B	C		
Origin	A	0	175	4		179
	B	291	0	11		302
	C	0	10	0		10
	Total	291	185	15		491

Table 5.5.14 Junction 2: 2041 With Development AM/PM Peak Hour Traffic Movements

Junction 3: Glounthaune Road/ Johnstown Close

		Destination				Tot
		A	B	C	D	
Origin	A	0	70	4	167	241
	B	52	0	1	271	324
	C	2	4	0	5	11
	D	74	205	3	0	282
	Total	128	279	8	443	858

		Destination				Tot
		A	B	C	D	
Origin	A	0	47	2	59	108
	B	51	0	193	4	248
	C	3	3	0	5	11
	D	140	218	6	0	364
	Total	194	268	201	68	731

Table 5.5.15 Junction 3: 2021 Existing AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C	D	
Origin	A	0	75	4	179	258
	B	56	0	1	290	347
	C	2	4	0	5	12
	D	79	220	3	0	302
	Total	137	299	9	475	919

		Destination				Tot
		A	B	C	D	
Origin	A	0	50	2	63	116
	B	55	0	207	4	266
	C	3	3	0	5	12
	D	150	234	6	0	390
	Total	208	287	215	73	783

Table 5.5.16 Junction 3: 2026 Without Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C	D	
Origin	A	0	99	5	208	312
	B	58	0	1	290	349
	C	2	4	0	5	12
	D	83	220	3	0	306
	Total	143	323	10	504	979

		Destination				Tot
		A	B	C	D	
Origin	A	0	57	2	79	139
	B	73	0	207	4	284
	C	4	3	0	5	13
	D	200	234	6	0	440
	Total	277	294	215	89	875

Table 5.5.17 Junction 3: 2026 With Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C	D	
Origin	A	0	81	5	193	279
	B	60	0	1	313	375
	C	2	5	0	6	13
	D	86	237	3	0	326
	Total	148	323	9	512	993

		Destination				Tot
		A	B	C	D	
Origin	A	0	54	2	68	125
	B	59	0	223	5	287
	C	3	3	0	6	13
	D	162	252	7	0	421
	Total	224	310	233	79	846

Table 5.5.18 Junction 3: 2031 Without Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C	D	
Origin	A	0	109	6	227	341
	B	62	0	1	313	377
	C	2	5	0	6	13
	D	90	237	3	0	331
	Total	155	351	10	546	1062

		Destination				Tot
		A	B	C	D	
Origin	A	0	62	2	87	152
	B	80	0	223	5	308
	C	5	3	0	6	14
	D	220	252	7	0	479
	Total	304	318	233	97	952

Table 5.5.19 Junction 3: 2031 With Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C	D	
Origin	A	0	88	5	209	302
	B	65	0	1	339	406
	C	3	5	0	6	14
	D	93	257	4	0	353
	Total	160	349	10	555	1074

		Destination				Tot
		A	B	C	D	
Origin	A	0	59	3	74	135
	B	64	0	242	5	311
	C	4	4	0	6	14
	D	175	273	8	0	456
	Total	243	336	252	85	915

Table 5.5.20 Junction 3: 2041 Without Development AM/PM Peak Hour Traffic Movements

		Destination				Tot
		A	B	C	D	
Origin	A	0	118	6	245	369
	B	68	0	1	339	408
	C	3	5	0	6	14
	D	98	257	4	0	358
	Total	168	379	11	591	1150

		Destination				Tot
		A	B	C	D	
Origin	A	0	68	3	94	164
	B	86	0	242	5	333
	C	5	4	0	6	15
	D	238	273	8	0	518
	Total	329	344	252	105	1031

Table 5.5.21 Junction 3: 2041 With Development AM/PM Peak Hour Traffic Movements

Junction 4: 'The Terrace'/L-2968

		Destination			Tot
		A	B	C	
Origin	A	0	22	92	114
	B	24	0	96	120
	C	88	53	0	141
	Total	112	75	188	375

		Destination			Tot
		A	B	C	
Origin	A	0	20	32	52
	B	17	0	21	38
	C	20	24	0	44
	Total	37	44	53	134

Table 5.5.22 Junction 4: 2021 Existing AM/PM Peak Hour Traffic Movements

		Destination			Tot
		A	B	C	
Origin	A	0	24	99	122
	B	26	0	103	129
	C	94	57	0	151
	Total	120	80	201	402

		Destination			Tot
		A	B	C	
Origin	A	0	21	34	56
	B	18	0	22	41
	C	21	26	0	47
	Total	40	47	57	144

Table 5.5.23 Junction 4: 2026 Without Development AM/PM Peak Hour Traffic Movements

		Destination			Tot
		A	B	C	
Origin	A	0	33	141	173
	B	35	0	103	138
	C	125	57	0	182
	Total	160	89	243	493

		Destination			Tot
		A	B	C	
Origin	A	0	35	56	92
	B	25	0	22	48
	C	33	26	0	59
	Total	59	61	79	199

Table 5.5.24 Junction 4: 2026 With Development AM/PM Peak Hour Traffic Movements

		Destination			Tot
		A	B	C	
Origin	A	0	25	106	132
	B	28	0	111	139
	C	102	61	0	163
	Total	130	87	217	434

		Destination			Tot
		A	B	C	
Origin	A	0	23	37	60
	B	20	0	24	44
	C	23	28	0	51
	Total	43	51	61	155

Table 5.5.25 Junction 4: 2031 Without Development AM/PM Peak Hour Traffic Movements

		Destination			Tot
		A	B	C	
Origin	A	0	36	155	191
	B	38	0	111	149
	C	138	61	0	199
	Total	176	97	266	539

		Destination			Tot
		A	B	C	
Origin	A	0	39	62	102
	B	28	0	24	52
	C	37	28	0	65
	Total	65	67	87	219

Table 5.5.26 Junction 4: 2031 With Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	28	115	143
	B	30	0	120	150
	C	110	66	0	177
	Total	140	94	235	470

Table 5.5.27 Junction 4: 2041 Without Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	28	115	143
	B	30	0	120	150
	C	110	66	0	177
	Total	140	94	235	470

Table 5.5.28 Junction 4: 2041 With Development AM/PM Peak Hour Traffic Movements

Junction 5: Johnstown Close/ 'The Terrace'

		Destination			
		A	B	C	Tot
Origin	A	0	72	28	100
	B	78	0	282	360
	C	27	209	0	236
	Total	105	281	310	696

Table 5.5.29 Junction 5: 2021 Existing AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	77	30	107
	B	84	0	302	386
	C	29	224	0	253
	Total	112	301	332	746

Table 5.5.30 Junction 5: 2026 Without Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	83	33	116
	B	91	0	302	393
	C	31	248	0	279
	Total	121	331	335	788

Table 5.5.31 Junction 5: 2026 With Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	83	32	116
	B	90	0	326	416
	C	31	242	0	273
	Total	121	325	359	805

Table 5.5.32 Junction 5: 2031 Without Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	90	36	126
	B	98	0	326	425
	C	34	270	0	303
	Total	132	360	362	854

Table 5.5.33 Junction 5: 2031 With Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	90	35	125
	B	98	0	353	451
	C	34	262	0	296
	Total	131	352	388	872

Table 5.5.34 Junction 5: 2041 Without Development AM/PM Peak Hour Traffic Movements

		Destination			
		A	B	C	Tot
Origin	A	0	98	43	140
	B	106	0	353	460
	C	36	292	0	328
	Total	143	389	396	928

Table 5.5.35 Junction 5: 2041 With Development AM/PM Peak Hour Traffic Movements

5.5.3.5 Network Modelling Results

This section presents the results of the traffic modelling of the five identified junctions with the existing L2968/L2969 Junction presented both with/without development in place for the future year scenarios. Junctions 2,3,4 and 5 development access results are presented for both morning and evening peak periods.

The LinSig modelling software produces a PRC % (Practical Reserve Capacity) and a Delay figure which are used to compare the effects the development will have on the junction being modelled. A PRC of 5% implies that the junction has reached capacity but is still operational with delay incurred. The delay figure produced (pcuHr) is a measure of the overall delay incurred on all arms of the junction and is based on the Demand Flow per arm multiplied by the Average Delay per PCU.

The Junctions 9: PICADY modelling software produces an RFC % (Ratio of Flow to Capacity), a Delay figure measured in seconds and a LOS (Level of Service) which are used to compare the effects the development will have on the junction being modelled. An RFC of 85% on a roundabout junction implies that the junction has reached capacity but is still operational with delay incurred. The following table describes the different LOS and the implications for the junction being assessed.

Level of Service A	Free-Flow
Level of Service B	Reasonably Free-Flow (no delay incurred)
Level of Service C	Stable Operation (busy but operational with acceptable delay incurred)
Level of Service D	Borderline Unstable (Junctions reaching capacity - but still operational- delay incurred)
Level of Service E	Extremely Unstable (Junctions at capacity or over, any incident will cause a grid-lock situation- significant delay incurred)
Level of Service F	Breakdown (Junctions over capacity, unacceptable delay traffic at a standstill)

Table 5.5.36: Level of Service

The Picady results for the selected junctions both with/without development are presented in the respective Tables below.

	AM					PM								
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity		
Junction 1 - 2021														
Stream B-ACD	D1	0.2	8.09	0.17	A	234 %	D2	0.1	8.29	0.09	A	380 %		
Stream A-BCD		0.0	5.42	0.02	A			0.0	5.76	0.01	A			
Stream D-ABC		0.1	7.22	0.05	A			[Stream B-ACD]	0.0	0.00	0.00		A	[Stream B-ACD]
Stream C-ABD		0.0	5.84	0.03	A			0.1	5.94	0.08	A			
Junction 1 - 2026 Without Development														
Stream B-ACD	D3	0.2	8.28	0.18	A	212 %	D4	0.1	8.44	0.09	A	344 %		
Stream A-BCD		0.0	5.40	0.03	A			0.0	5.75	0.01	A			
Stream D-ABC		0.1	7.35	0.06	A			[Stream B-ACD]	0.0	0.00	0.00		A	[Stream B-ACD]
Stream C-ABD		0.0	5.83	0.03	A			0.1	5.94	0.09	A			
Junction 1 - 2026 With Development														
Stream B-ACD	D5	0.2	8.37	0.18	A	201 %	D6	0.1	8.33	0.12	A	289 %		
Stream A-BCD		0.0	5.44	0.03	A			0.0	5.66	0.01	A			
Stream D-ABC		0.1	7.50	0.06	A			[Stream B-ACD]	0.0	6.99	0.01		A	[Stream B-ACD]
Stream C-ABD		0.1	5.72	0.04	A			0.1	5.98	0.10	A			
Junction 1 - 2031 Without Development														
Stream B-ACD	D7	0.2	8.54	0.20	A	188 %	D8	0.1	8.54	0.10	A	316 %		
Stream A-BCD		0.0	5.37	0.03	A			0.0	5.75	0.01	A			
Stream D-ABC		0.1	7.48	0.06	A			[Stream B-ACD]	0.0	0.00	0.00		A	[Stream B-ACD]
Stream C-ABD		0.1	5.81	0.04	A			0.1	5.94	0.09	A			
Junction 1 - 2031 With Development														
Stream B-ACD	D9	0.2	8.65	0.20	A	177 %	D10	0.1	8.46	0.13	A	260 %		
Stream A-BCD		0.0	5.42	0.03	A			0.0	5.65	0.01	A			
Stream D-ABC		0.1	7.67	0.06	A			[Stream B-ACD]	0.0	7.17	0.01		A	[Stream B-ACD]
Stream C-ABD		0.1	5.69	0.05	A			0.2	6.00	0.10	A			
Junction 1 - 2041 Without Development														
Stream B-ACD	D11	0.3	8.85	0.22	A	165 %	D12	0.1	8.73	0.11	A	283 %		
Stream A-BCD		0.0	5.34	0.03	A			0.0	5.75	0.01	A			
Stream D-ABC		0.1	7.63	0.07	A			[Stream B-ACD]	0.0	6.99	0.01		A	[Stream B-ACD]
Stream C-ABD		0.1	5.81	0.04	A			0.1	5.95	0.10	A			
Junction 1 - 2041 With Development														
Stream B-ACD	D13	0.3	8.97	0.22	A	156 %	D14	0.2	8.67	0.14	A	233 %		
Stream A-BCD		0.0	5.40	0.03	A			0.0	5.64	0.01	A			
Stream D-ABC		0.1	7.84	0.07	A			[Stream B-ACD]	0.0	7.26	0.01		A	[Stream B-ACD]
Stream C-ABD		0.1	5.67	0.05	A			0.2	6.01	0.11	A			

Table 5.5.37: Junctions 1: PICADY Traffic Modelling Results

	AM					PM						
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
Junction 2 - 2021												
Stream B-AC	D1	0.0	7.98	0.04	A	412 %	D2	0.0	8.06	0.02	A	578 %
Stream C-AB		0.0	5.09	0.00	A			[Stream B-AC]	0.0	5.69	0.00	
Junction 2 - 2026 Without Development												
Stream B-AC	D3	0.0	8.12	0.04	A	376 %	D4	0.0	8.12	0.04	A	376 %
Stream C-AB		0.0	5.05	0.00	A			[Stream B-AC]	0.0	5.05	0.00	
Junction 2 - 2026 With Development												
Stream B-AC	D5	0.0	8.66	0.04	A	258 %	D6	0.0	8.81	0.02	A	315 %
Stream C-AB		0.0	4.76	0.01	A			[Stream B-AC]	0.0	5.56	0.01	
Junction 2 - 2031 Without Development												
Stream B-AC	D7	0.0	8.19	0.05	A	343 %	D8	0.0	8.23	0.02	A	490 %
Stream C-AB		0.0	4.99	0.00	A			[Stream B-AC]	0.0	5.66	0.00	
Junction 2 - 2031 With Development												
Stream B-AC	D9	0.1	8.82	0.05	A	228 %	D10	0.0	8.23	0.02	A	490 %
Stream C-AB		0.0	4.67	0.01	A			[Stream B-AC]	0.0	5.66	0.00	
Junction 2 - 2041 Without Development												
Stream B-AC	D11	0.1	8.36	0.05	A	309 %	D12	0.0	8.34	0.02	A	443 %
Stream C-AB		0.0	4.94	0.00	A			[Stream B-AC]	0.0	5.66	0.00	
Junction 2 - 2041 With Development												
Stream B-AC	D13	0.1	9.09	0.05	A	202 %	D14	0.0	9.24	0.03	A	248 %
Stream C-AB		0.0	4.60	0.01	A			[Stream B-AC]	0.0	5.52	0.01	

Table 5.5.38: Junctions 2: PICADY Traffic Modelling Results

	AM					PM								
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity		
2021														
Stream B-ACD	D1	0.0	7.80	0.03	A	37 %	D2	0.0	6.66	0.02	A	188 %		
Stream A-BCD		0.1	6.21	0.09	A			0.0	0.00	0.00	A			
Stream D-ABC		1.1	14.53	0.52	B			[Stream D-ABC]	0.3	7.82	0.21		A	[Stream D-ABC]
Stream C-ABD		0.0	6.07	0.01	A			0.0	5.68	0.01	A			
2026 Without Development														
Stream B-ACD	D3	0.0	7.99	0.03	A	28 %	D4	0.0	6.87	0.02	A	147 %		
Stream A-BCD		0.1	6.31	0.10	A			0.1	6.40	0.10	A			
Stream D-ABC		1.3	16.37	0.56	C			[Stream D-ABC]	0.3	8.36	0.23		A	[Stream D-ABC]
Stream C-ABD		0.0	6.14	0.01	A			0.0	5.95	0.01	A			
2026 With Development														
Stream B-ACD	D5	0.0	8.18	0.03	A	12 %	D6	0.0	6.82	0.02	A	139 %		
Stream A-BCD		0.1	6.53	0.13	A			0.0	5.79	0.01	A			
Stream D-ABC		2.1	22.75	0.69	C			[Stream D-ABC]	0.4	8.58	0.27		A	[Stream D-ABC]
Stream C-ABD		0.0	6.23	0.01	A			0.0	5.73	0.01	A			
2031 Without Development														
Stream B-ACD	D7	0.0	8.27	0.03	A	19 %	D8	0.0	6.85	0.02	A	130 %		
Stream A-BCD		0.1	6.41	0.10	A			0.1	6.52	0.11	A			
Stream D-ABC		1.6	19.37	0.62	C			[Stream D-ABC]	0.3	8.71	0.25		A	[Stream D-ABC]
Stream C-ABD		0.0	6.24	0.01	A			0.0	6.03	0.01	A			
2031 With Development														
Stream B-ACD	D9	0.0	8.53	0.03	A	2 %	D10	0.0	6.89	0.03	A	119 %		
Stream A-BCD		0.2	6.68	0.14	A			0.0	5.86	0.01	A			
Stream D-ABC		3.1	31.39	0.77	D			[Stream D-ABC]	0.4	9.04	0.29		A	[Stream D-ABC]
Stream C-ABD		0.0	6.34	0.01	A			0.0	5.79	0.01	A			
2041 Without Development														
Stream B-ACD	D11	0.0	8.64	0.04	A	9 %	D12	0.0	7.17	0.03	A	110 %		
Stream A-BCD		0.1	6.55	0.11	A			0.1	6.68	0.12	A			
Stream D-ABC		2.2	24.31	0.69	C			[Stream D-ABC]	0.4	9.21	0.28		A	[Stream D-ABC]
Stream C-ABD		0.0	6.36	0.01	A			0.0	6.12	0.01	A			
2041 With Development														
Stream B-ACD	D13	0.0	8.96	0.04	A	-5 %	D14	0.0	7.08	0.03	A	101 %		
Stream A-BCD		0.2	6.84	0.15	A			0.0	5.92	0.01	A			
Stream D-ABC		5.0	47.69	0.85	E			[Stream D-ABC]	0.5	9.58	0.33		A	[Stream D-ABC]
Stream C-ABD		0.0	6.47	0.01	A			0.0	5.85	0.01	A			

Table 5.5.39: Junctions 3: PICADY Traffic Modelling Results

	AM					PM						
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
2021												
Stream B-AC	D1	0.3	8.44	0.23	A	180 %	D2	0.1	6.45	0.09	A	595 %
Stream C-AB		0.1	6.01	0.05	A			[Stream B-AC]	0.0	6.19	0.03	
2026 Without Development												
Stream B-AC	D3	0.3	8.72	0.25	A	160 %	D4	0.1	6.51	0.10	A	556 %
Stream C-AB		0.1	6.01	0.06	A			[Stream B-AC]	0.0	6.21	0.03	
2026 With Development												
Stream B-AC	D5	0.5	10.35	0.36	B	96 %	D6	0.2	7.06	0.16	A	329 %
Stream C-AB		0.1	6.22	0.08	A			[Stream B-AC]	0.1	6.33	0.05	
2031 Without Development												
Stream B-AC	D7	0.4	9.03	0.27	A	143 %	D8	0.1	6.59	0.11	A	501 %
Stream C-AB		0.1	6.02	0.06	A			[Stream B-AC]	0.0	6.23	0.04	
2031 With Development												
Stream B-AC	D9	0.6	11.13	0.39	B	79 %	D10	0.2	7.25	0.18	A	287 %
Stream C-AB		0.1	6.26	0.08	A			[Stream B-AC]	0.1	6.37	0.05	
2041 Without Development												
Stream B-AC	D11	0.4	9.45	0.29	A	124 %	D12	0.1	6.68	0.12	A	457 %
Stream C-AB		0.1	6.02	0.07	A			[Stream B-AC]	0.0	6.24	0.04	
2041 With Development												
Stream B-AC	D13	0.4	9.45	0.29	A	124 %	D14	0.1	6.68	0.12	A	457 %
Stream C-AB		0.1	6.02	0.07	A			[Stream B-AC]	0.0	6.24	0.04	

Table 5.5.40: Junctions 4: PICADY Traffic Modelling Results

	AM					PM						
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
2021												
Stream B-AC	D1	0.3	8.44	0.23	A	180 %	D2	0.1	6.45	0.09	A	595 %
Stream C-AB		0.1	6.01	0.05	A			[Stream B-AC]	0.0	6.19	0.03	
2026 Without Development												
Stream B-AC	D3	0.3	8.72	0.25	A	160 %	D4	0.1	6.51	0.10	A	556 %
Stream C-AB		0.1	6.01	0.06	A			[Stream B-AC]	0.0	6.21	0.03	
2026 With Development												
Stream B-AC	D5	0.5	10.35	0.36	B	96 %	D6	0.2	7.06	0.16	A	329 %
Stream C-AB		0.1	6.22	0.08	A			[Stream B-AC]	0.1	6.33	0.05	
2031 Without Development												
Stream B-AC	D7	0.4	9.03	0.27	A							

Proposed Signalised Junction at Residential Development		With Development		
		Deg Sat %	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
2026	AM	64.8	49.2	4.6
	PM	39.1	41.4	3.2
2031	AM	67.7	48.2	5.3
	PM	59.1	40.2	3.9
2041	AM	74.9	53.1	6.5
	PM	52.6	39.5	4.1

Table 5.5.42: Junction 6: Proposed Signalised Junction Cois Chuain/L2968/ Residential Development

The traffic modelling results show that the proposed junction serving the development (Junction 6) operates within capacity up to and including the design year 2041.

Analysis of Junction 3: Glounthaune Road/Johnstown Close shows that the junction currently operates within capacity with a level of service B during the morning peak hour. With the addition of standard growth rates on existing traffic flows the level of service for 2026 goes to C for the AM time period. When development traffic is added the Junction LOS goes to E for 2041. The conclusion from the modelling is that the junction will deteriorate over time both with/without development taking place. As this is currently an uncontrolled cross-roads junction the option of signalization in the future will have to be considered. The existing junction also interacts with the Inter-Urban Greenway (IU-1) which may at some stage require signal control to improve safety of all road users.

The results of the modelling were discussed with the Traffic & Transport Department of Cork County Council and it was agreed that the junction would be monitored over time to determine if and when remedial measures will be required. Given that the area is well served with public transport and with the further completion of cycle facilities in the area as part of CMATS, it is anticipated that background growth rates, applied in accordance with TII Guidelines to existing traffic flows, will be negated by an increase in modal shift. If this was to occur, Junction 3 will continue to operate within capacity for all future years as per the 2026 modelling results.

5.5.3.6 Mitigation Measures

The scheme proposes significant pedestrian/cycle connectivity works to promote the use of sustainable transport solutions on offer in the area, these being the existing Midleton/Cork Rail Service and development of the east/

west greenway. Facilitating safe off-road access to these modes of travel will reduce the volume of traffic generated from the site thereby reducing the impact of development traffic on the existing roads network into the future. In addition to accommodating the proposed development the connectivity works will also facilitate existing housing that at present require persons to walk/cycle using the public road network without footpath facilities in parts (estimated at 20% of the local road network).

Government policy to reduce dependence on private car use, is directing the development of new residential schemes in areas where public transport and sustainable solutions are available or will be available in the foreseeable future. The proposed development falls within this category and will positively impact the economic viability of public transport offerings in the area into the future.

The traffic modelling results indicate that Junction 3: Glounthaune Road/Johnstown Close, will deteriorate over time both with/without development traffic. Additional delay is incurred when development traffic is included with the Level of Service (LOS) going from D to E from 2031 to 2041 for the AM peak (08:00-09:00). As this uncontrolled junction crosses the IU-1 Inter-Urban Greenway there is a likelihood that this junction will be signalized in the foreseeable future. This would resolve any capacity issues whilst improving safety for all road users.

5.5.3.7 Residual Impacts

If government modal shift targets are achieved in the future, there will remain a percentage of new trips on the roads network because of the proposed scheme. These new trips will add traffic to the assessed junctions reducing their operational efficiency. The extent of this impact will be mitigated through further promotion of sustainable transport use as well as changes in the way we work and live. The traffic modelling has shown that 5 of the 6 junctions modelled will operate within capacity up to the design year 2041. Junction 3, in its current configuration as a priority-controlled cross-roads junction, will deteriorate in terms of Level of Service for future year scenarios reaching full capacity in the AM peak in 2041.

A summary of predicted operational phase impacts are presented in Table 5.5.42.

Mode	Cause	Impact
Operation Stage		
Traffic	Development Generated Traffic onto Roads Network	Slight Negative

Table 5.5.42: Development Related Impacts

5.5.4 Risk of Major Accidents and Disasters

The likelihood of an accident occurring involving development traffic is unlikely with vehicular access to the site solely from the L-2968 by means of a traffic signal-controlled junction. Off-road pedestrian and cycle access to the Village, greenway and train station further reduce the risk of accidents for residents of the scheme and surrounding area.

5.6 CUMULATIVE IMPACTS

5.6.1 Cumulative Impacts

Industry standard growth rates have been applied to background traffic for future year assessments (to account for further development within the area). These growth rates make allowance for modal shift targets as set by national policy but do not take account of site-specific measures that may be implemented to mitigate against traffic generation from a particular development. The application of these growth rates ensures a robust analysis of the surrounding roads network is carried out both with/without development.

A full list of granted permissions and current planning's in the area are included in Chapter 2 as well as being detailed in Table 5.1 of this report.

5.7 SUMMARY OF IMPACTS

The following table outlines the residual impacts of the proposed development on the study area.

Mode	Cause	Quality	Mitigation	Significance	Probability	Duration of Impact
Construction Stage						
Traffic	Development based HGV and other traffic flow onto the existing roads network	Negative	Off-peak construction workers arrival/departure hours, off-peak delivery to/from site, traffic signal-controlled access to the site	Slight	Likely	Temporary (duration of construction)
Operational Stage						
Traffic	Normal residential based traffic generated onto the existing roads network	Negative	Promotion of alternative modes of travel by means of providing off-road safe access to Village, greenway and train station. The local school is accessed via the main junction which is traffic-signal controlled and includes a dedicated pedestrian phase.	Slight	Likely	Long-term

Table 5.7.1: Residual Impacts

5.8 MONITORING

The operation of the local roads network and the effectiveness of the Greenway as well as public transport usage will be monitored by the Local Authority on an on-going basis. Traffic modelling has shown that most of the road's network will operate within capacity into the future, with Junction 3 the only junction showing a degradation in capacity for future years. The signalisation of this junction would resolve this issue as well as improving safety on the Inter-Urban Greenway. The implementation of such junction improvements will be carried out by the Local Authority when required.

5.9 INTERACTIONS

The development of this chapter also fed in the development of other Chapters of the EIA. The vehicular traffic flows that shall be generated by the scheme may result in corresponding changes in air quality and noise levels in the vicinity of the surrounding roads network. The nature, extents and consequences of these changes are examined in Chapter 10, Noise & Vibration and Chapter 13, Population & Human Health of this EIA.

5.10 DIFFICULTIES

No particular difficulties were encountered in completing this chapter of this EIA.

5.11 APPENDICES

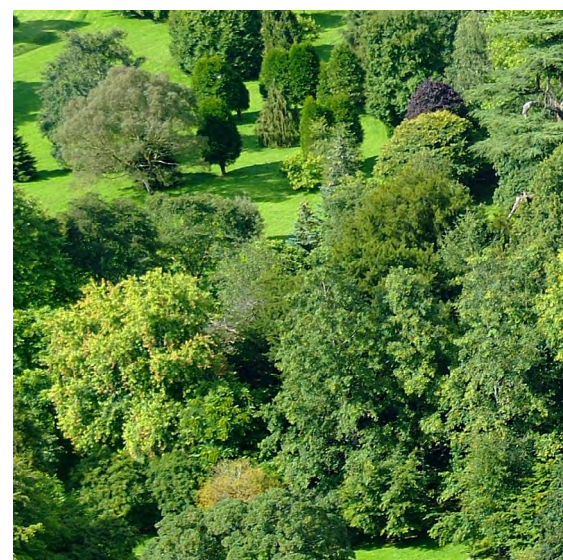
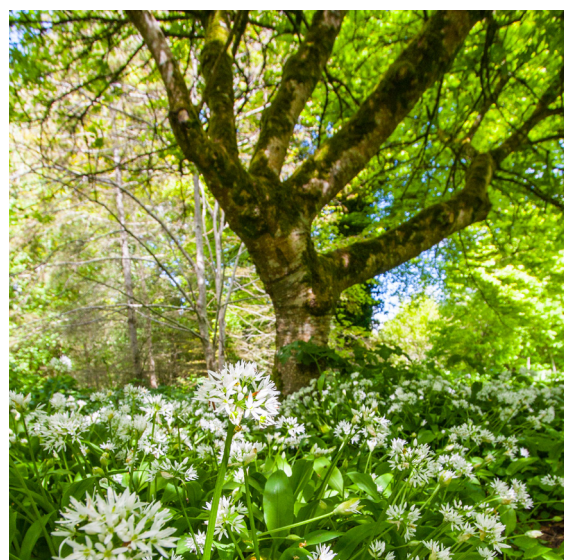
- Appendix 5-1 – Traffic & Transport Assessment



LACKENROE SHD

CHAPTER 6

Material Assets – Services, Infrastructure & Utilities



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CHAPTER 6

Material Assets – Services,
Infrastructure & Utilities

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6 Material Assets

6.1 INTRODUCTION

This chapter comprises an assessment of the likely effects on existing material assets of the proposed construction of a residential development as described in Chapter 2 during the demolition, construction, and operational phases of the proposed development. It will also identify the characteristics, predicted impact and mitigation measures arising from the different phases.

6.1.1 Author Information

Name: Emma McKendrick

Title: Regional Director, Chartered Civil Engineer, AECOM

Qualifications: BEng CEng MICE FIEI

Emma McKendrick is a Chartered Civil Engineer with 30 years' experience. Originally from Belfast, Emma studied at Edinburgh University and remained in Scotland for 20 years. In 2006, she relocated to Limerick.

Emma joined AECOM in 2017, prior to that she was at senior management level in PUNCH Consulting for 7 years. Emma has been responsible for the technical delivery of a wide range of projects from inception to handover in Ireland, UK, Libya and Saudi Arabia. Emma has significant experience in the preparation of EIAR documentation for residential developments such as this.

Name: Keith Fitzpatrick

Title: Associate Director, AECOM

Qualifications: NCEA in Electrical Engineering (Merit), BSc Building Services Engineering, Masters in Engineering Management (MEM), ACIBSE, MIEI, MIET

Keith Fitzpatrick is an Associate Director with over 20 years' experience and is responsible for design and design management of electrical services for various projects in Ireland, UK, Switzerland, UAE, Qatar, Oman, Bahrain, Saudi Arabia, Morocco, Tunisia. Keith is responsible for projects from initial design concept stages through tendering procedures, construction works and ultimately through to project handover. Keith's experience includes working on Residential Developments, Commercial, Public, Healthcare and Leisure Sector projects - schools, hotels, universities, airports, prisons, listed buildings, art galleries, office developments and retail / industrial parks.

6.1.2 Methodology

This chapter describes the material assets in the form of utilities that could potentially be impacted by the proposed development. The purpose of this chapter is to assess the impacts of the proposed utilities on the existing utility network which includes the following infrastructure:

- Surface Water Drainage,
- Foul Water Drainage,
- Water Supply,
- Electricity Supply,
- Natural Gas,
- Telecoms.

The impacts of the development on Traffic and Transportation, Population and Human Health, Air & Climate have been considered in the following chapters of this EIA Report as follows:

- Chapter 5: Material Assets – Traffic and Transportation,
- Chapter 10: Air Quality and Climate,
- Chapter 13: Population and Human Health.

6.1.2.1 Identification of Utilities

The Infrastructure Report prepared for the proposed development, included in Appendix 2-1, includes information related to existing services in the vicinity of the proposed development site.

Water services information (surface water drainage, wastewater drainage and water supply) was provided by Irish Water and Cork County Council.

AECOM reviewed existing utilities (ESB, Gas and Telecoms) in the vicinity of the site to identify the servicing of the development site and any potential impacts of existing infrastructure.

An Energy Statement for the proposed development has been prepared. This outlines the proposed energy conservation approach/ strategy for the proposed development. The proposed energy strategy is to provide high efficiency, low energy, sustainable building services systems to minimise the carbon footprint of the development. The proposed development will be designed in accordance with Part L of the Building Regulations.

6.1.3 Relevant Guidelines

The assessment has been carried out in consultation with Irish Water and Cork County Council and in accordance with the relevant Standards and Guidelines, including but not limited to the following:

- BS EN 752-4: 1997 – Drain and Sewer Systems Outside Buildings, Part 4: Hydraulic Design and Environmental Considerations,
- Irish Water Standard Details and Specifications, latest editions,
- Irish Water Code of Practice for Wastewater Infrastructure,
- Irish Water Code of Practice for Water Infrastructure,
- Greater Dublin Strategic Drainage Study (GSDSDS) Volume 2 – New Developments,
- Guidebook for ESB Networks Standards for Electrical Services,
- ESB Construction Specifications for MV Sub stations,
- Virgin Media New Developments Handbook.

6.2 DESCRIPTION OF EXISTING ENVIRONMENT

The proposed project is described in detail in Chapter 2. Due to the greenfield nature of the majority of the development site, the extent of existing utilities is limited to the existing roads and residential units in the area.

6.2.1 Existing Surface water drainage

Information available on the extent of the existing surface water drainage networks in the area surrounding the site is limited. A large proportion of the existing drainage networks in the area are combined networks rather than separate surface water and wastewater drainage networks.

There is an existing surface water channel running parallel to the Terrace which discharges to a below ground pipe network and on Johnstown Close and ultimately discharges to Lough Mahon through an existing outfall running underneath Glounthaune Train Station. There is an existing 225 mm diameter pipe running perpendicular to the public roadway and train line and discharges through a flap valve.

Cork County Council have noted ongoing issues with this existing outfall due to the limited capacity of the existing 225 mm diameter pipe. Figure 61 is an image of the existing outfall at Glounthaune Train Station (provided by Irish Rail).

Figure 6.1 – Existing Outfall at Glounthaune Train Station



Figure 62 shows the downstream end of the existing surface water channel running parallel to 'the Terrace'. The channel discharges to an existing drainage network at the location noted.

Figure 6.2 – Existing Channel on the Terrace



There is an additional surface water outfall to the east of Glounthaune Station, south of Johnstown Park. Cork County Council have noted that dye testing has been undertaken to identify the route of the existing network from the public road way to the existing headwall. Figure 63 is an image of the existing outfall. This outfall discharges to Lough Mahon between the Cork – Midleton and Cork – Cobh railway lines as shown in Figure 64.

Figure 6.3 – Existing Outfall east of Glounthaune Station at Johnstown Park



Figure 6.4 – Location of Existing Outfall east of Glounthaune Train Station



6.2.2 Existing Wastewater Drainage

Information on the extent of the existing public wastewater drainage networks within the study area was obtained from Cork County Council and Irish Water. Wastewater generated in the Glounthaune area is treated at Carrigrennan Wastewater Treatment Plant (WWTP), which is located in Little Island, Co. Cork. Treated wastewater from the plant is discharged through a 500m long outfall pipe to Cork Harbour at Lough Mahon. Carrigrennan WWTP operates under a wastewater discharge licence (D0033-01). The existing plant has a treatment design capacity of 413,200 P.E. The Irish Water Investment Plan 2020-2024 notes that it is proposed to undertake works at the WWTP to “reduce phosphorus and to protect environment and quality of receiving waters”.

There are no existing wastewater drainage networks within or to the north of the subject site. There are a number of existing combined drainage networks in the area to the west and south of the subject site:

- Existing combined drainage network running in the Knockraha road to the west of the subject site,
- Existing combined network running east along the Terrace at the entrance to The Woods residential development and onto Johnstown Park,
- Existing combined network running along the Old Youghal Road at Johnstown Close.

The existing networks running on the Terrace/ Johnstown Park and Johnstown Close discharge to an existing pumping station on Johnstown Close (Johnstown Pumping Station). The existing pumping station is located in the walkway to the east of Fitzpatrick’s Shop/ existing apartments. Figure 65 illustrates the extent of the existing wastewater drainage networks in the vicinity of the subject site.

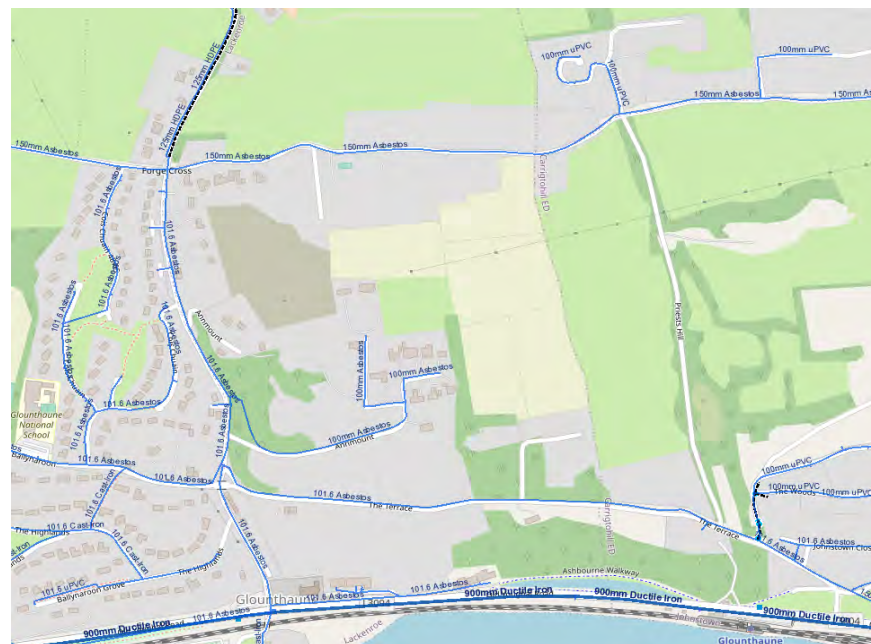
Figure 6.5 – Existing Wastewater Drainage Network



6.2.3 Existing Water Supply

Information on the extent of the public water supply schemes within the study area was obtained from Cork County Council and Irish Water. The study area is served by the Glashaboy Water Supply Zone. Glashaboy Regional Water Supply Scheme is designed to extract 5 million gallons of water per day, via river intake from the Glashaboy River near Riverstown, Glanmire. Water is pumped directly to the Treatment Plant at Richmond Glanmire. There is no raw water storage. Treated water is supplied from Glashaboy Water Treatment Plant to Caherlag Pumphouse via a 750 mm diameter watermain. There is an existing reservoir at Caherlag. There is an existing water distribution network serving the area including the subject site. There is an existing 150 mm diameter asbestos water main running in the Killahora Road to the north of the site, and existing 101.6 mm diameter asbestos watermain running along the Terrace, and an existing 101.6 mm diameter asbestos watermain to the south on Johnstown Close. Figure 6.6 illustrates the existing water distribution network in the vicinity of the subject site.

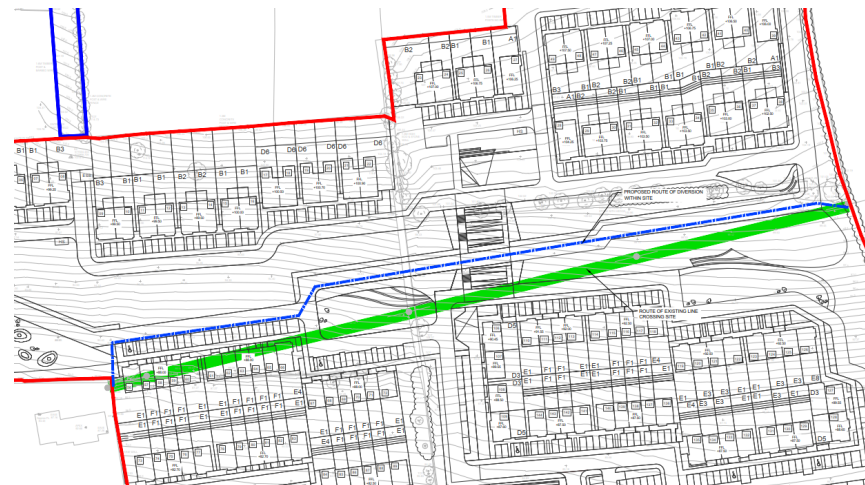
Figure 6.6 – Existing Water Distribution Network



6.2.4 Existing Electricity

Information provided by ESB indicates that there are existing overhead lines traversing across a section of the proposed development which will need to be diverted underground at either side of the site boundary. It is not envisaged that this supply will be used for the new development and will be a clean diversion through the site.

Figure 6.7 – Location of Overhead ESB Lines



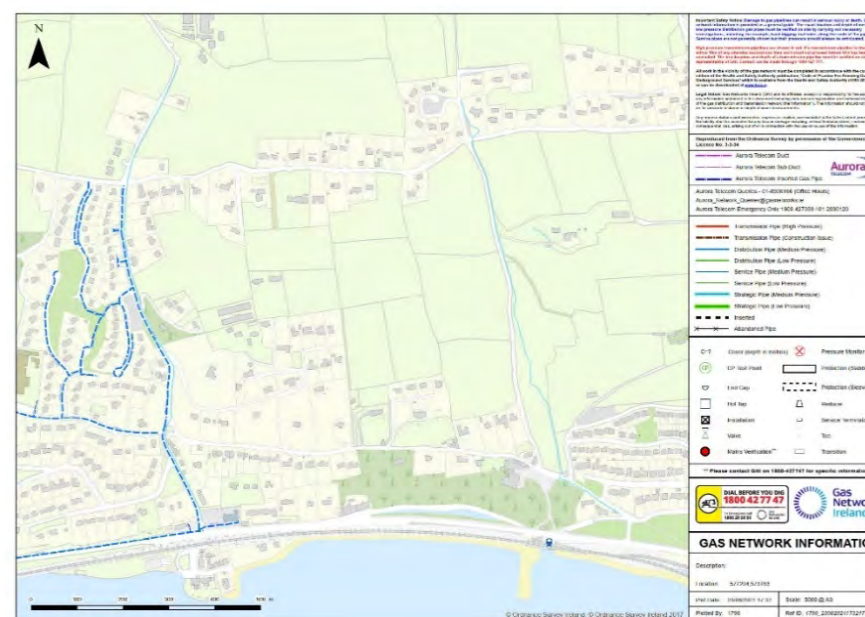
The ESB network to the existing dwellings to the north of the development are supplied via a OH LV line network on the existing road access and not on the proposed development.

The adjacent development which is under construction will be supplied via an underground ESB network, supplying substations and mini pillars as required.

6.2.5 Existing Natural Gas

Review of the Gas Networks Ireland online mapping portal indicates that there are no gas mains in the immediate vicinity of the site. The closest gas network to the site, as indicated in Figure 6-8 is located to the west of the site along the L-2968.

Figure 6.8 – Location of Medium Pressure Gas Main



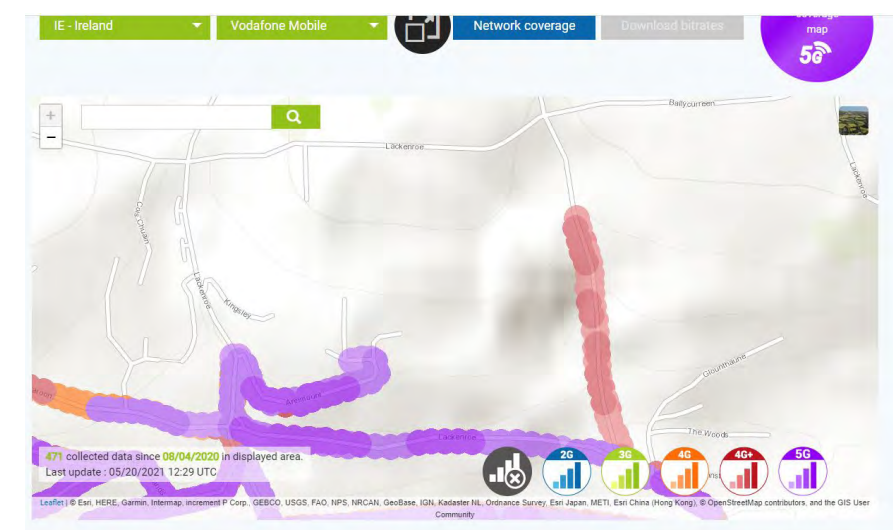
6.2.6 Existing Telecoms

Review of the National Broadband Ireland online network map shows that the site is currently outside the intervention area.

Eir Fibre Broadband is available within Glounthaune Village and Johnstown Close to the south east of the site. 3 Mobile also has coverage on Johnstown Close.

Vodafone networks coverage is closest to the site with coverage on the L-2970 ("the Terrace"), Johnstown Close plus L-2968.

Figure 6.9 – Vodafone Coverage in the vicinity of the Site



6.3 PROPOSED DEVELOPMENT

The proposed project is described in detail in Chapter 2.

6.3.1 Proposed Surface water drainage

It is proposed to provide a separate surface water drainage network within the development. To facilitate maintenance, the proposed surface water drainage network (sewers and attenuation tanks) have been located within roadways and other public areas within the proposed development.

The proposed network will include attenuation and treatment of surface water run-off generated within the site. The surface water drainage network has been designed such that the rates of surface water leaving the development site are no greater than predevelopment run-off rates.

The network has been designed to convey flows associated with a 1 in 5 year return period rainfall event and have been checked for flooding during a 1 in 100 year return period rainfall event + 20% climate change. The hydraulic model indicates that flooding will not occur during a 1 in 100 year return period rainfall event + 20% climate change.

The proposed storm sewers have been designed using Microdrainage software in accordance with the “Recommendations for site development works for Housing Areas” design guide. A model was developed with an M5-60 of 18.800mm, a ratio R of 0.250 and a rainfall intensity of 50 mm/hr.

The greenfield runoff rate – Qbar Runoff Rate – was calculated for the site using soil type 4 (Clayey), a soil value of 0.45 and the Standard Annual Average Rainfall (SAAR) of 1077mm as per the www.uksuds.com website. The Qbar Rate value for the proposed site area (12.7ha) is 101.5l/s. The following drawings (included in Appendix 6-1) present the proposed surface water drainage network layout associated with the development:

- 60592432-ACM-00-00-DR-CE-10-0501,
- 60592432-ACM-00-00-DR-CE-10-0502,
- 60592432-ACM-00-00-DR-CE-10-0503,
- 60592432-ACM-00-00-DR-CE-10-0504,
- 60592432-ACM-00-00-DR-CE-10-0505,
- 60592432-ACM-00-00-DR-CE-10-0506,
- 60592432-ACM-00-00-DR-CE-10-0507.

6.3.2 Proposed Wastewater Drainage

A new separate gravity piped wastewater drainage network will be provided to serve all new buildings. The following drawings (included in Appendix 6-2) present the proposed wastewater drainage network layout associated with the development:

- 60592432-ACM-00-00-DR-CE-10-0501,
- 60592432-ACM-00-00-DR-CE-10-0502,
- 60592432-ACM-00-00-DR-CE-10-0503,
- 60592432-ACM-00-00-DR-CE-10-0504,
- 60592432-ACM-00-00-DR-CE-10-0505,
- 60592432-ACM-00-00-DR-CE-10-0506,
- 60592432-ACM-00-00-DR-CE-10-0507.

The wastewater from the entire development will discharge via a single point of connection into the 225mm diameter public foul sewer running along The Terrace. In order to achieve this, it is proposed to lay a new 225mm foul water sewer from the southern boundary of the proposed development along the terrace and connect to the existing 225mm foul water system.

Foul water drainage has been designed in accordance with the Irish Water Code of Practice for Wastewater Infrastructure (July 2020) and the Greater Dublin Strategic Drainage Study (GSDSDS) using Innovyze MicroDrainage software. The design guidelines of the Environmental Protection Agency (EPA) Wastewater Treatment Manual, “Treatment Systems for Small Communities, Business, Leisure Centres and Hotels” were used to estimate the proposed hydraulic foul water loading rates. The wastewater drainage network is based on the Technical Guidance Document Part H and the Irish Water Code of Practice for Wastewater (2020).

The dry weather flow (DWF) was calculated as 1.52 l/s with a peak flow of 9.1 l/s as outlined in Table 6-2 over.

Table 6-1. Proposed Foul Water Hydraulic Loadings

Source	Unit	Quantity	Flow	Daily Flow	DWF	DWF	Peak Flow	
			(litres/day/unit or litres/sec/ha)	(litres/day)	m ³ /day	litres/sec	litres/sec	
Residential Units @ 450 l/day/unit	Unit	289	450	130,050.00	130.05	1.51	9.03	6DWF
Creche	Area (ha)	0.0280	0.16	387.07	0.3871	0.004	0.02	4.5DWF
Commercial and Amenity Units (ground floor adjacent to Fitzpatrick’s Shop)	Area (ha)	0.0735	0.16	1,016.06	1.0161	0.012	0.05	4.5DWF
Total				131,453.14	131.45	1.52	9.1	

6.3.3 Proposed Water Supply

It is proposed to service the proposed development via a new 150mm diameter watermain connection off the 150mm diameter watermain running along the northern boundary and to also connect to the 100mm diameter watermain running along the southern boundary indicated on the AECOM Drawing PR333513-ACM-00-00-DR-CE-10-2700 & 2701.

The internal water supply network is based on the Department of the Environment ‘Recommendation for Site Development Works’, the requirements of Irish Water and the Technical Guidance Document – Part B of the Building Regulations 2006:

- The development shall have a bulk water meter (exact location to be agreed with Irish Water) in accordance with Irish Water Code of Practice for Water Infrastructure Section 3.15.4.
- All apartments and similar properties shall have meters installed internally within the premises in accordance with the Building Control Authority’s requirements and subject to review by Irish Water as per Irish Water Code of Practice for Water Infrastructure Section 3.15.2.
- Hydrants are positioned within 46m from all the proposed buildings
- Sluice valves are positioned to isolate the watermain
- An air valve is proposed at the high point within the internal water supply network
- A scour valve is proposed the low point within the internal water supply network

It is generally accepted that the design loading for the foul drainage can be used to evaluate an approximation of the water demand on site. On this basis a water demand of 131.45 m³/day is proposed to service the proposed development via a new 150mm diameter watermain connection off the 150mm diameter watermain running along the northern boundary and to also connect to the 100mm diameter watermain running along the southern boundary indicated on the AECOM Drawings 60592432-ACM-00-00-DR-CE-10-2701, 60592432-ACM-00-00-DR-CE-10-2702, 60592432-ACM-00-00-DR-CE-10-2703, and 60592432-ACM-00-00-DR-CE-10-2704 (included in Appendix 6-3).

The internal water supply network is based on the Department of the Environment ‘Recommendation for Site Development Works’, the requirements of Irish Water and the Technical Guidance Document – Part B of the Building Regulations 2006:

- The development shall have a bulk water meter (exact location to be agreed with Irish Water) in accordance with Irish Water Code of Practice for Water Infrastructure Section 3.15.4.
- All apartments and similar properties shall have meters installed internally within the premises in accordance with the Building Control Authority's requirements and subject to review by Irish Water as per Irish Water Code of Practice for Water Infrastructure Section 3.15.2.
- Hydrants are positioned within 46m from all the proposed buildings
- Sluice valves are positioned to isolate the watermain
- An air valve is proposed at the high point within the internal water supply network
- A scour valve is proposed the low point within the internal water supply network

It is generally accepted that the design loading for the foul drainage can be used to evaluate an approximation of the water demand on site. On this basis a water demand of 131.45 m³/day is estimated. Watermain demand is generally designed with a peak flow of 1.25 times the average. The total additional peak demand from the proposed development is estimated at 1.9 l/s.

To further reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets.

6.3.4 Proposed Electricity

The proposal is for ESB to provide a new MV network to the development, supplying a series of kiosk type substations located to suit the phasing of the development. It is proposed that 4No. substations are provided. This is based on ESB guidelines and will be subject to ESB's assessment which will be carried out following planning approval for the proposed development. An application will be made to the ESB following approval of the proposals.

An underground LV network will be provided, supplying mini pillars as required to feed the individual premises.

6.3.5 Proposed Natural Gas

The proposal is for GNI to provide a new medium distribution network to serve the development. The network can be accessed from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17.

6.3.6 Proposed Telecoms

The proposal is for a new telecoms network to serve the development. The provision will consist of a network of underground ducts within the public footpaths with individual ducts serving each dwelling. The tie in point to the existing Eir network will be developed with the NBI / Eir prior to construction.

6.3.7 Site Lighting

The external lighting scheme is based on best practice, National Transport Authority guidance's and, more importantly, national & international industry standards, incorporating the following considerations;

- Light pollution,
- Disability and discomfort glare,
- Sky glow,
- Cork County Council (Cork CoCo) – Product Lighting Manual and Product specification 2020.

The following measures are incorporated into the design:

- 1) Consciously positioned luminaires, so as to limit negative spill and light pollution whilst also maintaining the required lux levels uniformly across the pedestrian footpath around the development. Thus mitigating light spill onto adjoining trees / neighbouring dwelling
- 2) An asymmetrical beam optic is employed to physically contain unnecessary light spillage and light pollution.
- 3) Illumination levels within Glounthaune estate residential roads were kept to a minimum to meet the conditions of classification P4 (5 Lux average, with a minimum of 1 Lux, as set out in Table 3 of IS EN 13201-2:2015; this uniformity ratio of 0.2 has been achieved in all areas. Said scheme also complies with the National Transport Authority's (NTA) guidance's for cycle/pedestrian routes) at ground level as per Cork County Council requirements while maintaining uniformity. It should be noted that this minimum light level meets the minimum safe levels for pedestrians as set out in BS5489-1:2020.
- 4) It is proposed that 6 metre high LED lamp standards will provide illumination to the residential estate roads. This design is cognisant of the fact that light pollution both in terms of sky glow and light spill.
- 5) Illumination levels on the main road intersection at the entrance to the residential estate were kept to a minimum to meet the conditions of classification C3 (15 Lux average, Uniformity 0.4) at ground level.
- 6) It is proposed that 8 metre high LED lamp standards will provide adequate illumination at the intersection. This design minimises light pollution both in terms of sky glow and light spill.
- 7) On the pedestrian walkway through the site and the pedestrian walkway exiting the site to the north of the site bollard luminaires are designed.

These areas are designed to classification P4 (5 Lux average, with a minimum of 1 Lux, as set out in Table 3 of IS EN 13201-2:2015.

- 8) All lanterns have a colour temperature of 3000K.

6.4 IMPACT ASSESSMENT

The predicted impact, the mitigation measures required, and the residual impacts of the proposed development are considered under four separate headings;

- Do Nothing Scenario
- Construction Phase
- Operational Phase
- Cumulative Impacts

6.4.1 Do Nothing Scenario

The 'Do Nothing' scenario refers to what would happen if the proposed development was not implemented. In this scenario, the effects described in this chapter would not arise and for this reason the 'do-nothing' scenario is considered to have a neutral effect with regards to utilities. The 'Do Nothing' scenario is therefore not addressed further in this chapter.

6.4.2 Construction Phase

The construction of below ground services within the development will require the excavation of trenches for new surface and wastewater networks, watermain network, electricity supply, gas supply and comms supply. The excavation of the required trenches will disturb the existing ground and has potential to introduce suspended solids into run-off from the site.

Surface water run-off from construction activities has the potential to be contaminated. There is a potential for unrestricted surface water runoff from the site, ingress of groundwater and overland flows into excavations during construction. This has the potential to directly negatively impact the receiving waters to the south of the site as well as the downstream receiving waters, i.e., Lough Mahon Transitional Water Body. This could result in a moderate short-term negative impact on the water quality in the adjacent watercourses as well as increased flood risk in the adjacent lands and will require appropriate environmental controls.

The Contractor's operations will generate effluent and sanitary waste from facilities provided for the work force on site. The Contractor's operations will result in water demand for the work force on site and for use in the construction process. This has the potential to directly negatively impact the existing water/wastewater infrastructure in the vicinity of the site and result in a slight short-term impact on the capacity of the existing water/wastewater infrastructure.

Where road opening is required to deliver utilities, this will require minor local traffic management measures at off peak times or at night. Details of the traffic management measures are to be developed by the contractor as part of the Construction Traffic Management Plan in advance of the construction works, in consultation and agreement with Cork County Council. Outside the (ownership) boundary, each utility will manage this as part of development contributions for connection including applications for road opening.

6.4.3 Operational Phase

Surface water run-off from operational activities has the potential to be contaminated. The operation of the development has the potential to result in a large volume of surface water discharge in the absence of controls and measures to limit off-site discharge. This has the potential to directly negatively impact the adjacent watercourses. It could cause a significant long-term negative impact on the water quality and quantity within the adjacent watercourses if appropriate controls are not put in place.

The proposed surface water drainage network has been designed to provide attenuation of surface water run-off within the development. This will limit the rate of surface water discharged from the proposed development. The proposed network also incorporates green roofs, hydrocarbon interceptors and filter drains.

The operation of the development will result in the increase of generation of effluent and sanitary waste from the proposed development. This has the potential to directly negatively impact the existing water/wastewater infrastructure in the vicinity of the site and result in a significant long-term impact on the capacity of the existing wastewater infrastructure.

Wastewater generated by the development will ultimately discharge to Carrigrennan Wastewater Treatment Plant in Little Island. Through the Pre-Connection Enquiry Process, Irish Water have advised that there is capacity within the public network to facilitate the proposed development.

The operation of the development will result in the increase in water demand. This has the potential to directly negatively impact the existing water/wastewater infrastructure in the vicinity of the site and result in a significant long-term impact on the capacity of the existing water infrastructure. Through the Pre-Connection Enquiry Process, Irish Water have advised that there is capacity within the public water supply network to facilitate the proposed development.

Based on the information provided to date, there are no known significant impacts associated with the electrical, telecoms or gas supplies for the development.

6.4.4 Cumulative Impacts

A review of the development applications within close proximity of the proposed development was undertaken in order to ascertain if the proposed development would give rise to any potential cumulative impacts on material assets during the operational phase. The nearby development applications considered are as follows:

Table 6-2. Planning Applications

Planning Reference	Applicant	Development Proposal	Notes
Part 8 Development	Cork County Council	Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune	Under Construction/Partially Complete
21/6851	Citidwell Developments Limited	Demolition of 2 no. farm buildings and a derelict dwelling and the construction of 21 no. units.	Application currently pending a decision from Cork County Council.
21/5072	Barlow Properties Ltd	94 Residential Units	Application being assessed
21/4622	Glounthaune Homes Trust	12 Residential Units	Application being assessed
18/6250	Keta Products Ltd.	Demolition of The Great O'Neill Public House and construction of a two-storey extension of the existing Fitzpatricks shop to the east to replace the demolished public house, for use as an extended retail.	Under Construction – Nearing Completion
17/5699 (ABP Reference 300128-17) Amended by 18/6312 & 20/5864	Bluescape Ltd	Phase 1 of Proposed Development. Construction of 38 no. residential units & upgrade of local road network	Construction recently commenced
ABP-301197-18	O'Mahony Developments Limited	Strategic Housing Development Construction of 174 number residential units	Under Construction with initial phases occupied.

During the construction stage of the subject development, the development will require minimal use of existing material assets therefore the cumulative impact at this stage is considered to be negligible.

The proposed surface water drainage network has been designed to provide attenuation of surface water run-off within the development. This will limit the rate of surface water discharged from the proposed development. The proposed network also incorporates green roofs, hydrocarbon interceptors and filter drains.

The proposed foul network drainage system has been designed to drain into the existing public foul drainage network. Wastewater generated by the development will ultimately discharge to Carrigrennan Wastewater Treatment Plant in Little Island. Through the Pre-Connection Enquiry Process, Irish Water have advised that there is capacity within the public network to facilitate the proposed development.

The operation of the development will result in the increase in water demand. This has the potential to directly negatively impact the existing water/wastewater infrastructure in the vicinity of the site and result in a significant long-term impact on the capacity of the existing water infrastructure. Through the Pre-Connection Enquiry Process, Irish Water have advised that there is capacity within the public water supply network to facilitate the proposed development.

Based on the information provided to date, it is not anticipated that there will be a significant impact on the existing electrical, telecoms or gas supplies for the area when considered in conjunction with the developments set out in Table 6-2.

The cumulative operational impact of the proposed development and other consented developments are considered to be slight.

6.5 MITIGATION MEASURES

This section discusses the mitigation approaches that will be followed during the construction and operational phase of the development.

6.5.1 Construction Phase

The contractor will be obliged to put temporary measures in place to limit the rate of surface run-off from the site. They will also be obliged to manage the quality of surface water runoff and ensure run-off from the site does not result in excessive siltation of the receiving drainage channels. This will be managed in line with the Construction and Environmental Management Plan and as follows:

It is not proposed to store any oils/fuels for the purpose of refuelling on the site.

Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles are not to be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.

The following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- Eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other suitable material. Do not spread or flush away the spill.
- Cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
- Clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.

- The Employers Representative will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.

All watercourses must be protected from sedimentation and erosion throughout the duration of the Works.

Surface water management on site will comply with the following guidelines from CIRIA:

- C532 Control of Water Pollution from construction Sites, Guidance for Consultants and Contractors,
- C741 Environmental Good Practice on Site - 4th Edition.

Refer to Chapter 8 of the EIAR for additional measures which must be implemented for the duration of the works.

Run-off control measures to include the following:

- Dewatering measures will only be employed where there are no other alternatives.
- For groundwater encountered during construction phase, mitigation measures will include;
 - Dewatering by pumping to a soakaway.
 - Excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e., highly vulnerable groundwater areas.
- If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.
- Existing surface drainage channels within the site that serve adjacent lands will be retained where possible to prevent causing increased flooding impacts.
- Any surface water sewer connections will be made under the supervision of the Local Authority/Irish Water and checked prior to commissioning.
- New onsite surface water drains will be tested and surveyed prior to commissioning to prevent any possibility of ingress of ground water.
- All surface water manholes and drains will be inspected and sealed to ensure that uncontrolled ground water inflow does not occur.
- Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.
- Areas surrounding the site are to be protected as necessary from sedimentation and erosion due to direct surface water runoff generated onsite during construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works, as noted in the points above, until the permanent surface water drainage system of the proposed site is complete.

- Regular inspections of de-watering settlement tanks, if used, are to be carried out and additional treatment used if settlement is not adequate.
- Bunded areas will be created for the storage or use of any fuels, oils, greases, cement, etc.
- Emergency spill kits will be kept close to the works.

The Contractor is expected to agree a dedicated water supply connection and a wastewater discharge connection for the construction activities. It is expected they will consult Irish Water to obtain these connections. The demand during the construction phase is not expected to be significant enough to affect existing pressures or capacities.

The Contractor will be obliged to put measures in place to ensure that there are minimal or no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines they may have. Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate and will adhere to their requirements.

6.5.2 Operational Phase

Due to the measures already incorporated in the design as outlined in Section 6.4 above (e.g., silt management, restricted discharge off site) no additional mitigation measures will be necessary on surface water during the operational phase.

The potable water network is designed in accordance with the Irish Water Code of Practice and Standard Details to provide a robust construction to prevent failure of the system under normal conditions. Watermains are located in public spaces to ensure that access is available to allow for inspection and maintenance. The water system will be metered to determine water consumption and facilitate leakage detection.

The proposed wastewater drainage network is designed in accordance with the Irish Water Code of Practice and Standard Details to provide a robust construction to prevent failure of the system under normal conditions. Sewers are located in public spaces to ensure that access is available to allow for inspection and maintenance.

The proposed development will result in increased volumes of sewage discharge to the public wastewater system. This involves extending the Irish Water sewer network by approximately 400m on 'the Terrace' to the south of the development. Irish Water have confirmed that capacity is available to serve the proposed development. Therefore, the proposed development will not have a significant impact on sewage treatment.

Connection agreements will be made with Irish Water regarding water supply to the site and foul water discharge off site. No additional mitigation measures will be required. Irish Water have been consulted and confirmed capacity within their networks.

New electrical supplies will be fitted with dedicated circuit breakers to ensure health and safety. Supplies will also be metered to facilitate monitoring of power consumption.

6.6 MONITORING

6.6.1 Construction Phase

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development and close contact with the electricity, gas and water utility providers will be under the control of the main contractor.

6.6.2 Operational Phase

All utilities will be monitored and metered in accordance with the service agreements for the various utilities. Appropriate maintenance regimes will be put in place to monitor/maintain surface water drainage. This will include periodic cleaning out of gully pots & drainage channel sumps and cleaning of pipes if/when blockages occur. Hydrocarbon interceptors will be fitted with sensors/alarms designed to notify the site maintenance team when hydrocarbon levels are such that the unit needs to be emptied.

6.7 RESIDUAL IMPACTS

This section outlines the residual impacts of the proposed development during the construction and operational phase having considered the predicted impacts of the proposed development (Section 6.5) and the mitigation measures (Section 6.6).

6.7.1 Construction Phase

Residual impacts will be not-significant following implementation of mitigation measures.

6.7.2 Operational Phase

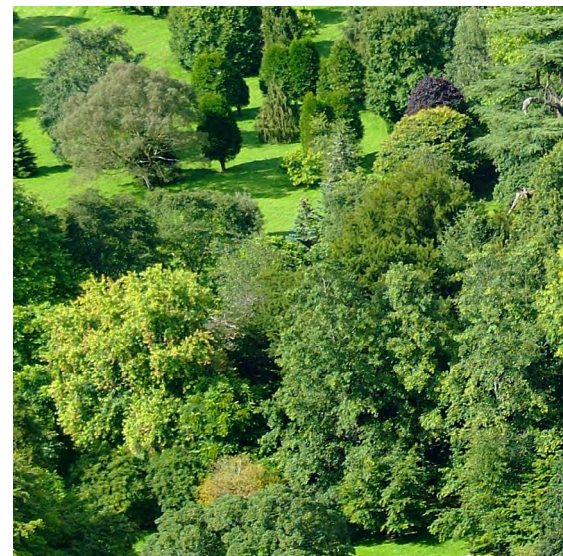
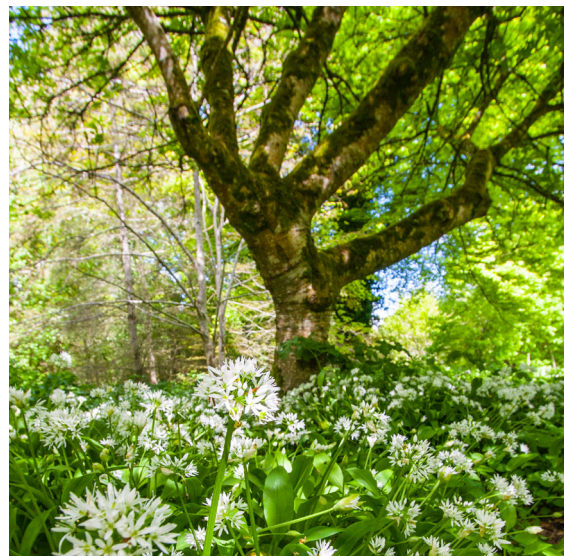
Residual impacts will be not-significant following implementation of mitigation measures.



LACKENROE SHD

CHAPTER 7

Land & Soils



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CHAPTER 7

Land & Soils

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7 Land & Soils

7.1 INTRODUCTION

This chapter comprises an assessment of the likely effects on land and soils of the proposed construction of a residential development as described in Chapter 2 during the demolition, construction, and operational phases of the proposed development. It will also identify the characteristics, predicted impact and mitigation measures arising from the different phases. Note that Hydrogeology is considered in Chapter 8 – Hydrology and Hydrogeology.

7.1.1 Author Information

Name: Emma McKendrick
Title: Regional Director, Chartered Civil Engineer, AECOM
Qualifications: BEng CEng MICE FIEI

Emma McKendrick is a Chartered Civil Engineer with 30 years' experience. Originally from Belfast, Emma studied at Edinburgh University and remained in Scotland for 20 years. In 2006, she relocated to Limerick.

Emma joined AECOM in 2017, prior to that she was at senior management level in PUNCH Consulting for 7 years. Emma has been responsible for the technical delivery of a wide range of projects from inception to handover in Ireland, UK, Libya and Saudi Arabia. Emma has significant experience in the preparation of EIAR documentation for residential developments such as this.

7.1.2 Methodology

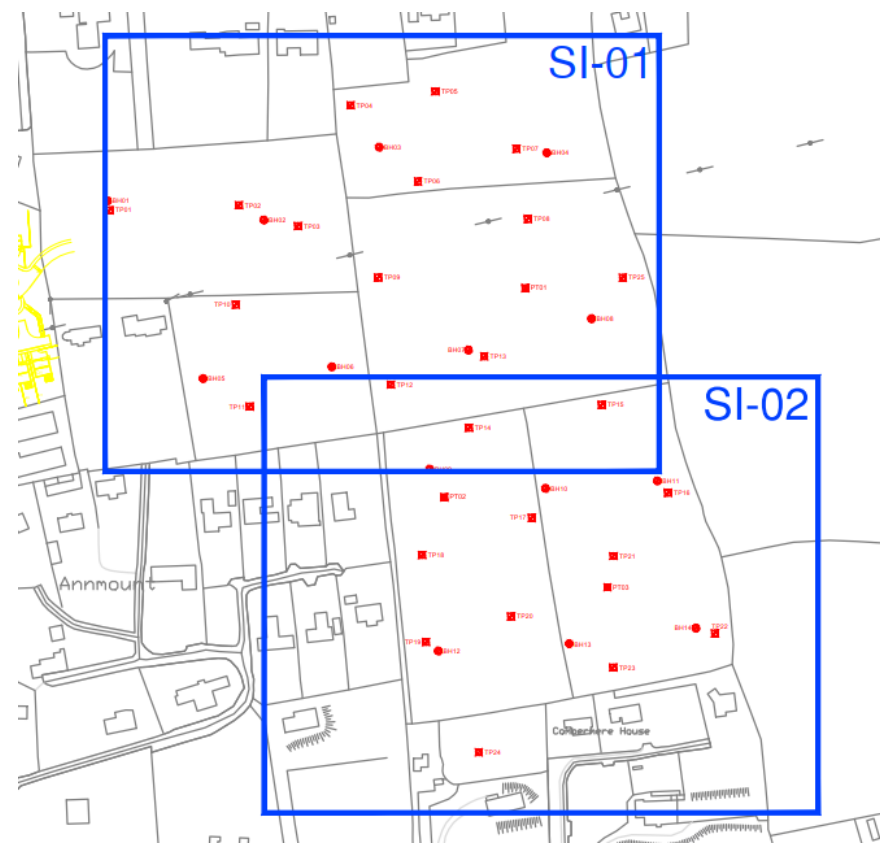
An assessment of the soils and bedrock geology underlying the study area was undertaken in the form of a desktop study using information from the Geological Survey of Ireland (GSI) and specific geological information was obtained from a preliminary site investigation which was carried out by Priority Geotechnical Limited in July and August 2018.

Information on land and soils for the subject lands was assembled from the following sources:

- Site Investigation Report (Appendix 7-1);
- Geological Survey of Ireland (GSI) maps;
- Environmental Protection Agency (EPA) maps.

The site investigation comprised of cable percussion borehole, trial pit excavations, insitu testing, standard penetration tests, soakaway tests, sampling and laboratory testing. The exploratory hole locations are shown on Figure 7-1. A total of 14 cable percussion boreholes were bored to depths between 1.2m and 4m below ground level (bgl) and 25 trial pits were dug to depths of between 1m and 2.6m below ground level (bgl). No groundwater was encountered during the period of works. No hazardous or contaminated materials were identified as part of this work.

Figure 7-1 – Extent of Site Investigation

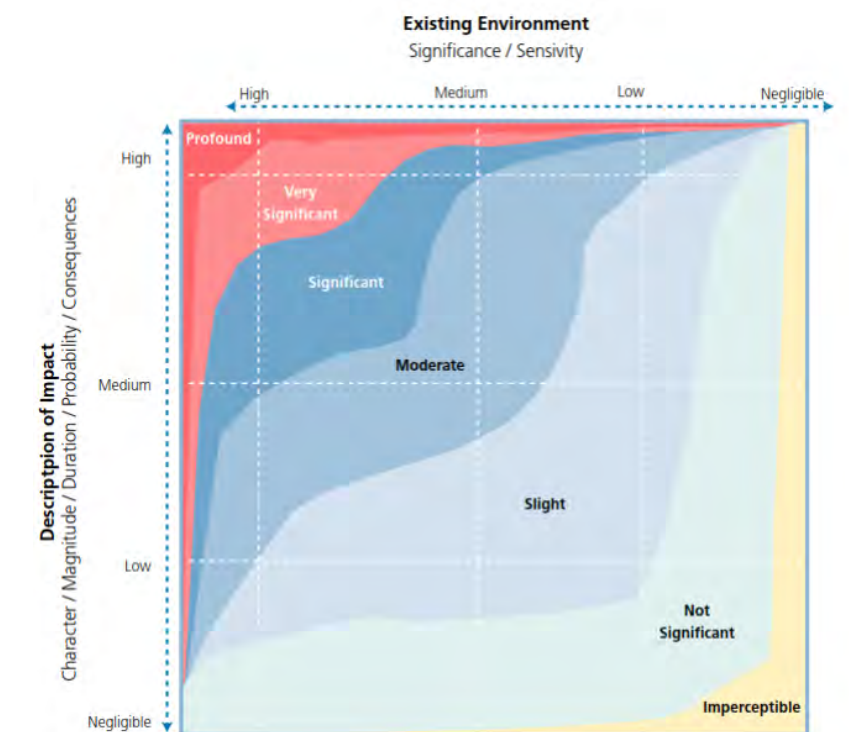


7.1.3 Appraisal Methodology

The appraisal methodology considered a description of the impact i.e. the “quality” of the effects (i.e. whether it is adverse or beneficial), the “significance” of the effects (i.e. the magnitude of the effect in terms of the environment), the “probability” of the event occurring, and the “duration” of the effects (i.e. whether it is short or long term) and also considers the significance / sensitivity of the existing environment. Terminology for describing the quality, significance, extent, probability and duration of effects is set out in Section 3.7.3 of the EPA EIAR guidance.

A qualitative approach was used in this evaluation and Figure 7-2 taken from the EPA EIAR guidance shows how comparison of the character of the predicted impact to the sensitivity of the receiving environment can determine the significance of the impact.

Figure 7-2 – Determination of the Significance of the Impact



7.2 DESCRIPTION OF EXISTING ENVIRONMENT

7.2.1 Topography

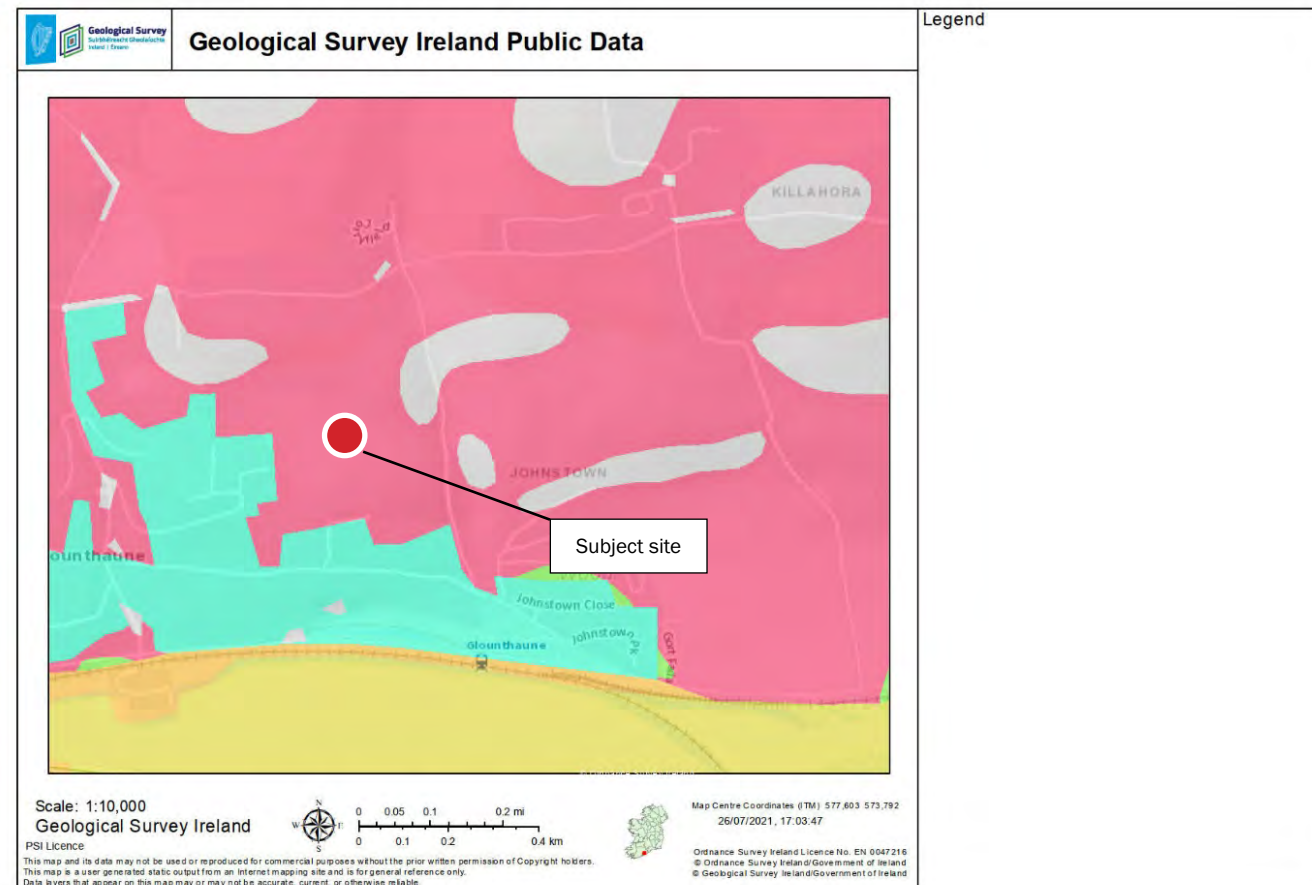
The current site comprises of a greenfield site. The site measures approximately 13.1ha in total. The majority of the site is located to the north of The Terrace Road with a small part of the site located to the south of The Terrace Road. There is a considerable variation in ground levels across the site which has been considered in developing the proposed layout. The site slopes from north to south from approximate +110 m OD Malin to +34.5 m OD Malin on The Terrace to approximately +3.30 m OD Malin.

The northern part of the site is bounded by existing residential developments to the north, west and south. Agricultural land bounds the site to the east. The southern part of the site is bounded by The Terrace Road to the north, existing dwellings to the east and west and Johnstown Close to the south. The public road network surrounding the site is defined by Killahora Road to the north, Knockraha Road to the west, and Ballynaron Road / The Terrace to the south.

7.2.2 Soils & Subsoils

The GSI soils map indicates the predominant soil type in the development site to be Till derived from Devonian sandstones with some areas noted as 'Bedrock outcrop or subcrop'. An extract from the GSI soils map is included in Figure 7-3.

Figure 7-3 – Extract from GSI Quaternary Mapping

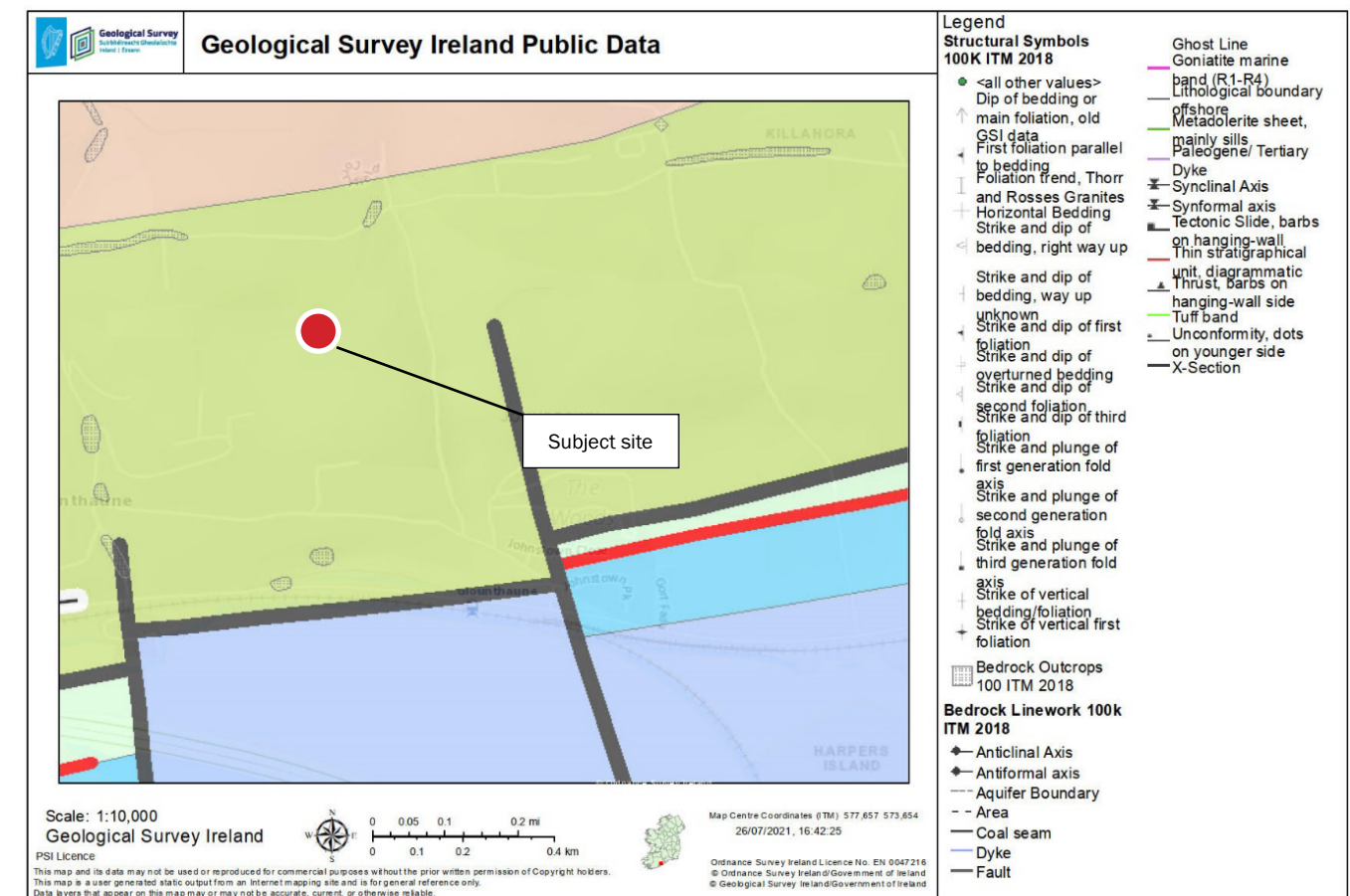


The ground investigation undertaken found that topsoil, where encountered, was approximately 300mm to 400mm thick. Superficial glacial deposits were described as firm to stiff, slightly sandy (slightly) gravelly clay/ silt with varying cobble content 0.7m to 2.1m thick and granular deposits of (very) silty (very) sandy gravel and (very) sandy (very) clayey gravel with varying cobble content 0.3m to 3.0m thick persisted to depths 1.0m bgl to 4.0m below ground level. Typically, the clay / silt deposit transitioned to the gravel overlying the bedrock. No groundwater was encountered during the ground investigation works.

7.2.3 Bedrock Geology

The bedrock geology of this area is Sandstone with mudstone & siltstone of the Gyleen Formation. to Figure 7-4.

Figure 7-4 – Extract from GSI Bedrock 100k



Shallow and exposed bedrock is located within the site area bounded by Johnstown Close and 'the Terrace'. Generally, the depth of rock below existing ground level decreases moving north east through the site. It is noted that bedrock was encountered at depths of between 1.0 m and 4.0 m below existing ground level.

The scope of the investigation did not allow for a detailed characterisation of the bedrock, however based on GSI the bedrock is most likely SILTSTONE.

A JCB backhoe excavator excavated within the upper 200mm to 500mm of the rock mass.

Consideration could also be given to using blasting or to using Dexpan or CARDOX (or similar) which is a vibration free method of 'blasting' that uses expanding gas to help remove the rock.

7.2.4 Geological Heritage and Designated Sites

There are no recorded Geological Heritage sites within the proposed development area.

There are two Unaudited Geological Heritage sites approximately 2.5 km to the south west of the subject site:

1. Rock Farm Quarry, Little Island – IGH 8 - A series of limestone quarries in which the limestone is divided into three distinctive zones of the Visean (Lower Carboniferous). Provides the type section for the Cork Red Marble Fm on its western shore & forms the type section for the Little Island Fm.
2. Little Island - IGH 3 - Little Island provides the type section for the Cork Red Marble Formation

7.2.5 Ground Contamination

There are no known areas of soil or ground contamination on the site. During the site walkovers, no areas of particular contamination concern were identified. According to the EPA online mapping (<http://gis.epa.ie/Envision>), there are no licenced waste facilities on or within the immediate environs of the proposed development site. There are no historic mines at or in the immediate vicinity of the site that could potentially have contaminated tailings.

7.3 IMPACT ASSESSMENT

The predicted impact, the mitigation measures required, and the residual impacts of the proposed development are considered under four separate headings;

- Do Nothing Scenario
- Construction Phase
- Operational Phase
- Cumulative Impacts

7.3.1 Do Nothing Scenario

The site currently comprises a greenfield site. If the proposed development did not proceed there would be no impact on the existing soils or geology of the site. It is envisaged that the land use would remain unchanged as primarily

greenfield. The potential impacts associated with a 'Do Nothing' scenario are considered to be not significant with respect to Land and Soils.

7.3.2 Construction Stage

The likely significant effects of the proposed development and mitigation measures that will be put in place to eliminate or reduce them are shown below. These relate to the construction stage. It should be noted that the main potential impacts on the soils and geology environment will occur during the construction stage.

7.3.2.1 Soil/Subsoil Excavation and Bedrock Excavation

Excavation of existing subsoil and bedrock will be required for site levelling, for the installation of foundations for foundation pads, service trenching and the development of the proposed landscaping measures. This will result in a permanent relocation of soil and subsoil at most excavation locations. The excavated materials will include existing topsoil/subsoil, and some bedrock. Please refer to Table 7-1 for the excavation and fill volumes associated with the proposed development. The initial development of the site would involve extensive stripping of the topsoil (approximately the upper 300mm of soil). Excavation of subsoil layers would be required to facilitate site development works, in particular the construction of foul and surface water sewers and underground surface water storage structures (attenuation). It is envisaged that non-reusable excavated material will be removed off-site to a licenced facility.

Removal of the upper soil layers will be necessary across the majority of the subject site. Top soil will initially be stripped from the lands and stored for later re-use in the landscaping for the developments. It is envisaged that there will be surplus topsoil produced by the site. This surplus will be removed off-site.

Earthworks and the removal of topsoil would expose subsoil layers to the effects of weathering and may result in the erosion of soil, particularly in times of adverse weather conditions. Surplus subsoil caused by excavations for foundations, roads and drainage will be stockpiled and taken off-site to a licenced landfill facility.

Excavation in existing rock within the proposed development will be required during the construction stage. This will result in an excavated volume of 18,565 m³. This will be crushed and stockpiled on site for re-use on site. As part of any rock breaking required within the proposed development, the Contractor must select and utilise methods of working and items of plant so that ground vibrations do not exceed the limits set out in Section 10.3.2 of Chapter 10 Noise and Vibration.

Increased traffic associated with the construction works would have the effect of compacting existing subsoil layers within the site. 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 in the absence of mitigation.

It will be necessary to import materials to site; in particular large volumes of graded stone will be required for construction of the roads, foundations and services. Also, large quantities of concrete, bricks, steel, tar etc. will all be delivered to site by lorry. Road levels have been designed in accordance with TII Design Manual for Roads and Bridges (DMRB) as well as the Design Manual for Urban Roads and Streets (DMURS), with an aim to balance cut and fill earthworks throughout the site.

Table 7-1 Volumes of Material

Material	Volume Excavated Material (m ³)	Volume Fill Material (m ³)	Net Material Volume (m ³)
Topsoil	41,772	-	41,772
Subsoil	53,964	66,566	-12,603
Rock	18,565	-	18,565

Mitigation Measures

The following mitigation measures will be implemented in accordance with the Construction and Environmental Management Plan (CEMP):

- Top soil will be stock piled on site and reused where possible;
- Excavated (existing) overburden material will be reused on site, where possible;
- Construction of service trenching, pumping station and surface water attenuation features will generate excess material, and all excess material will be used locally within the site for landscaping;
- Top-soiling and landscaping works will take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties.
- The construction phase will be monitored, in particular in relation to the following;
 - Protection of topsoil stockpiled for re-use;
 - Adequate protection from contamination of soils for removal;
 - Cleanliness of adjoining road network;
 - Prevention of oil and petrol spillages;
 - Dust control.
- Reusable excavated gravels, sands or rock will be retained on-site for backfilling or drainage purposes to reduce the total volume of imported material. Rock will be crushed and graded on site.
- Excavated materials will be visually assessed for signs of contamination. Should material appear to be contaminated, soil samples will be analysed by an appropriate testing laboratory.

Contaminated material will be treated in accordance with the Waste Management Regulations, 1998.

- Excess fill, unsuitable material and suitable material will be removed off-site. Removal will be in accordance with the relevant Waste Management Regulations and Construction and Demolition Waste Management Plan.
- Further ground investigation will be undertaken to inform the detailed design of the scheme. This will include testing of soil and made ground to identify any potentially contaminated material to ensure adequate classification and disposal.
- The Contractor will monitor ground vibrations at selected locations to the approval of the Employer's Representative during the progress of the works. The selected locations are to include the existing grotto structure at the southern end of the site. Please refer to Chapter 10 for vibration limits.
- A condition survey of existing structures adjacent to the proposed development is to be undertaken by the contractor. Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works.
- For details of monitoring of interrelated impacts such as noise and vibration levels, groundwater levels, dust emissions etc. please refer to Chapters 10 and 12 of this EIAR.
- Testing and monitoring of water and gas will be undertaken during excavation works.
- Monitoring of water movements either seepages or through control points.

Residual Impacts

Residual impacts will be non-significant following implementation of mitigation measures.

7.3.2.2 Contamination of Soil/Subsoil/Bedrock by Leakages and Spillages

There is a potential risk of localised contamination of the groundwater due to construction activities i.e. construction spillages, leaks etc. resulting in a Permanent Negative impact on the groundwater, however, the gravelly clay will limit the potential for contamination to infiltrate into the underlying aquifer. For these reasons, the impact on the groundwater contained within the bedrock aquifer is considered as Small Adverse.

Mitigation Measures

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling of construction machinery shall be undertaken in designated areas located away from surface water drainage. Spill kits shall be kept in these areas in the event of spillages;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills;
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment;
- Oil and fuel stored on site will be stored in designated areas. These areas shall be bunded and will be located away from surface water drainage;
- Hazardous waste shall be dealt with in accordance with the Waste Management (Hazardous Waste) Regulations, 1998;
- All potentially hazardous materials shall be securely stored on site.

Highest standards of site management will be maintained and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively.

Residual Impacts

Residual impacts will be non-significant following implementation of mitigation measures.

7.3.2.3 Soil and Subsoil Compaction

Mitigation Measures

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable. Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining its drainage properties.

Residual Impacts

Residual impacts will be non-significant following implementation of mitigation measures.

7.3.2.4 Assessment of Human Health Effects

Potential health effects arise mainly through the potential for soil and ground contamination. Residential and commercial developments are not a recognized source of significant potential pollution and so the potential for effects during the operational phase are negligible.

Hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

7.3.3 Operational Stage

No impacts on soils and geology are anticipated during the operational phase. The operational stage of the proposed development consists of the typical activities in a commercial and residential area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

Minor impacts may include reduced infiltration and therefore reduced recharge volumes entering the groundwater. This is directly related to the creation of impermeable development areas which pending their arrangement could increase run-off volumes and reduce existing "greenfield" infiltration potential.

No significant cumulative impacts on the land, soils and geology environment are envisaged during the operational stage.

7.3.4 Potential Cumulative Impacts

A review of the development applications within close proximity of the proposed development was undertaken in order to ascertain if the proposed development would give rise to any potential cumulative impacts during the operational phase. The nearby development applications considered are as follows:

Table 7-2. Planning Applications

Planning Reference	Applicant	Development Proposal	Notes
Part 8 Development	Cork County Council	Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune	Under Construction/Partially Complete
21/6851	Citidwell Developments Limited	Demolition of 2 no. farm buildings and a derelict dwelling and the construction of 21 no. units.	Application currently pending a decision from Cork County Council.
21/5072	Barlow Properties Ltd	94 Residential Units	Application being assessed
21/4622	Glounthaune Homes Trust	12 Residential Units	Application being assessed
18/6250	Keta Products Ltd.	Demolition of The Great O'Neill Public House and construction of a two-storey extension of the existing Fitzpatricks shop to the east to replace the demolished public house, for use as an extended retail.	Under Construction - Nearing Completion
17/5699 (ABP Reference 300128-17) Amended by 18/6312 & 20/5864	Bluescape Ltd	Phase 1 of Proposed Development. Construction of 38 no. residential units & upgrade of local road network	Construction recently commenced
ABP-301197-18	O'Mahony Developments Limited	Strategic Housing Development Construction of 174 number residential units	Under Construction with initial phases occupied.

No significant cumulative impacts on land, soils and geology environment are anticipated during the construction or operation phases as long as mitigation measures outlined are put in place.

7.4 CONCLUSION

Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods and with a full suite of mitigation measures and procedures.

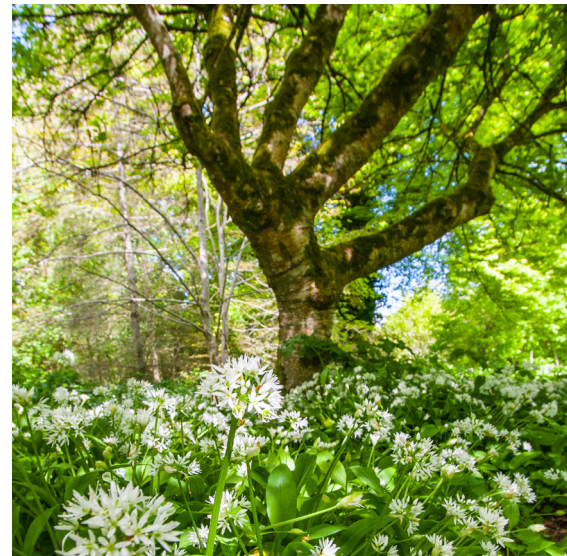
No significant impacts on the land, soil and geology of the site will occur. The soil and geology profiles described are extracted from available site investigation information which uses testing and observation of a sample within boreholes and trial pits to give an overall representation of the site. The assumptions made regarding the site are based on this available information only and cannot account for localised areas which differ however unlikely. There was no available information to confirm the existence of or the extent of contamination and therefore assumptions are based on the known historical land use of the proposed development site and the surrounding area. However, the mitigation measures proposed during demolition and construction stage will ensure that if any contamination is identified it will be addressed to ensure no adverse impacts on the environment.



LACKENROE SHD

CHAPTER 8

Water (Hydrology & Hydrogeology)



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CHAPTER 8

Water (Hydrology &
Hydrogeology)

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8 Hydrology and Hydrogeology

8.1 INTRODUCTION

This chapter comprises an assessment of the likely effects of the proposed construction of a residential development, as described in Chapter 2, on water bodies including surface freshwater (streams, ponds, rivers and lakes), groundwater (shallow and deep) and where applicable estuarine waters and marine waters.

8.2 AUTHOR INFORMATION

Name: Emma McKendrick

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Qualifications: BEng CEng MICE FIEI

Emma McKendrick is a Chartered Civil Engineer with 30 years' experience. Originally from Belfast, Emma studied at Edinburgh University and remained in Scotland for 20 years. In 2006, she relocated to Limerick.

Emma joined AECOM in 2017, prior to that she was at senior management level in PUNCH Consulting for 7 years. Emma has been responsible for the technical delivery of a wide range of projects from inception to handover in Ireland, UK, Libya and Saudi Arabia. Emma has significant experience in the preparation of EIA documentation for residential developments such as this.

A Site-Specific Flood Risk Assessment (included in Appendix 8-1) and an Infrastructure Report (included in Appendix 2-1) have been completed by AECOM and have contributed to the contents of the EIA.

8.3 METHODOLOGY

This assessment has been undertaken having particular regard to the following regulatory and best practice guidelines:

- Draft River Basin Management Plan (2022 - 2027),
- National River Basin Management Plan (2018-2021),
- Water Quality in Ireland 2010 - 2012 (EPA, 2015),
- The Lee Catchment Flood Risk Assessment and Management Study (CFRAMS OPW 2009);
- Office of Public Works (OPW) Guidelines for Planning Authorities (GPA): The Planning System and Flood Risk Management (OPW, 2009).

Information on the existing hydrology and hydrogeology of the area was obtained from the following sources:

- OSi Discovery Series Mapping,
- Cork County Council,
- The Office of Public Works (OPW),
- Environmental Protection Agency (EPA),
- Site Visit,
- Water Quality Monitoring Database and Reports,
- EPA flow and water level measurements (EPA Hydronet System),
- National Flood Hazard Website: www.floodmaps.ie,
- Geological Survey of Ireland online mapping: <http://www.gsi.ie/mapping.htm>,
- EPA Envision Mapping: <http://maps.epa.ie/InternetMapView/MapView.aspx>,
- EPA Catchments Mapping: <https://www.catchments.ie/>,
- NPWS Maps and Data: <http://www.npws.ie/maps-and-data/>,
- Maps and aerial photography of the study area and relevant associated watercourses,
- Site Investigation Report (Appendix 7-1),
- A SSFRA (Site Specific Flood Risk assessment) prepared by AECOM (Appendix 8-1),
- Local authority record drawings.

8.4 EXISTING RECEIVING ENVIRONMENT

The current site comprises of a greenfield site. The site measures approximately 13.1ha in total. The majority of the site is located to the north of The Terrace Road with a small part of the site located to the south of The Terrace Road. There is a considerable variation in ground levels across the site which has been considered in developing the proposed layout. The site slopes from north to south from approximate +110 m OD Malin to +34.5 m OD Malin on The Terrace to approximately +3.30 m OD Malin.

The northern part of the site is bounded by existing residential developments to the north, west and south. Agricultural land bounds the site to the east. The southern part of the site is bounded by The Terrace Road to the north,

existing dwellings to the east and west and Johnstown Close to the south. The public road network surrounding the site is defined by Killahora Road to the north, Knockraha Road to the west, and Ballynaron Road / The Terrace to the south.

A desk study review of the water features information contained on the EPA's interactive mapping site Envision (www.gis.epa.ie) and the EPA's Catchments website (www.catchments.ie) was undertaken. The Water Framework Directive Ireland's Water Maps website (www.wfdireland.ie/maps), which contains data from the first cycle of the River Basin Management Plans (RBMP) were also consulted.

8.4.1 Surface Water Bodies

A wide range of data is available to view online through the source referred to above. Data available includes surface water quality and status, water features, WFD risk scores, hydrometric areas, waterbody objectives and waterbody measures for river, lake, transitional, coastal water bodies and ground water bodies.

There are no watercourses within the subject site. The study area is located within the South Western River Basin District (SWRBD), and specifically within the Lee, Cork Harbour and Youghal Bay catchment. The study area is located within the subcatchment of Tibbotstown_SC_010.

Surface water bodies were identified within the study area using Ordnance Survey mapping and aerial photography and were verified during a site survey. The water body of relevance is Lough Mahon (Harper's Island) (IE_SW_060_0700), which lie to the south of the proposed development.

Lough Mahon (Harper's Island) is a transitional water body approximately 70 m to the south of the study area. Lough Mahon is part of Upper Cork Harbour and covers an area of over 12 km². Cork Harbour which encompasses Lough Mahon has a surface water area of around 100km² and is a large, sheltered, naturally deep water harbour. Strong estuarine influences dominate the upper reaches of the harbour in particular. Lough Mahon comprises Galshaboy River (IE_SW_19G010600), Moneygurney River (IE_SW_19M300900), Tibbotstown River (IE_SW_19T250870), Lough Mahon (Harper's Island) Transitional Water Body (IE_SW_060_0700), Glashaboy Estuary Transitional Water Body (IE_SW_060_0800) and the Lower Lee (Cork) Estuary Transitional Water Body (IE_SW_060_0900). Cork Harbour Coastal Water Body (IE_SW_060_0000) is downstream of Lough Mahon.

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. The nearest EPA monitoring is located on the Glashaboy River (d/s Butlerstown R confl), approximately 4.75 km to the west of the subject site and notes a Q value of 4-5 (High).

Please refer to Section 2 of the NIS for further information.

8.4.2 Hydrogeology

The bedrock underlying the site is classified by the GSI as a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones. No karst features have been identified in the area. Figure 81 illustrates the Aquifer types in the vicinity of the subject site.

Figure 8.1 – Aquifer Types

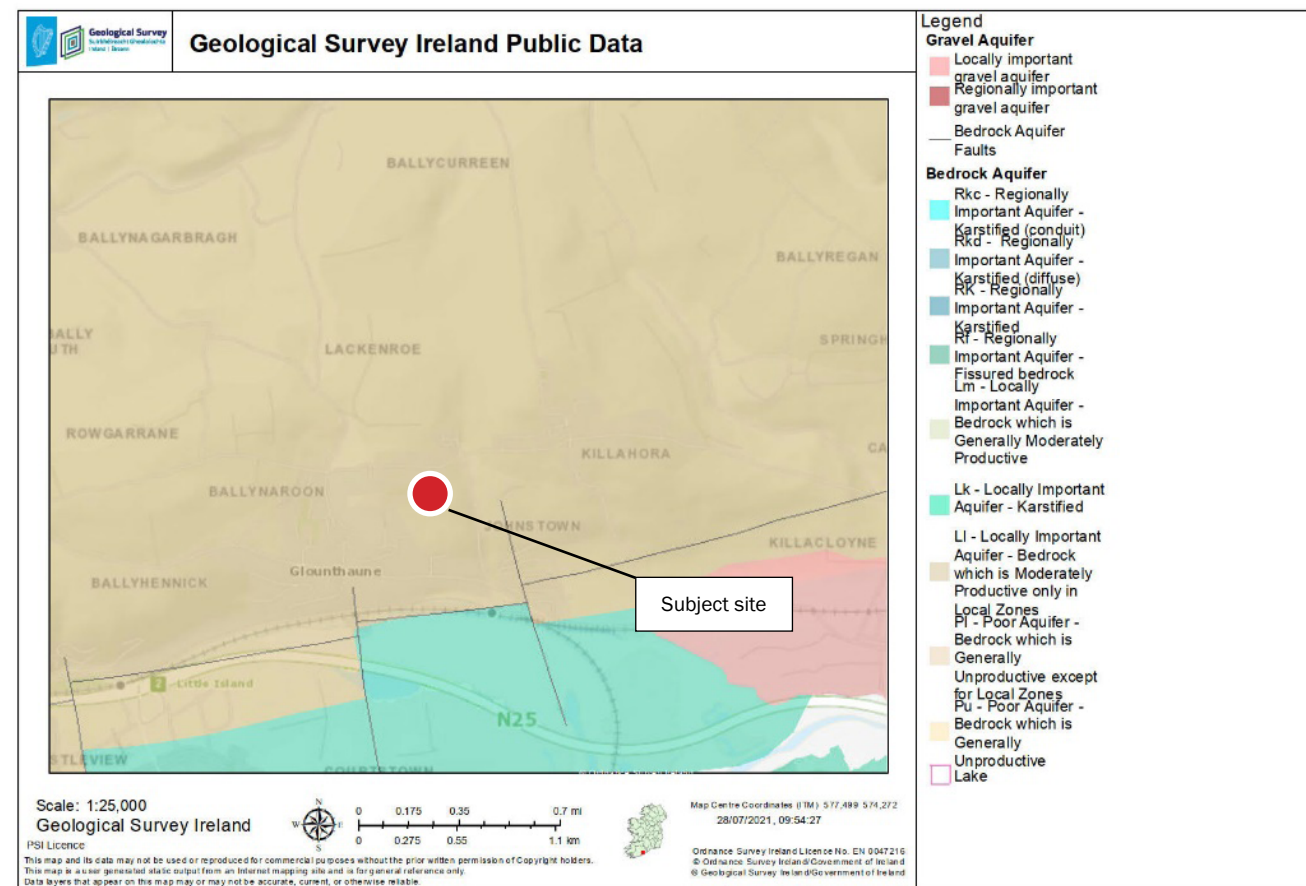
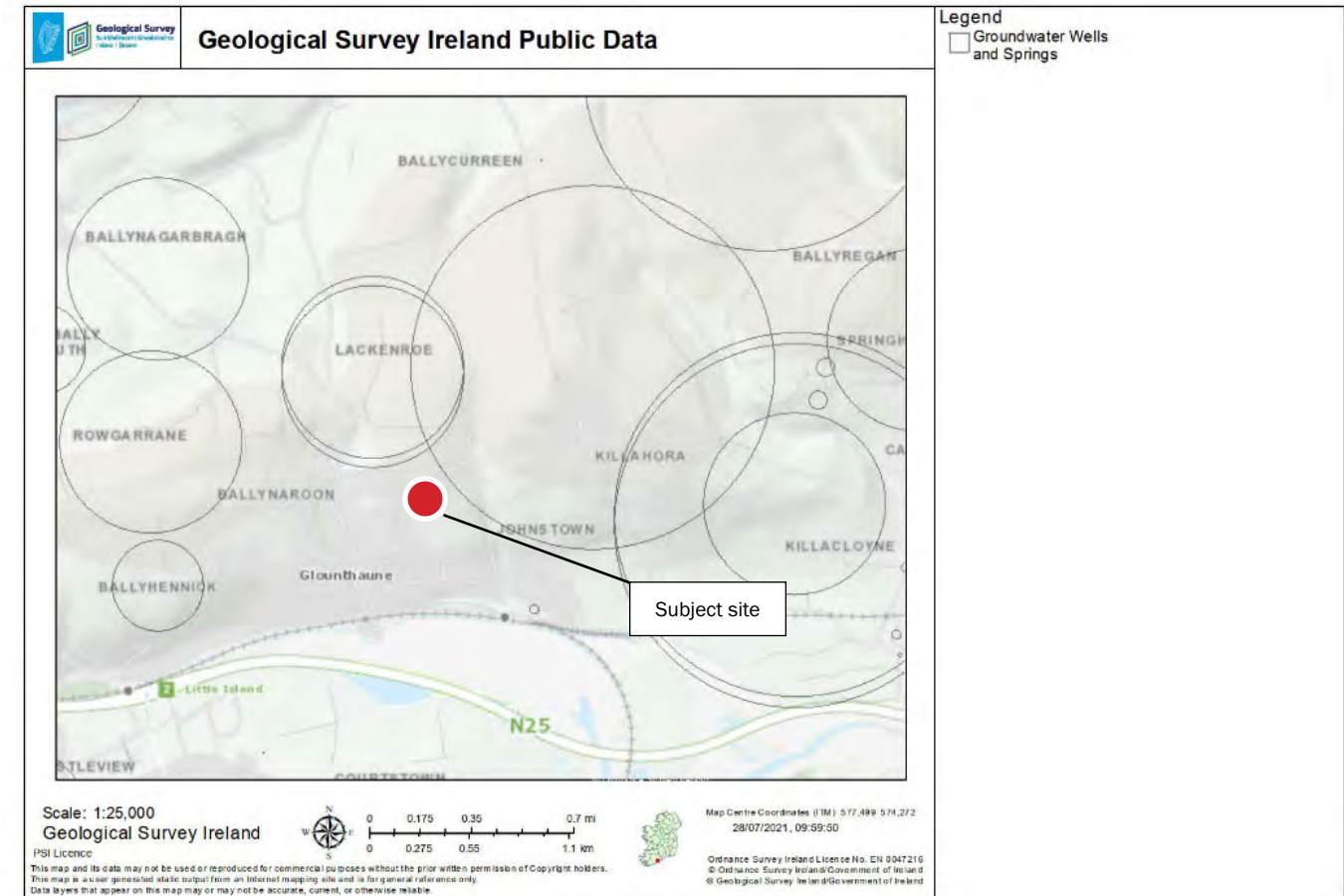


Figure 8.2 – Wells & Springs in the vicinity of the site

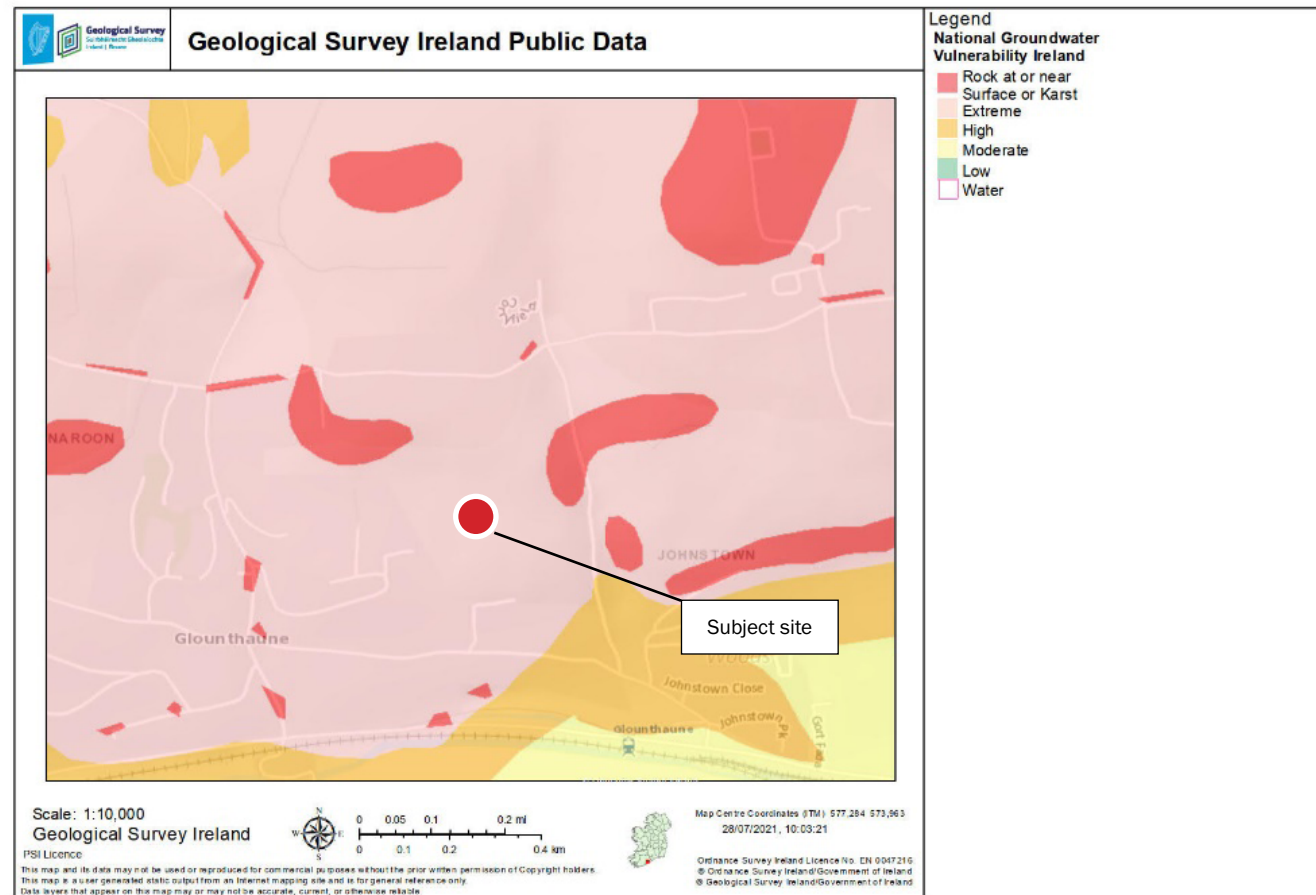


8.4.3 Groundwater Vulnerability

Aquifer or groundwater vulnerability is a relative measure of the ease with which the groundwater could be contaminated by human activity and depends on the aquifer’s intrinsic geological and hydrogeological characteristics. The vulnerability is determined by the permeability of any overlying deposits. For example, bedrock with a thick, low permeability, clay-rich overburden is less vulnerable than bedrock with a thin, high permeability, gravelly overburden. The classifications are based on the thickness and permeability of the sub-soils overlying the aquifer. The vulnerability rating of the aquifer within the overall site is classified as “Extreme”, with some minor areas identified as having “Rock at or near Surface or Karst”. Figure 83 illustrates the extent of each area identified within the subject site. This is supported by the findings of the ground investigation where rock was encountered between 1.2m and 4m below ground level (bgl).

There are no groundwater wells or springs recorded on the GSI Groundwater Data Viewer mapping within the site. There are three existing wells to the north of the site in the townlands of Lackenroe and Killahora (1707SWW058, 1707SWW055, 1707SWW022). Figure 82 illustrates the locations of existing wells and springs in the vicinity of the subject site.

Figure 8.3 – Groundwater Vulnerability



8.4.4 Groundwater Recharge

Effective rainfall is the amount of rainfall available as either recharge to ground or run-off to surface water after evaporation or taken up by plants and is 200 mm/yr. The recharge coefficient, which is the proportion of effective rainfall to recharge groundwater is 60%. Recharge is the amount of rainfall that replenishes the aquifer, it is a function of the effective rainfall, the permeability and thickness of the subsoil and the aquifer characteristics.

8.4.5 Groundwater Body Status

There are no groundwater quality data for the proposed development site and groundwater sampling would generally not be undertaken for this type of development in terms of EIAR reporting as there are no proposed discharges to ground. The WFD status for the local groundwater body in terms of water quality is “Good” and therefore this is considered to be the baseline condition for groundwater in the area of the proposed development.

8.4.6 Protection Areas

The development does not directly impact upon any protected areas. The following European sites are within 15km of the study area; Cork Harbour SPA (004030) and Great Island Channel SAC (001058). The following proposed Natural Heritage Areas (pNHAs) lie within the zone of influence of the study area:

- Great Island Channel pNHA (001058),
- Douglas River Estuary pNHA (001046),
- Glanmire Wood pNHA (001054),
- Dunkettle Shore pNHA (001082),
- Monkstown Creek pNHA (001979),
- Lough Beg (Cork) pNHA (001066),
- Owenboy River pNHA (001990).
- Please refer to the NIS for further information.

8.4.7 Flow Measurements

Hydrometric monitoring is undertaken throughout the Republic of Ireland by the OPW and the EPA. The OPW maintains a tidal station at the National Maritime College of Ireland (NMCI) adjacent to the site of the proposed Service Area, Station number 19069. This gauge measures water level only.

8.4.8 Water Supply Sources

Information on the extent of the public water supply schemes within the study area was obtained from Cork County Council and Irish Water. The study area is served by the Glashaboy Water Supply Zone. Glashaboy Regional Water Supply Scheme is designed to extract 5 million gallons of water per day, via river intake from the Glashaboy River near Riverstown, Glanmire. Water is pumped directly to the Treatment Plant at Richmond Glanmire. There is no raw water storage. The Glashaboy Regional Water Supply Scheme includes the Raw Water Intake and Pumping Station at Glanmire, the Treatment Works at Richmond, the pumphouses at Castlejane and Kilcoolishal and trunk and distribution mains.

8.4.9 Amenities

Cork Harbour is considered one of Ireland’s five major tourism areas. Cork Harbour is widely used for commercial and recreational fisheries, both from boats and the shore. Once famous for its sea angling, this activity is now in decline due to over fishing, dredging, industrial development and other impacts (Coastal and Marine Research Centre, 2001), although it’s still of significant value. The closest important angling point indicated by Inland Fisheries Ireland (IFI) dedicated angling website (www.fishinginireland.info) is at Paddy’s Point, Ringaskiddy, located c. 9 km south of the subject site. Sailing and boating are also popular around Cork Harbour. There are no designated Bathing Waters or Shellfish Areas adjacent to the study area, although Cork Harbour CWB supports three shellfish areas, and Great Island Channel TWB also supports a further shellfish area.

8.5 IMPACT ASSESSMENT

8.5.1 Construction Phase

Due to the inter-relationship between surface water (hydrology) and soils, geology and hydrogeology the following impacts discussed will be considered applicable to Chapters 6 (Material Assets – Services, Infrastructure & Utilities) and 7 (Lands, Soils, Geology) of this EIAR.

8.5.1.1 Earthworks (Excavations & Stock Piling) resulting in suspended solids entrainment in surface waters – discharge to storm sewer

Construction phase activities including site preparations, service trench construction, levelling/construction, tree removal and pad foundation excavation will require some level of earthworks resulting in removal of vegetation cover and excavation of any minor local pockets of organic soil/subsoils, and bedrock. The main risk will be from surface water runoff from bare soil and soil storage areas during construction works.

Proposed Mitigation Measures

A summary of surface water controls that can be employed during the earthworks and construction phase are as follows:

- Source controls:
 - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
 - Silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems:
 - Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.

Silt Fences:

Silt fences will be placed up-gradient of the site sump. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the sump of sand and gravel sized sediment, released from excavation of mineral subsoils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase.

Silt Bags:

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with to the east of the site and the discharge allowed percolate to ground.

Management of surface water runoff and subsequent treatment prior to release offsite will be undertaken during construction work as follows:

- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present.
- No pumped construction water will be discharged directly into any local watercourse.
- Daily monitoring and inspections of site drainage during construction will be completed.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.

Monitoring

An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any construction works. Regular inspections of the sump and holding tank will be undertaken, especially after heavy rainfall, to check for visual evidence of sediment in the water body.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for the holding/settlement tank, and specifically following heavy rainfall events (i.e. weekly, monthly, and event-based monitoring is proposed).

Significance of Effects

The effects on surface water quality due to site excavation work are expected to be not significant. There is no hydraulic connectivity between the site and open watercourses. Mitigation measures will be employed on a precautionary basis to protect the storm sewer. The potential effects on the storm sewer will be slight as the flow and quality will be controlled for the short-term use of the discharge.

8.5.1.2 Potential Release of Hydrocarbons during Construction Stage

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a significant pollution risk to groundwater, surface water (via subsurface flows) and associated ecosystems, and to terrestrial ecology. In this case, the most sensitive receptor is groundwater. The accumulation of small spills of fuels and lubricants during routine plant use can also be a pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna,

including fish, and is persistent in the environment. It is also a nutrient supply for adapted micro-organisms, which can rapidly deplete dissolved oxygen in waters, resulting in death of aquatic organisms.

Proposed Mitigation Measures

On-site refuelling will be carried out at designated refuelling stations on site. Drip trays will be used when refuelling all plant. Absorbent material and pads will be available in the event of any accidental spillages. Alternatively, mobile double skinned fuel bowsers may be used. Fuel bowsers will be parked on a level area in the site when not in use. Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be used during all refuelling operations.

The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- Minimal maintenance of construction vehicles or plant will take place on site.
- Drip trays will be used to control on-site refuelling at controlled fuelling stations.
- On-site diesel tanks will be double skinned to 110% of their capacity.
- Containment stores will be used for refuelling of small plant such as consaws etc.
- Any fuel bowsers used on site will be custom-built / bunded to 100% of capacity. Fuel bowsers will be parked on a level area in the construction compound when not in use.
- Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
- Fuels volumes stored on site will be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction.
- Plant used will be regularly inspected for leaks and fitness for purpose.
- Any Hazardous Materials will be stored in drip trays in secure containment stores.
- Refuelling/containment store signage will be erected at predetermined locations around the site.
- An emergency plan for the construction phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with any accidental spillage in and outside the refuelling area

Significance of Effects

The effects on surface water or groundwater quality are anticipated to be not significant.

8.5.1.3 Groundwater and Surface Water Contamination from Wastewater Disposal (Construction Phase)

Release of effluent from on-site wastewater systems has the potential to impact on groundwater and surface waters.

Proposed Mitigation Measures

A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works;

No wastewater will be discharged on-site during either the construction or operational phase.

Significance of Effects

No significant effects on surface water or groundwater quality are anticipated.

8.5.1.4 Release of Cement-Based Products

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills. A pH range of $\geq 6 \leq 9$ is set in S.I. No. 293 of 1988 Quality of Salmonid Water Regulations, with artificial variations not in excess of ± 0.5 of a pH unit. Entry of cement based products into the site drainage system, into surface water runoff, and hence to surface sewer or into watercourses represents a risk to the aquatic environment. There is no direct hydraulic connection between the site and open water courses.

Proposed Mitigation Measures

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Use weather forecasting to plan dry days for pouring concrete; and,
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

Significance of Effects

The effects on water quality are anticipated to be not significant.

8.5.1.5 Potential Impacts on Hydrologically Connected Designated Sites

Possible effects include water quality impacts most likely via groundwater flow paths which could be significant if mitigation is not put in place.

Proposed Mitigation Measures

The proposed mitigation measures for protection of groundwater quality and surface water quality which will include on site drainage control measures (i.e. sump and settlement/holding tank) will ensure that the quality of runoff from proposed development areas will be very high. As outlined above controls will also be put in place to manage risks associated with hydrocarbons/chemicals and cement-based products used during construction phase. The majority surface water arising on site will drain to ground, with no proposed outfall other than intermittent and temporary pumping of surface water to the municipal foul sewer. Groundwater quality risks are reduced during the construction phase by use of the control measures described above.

No impacts on water quality or downstream designated sites are anticipated.

Significance of Effects

The impacts on groundwater or surface water quality and downstream designated sites are anticipated to be not significant.

8.5.2 Operational Phase Impacts

8.5.2.1 Potential Increased Downstream Flood Risk due to Increased Hardstanding Area

Replacement of the greenfield surface with hardstand surfaces will result in an increased risk of pluvial flooding due to low permeability surfaces which will inhibit any downward percolation of rainwater.

Proposed Mitigation Measures

- The risk of flooding is minimized by the collection, treatment and discharge of water to the municipal sewers.
- The mitigation measures described in the Site-Specific Flood Risk Assessment (Appendix 8-1) reduces this risk. Water quality risks are reduced by use of hydrocarbon interceptors and silt traps.
- The surface water run-off from the proposed development is to be separate from the development's wastewater drainage network as described in the Infrastructure Report prepared by AECOM (included in Appendix 2-1).
- All surface water run-off from roof areas and hardstanding areas shall be collected in the gravity pipe network. The surface water from any open deck parking areas or pavements shall be collected via a series of gullies and channels.

- On-site attenuation is to be provided to restrict flows from the development to greenfield run-off rates across the site.

Significance of Effects

The impacts in terms of flooding or water quality due to the proposed development are considered to be not significant.

8.5.2.2 Potential Emissions to Groundwater and/or Surface water

There are no proposed emissions to ground or surface water courses from the site during the operational phase.

Proposed Mitigation Measures

The risk of emissions is minimized by the collection, treatment and discharge of water to the municipal sewers. Water quality risks are reduced by use of hydrocarbon interceptors and silt traps.

Significance of Effects

The impacts in terms of water quality expected due to the proposed development are considered to be not significant.

8.6 ASSESSMENT OF POTENTIAL HEALTH EFFECTS

Potential health effects are associated with negative impacts on public and private water supplies and potential flooding. There are no mapped public supply group water scheme groundwater protection zones in the area of the proposed development. The proposed site design and mitigation measures outlined in the previous subsections ensures that the potential for impacts on the water environment are not significant.

The Site Specific Flood Risk Assessment for the development (Appendix 8-1) has also shown that the risk of the proposed development contributing to downstream flooding is also very unlikely, and also that the risk of inundation of the buildings within the site post construction is unlikely due to the proposed design floor levels and site layout and measures described in the Site Specific Flood Risk Assessment included in Appendix 8-1.

8.6.1 Do Nothing Scenario

If the proposed development did not proceed there would be no impact on the existing soils or geology of the site. It is envisaged that the land use would remain unchanged as primarily greenfield along with residential uses associated with the gate lodge and existing dwelling on site.

8.6.2 Cumulative Impacts

A review of the development applications within close proximity of the proposed development was undertaken in order to ascertain if the proposed development would give rise to any potential cumulative impacts during the operational phase. The nearby development applications considered are as follows:

Table 6-2. Planning Applications

Planning Reference	Applicant	Development Proposal	Notes
Part 8 Development	Cork County Council	Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune	Under Construction/Partially Complete
21/6851	Citidwell Developments Limited	Demolition of 2 no. farm buildings and a derelict dwelling and the construction of 21 no. units.	Application currently pending a decision from Cork County Council.
21/5072	Barlow Properties Ltd	94 Residential Units	Application being assessed
21/4622	Glounthaune Homes Trust	12 Residential Units	Application being assessed
18/6250	Keta Products Ltd.	Demolition of The Great O'Neill Public House and construction of a two-storey extension of the existing Fitzpatrick's shop to the east to replace the demolished public house, for use as an extended retail.	Under Construction – Nearing Completion
17/5699 (ABP Reference 300128-17) Amended by 18/6312 & 20/5864	Bluescape Ltd	Phase 1 of Proposed Development. Construction of 38 no. residential units & upgrade of local road network	Construction recently commenced
ABP-301197-18	O'Mahony Developments Limited	Strategic Housing Development Construction of 174 number residential units	Under Construction with initial phases occupied.

No significant cumulative impacts on the water environment are anticipated during the construction or operation phases as long as mitigation measures outlined are put in place.

8.7 CONCLUSION

The site is naturally separated from any local watercourses, and this setback distance means that the impact on surface water quality or the downstream designated sites is unlikely. Notwithstanding this, during each phase of the proposed development (construction and operation) a number of activities will take place on the proposed development site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity.

These potential impacts generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds, with the former having the most potential for impact during the construction phase. Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant adverse impacts on water quality and downstream designated sites.

During the construction phase, the surface water drainage plan will focus on silt management to control runoff rates to the municipal sewer. The key surface water control measure is that there will be no direct discharge of development runoff into local watercourses. This will be achieved by avoidance methods and design methods (i.e. surface water drainage to sump and holding tank). Preventative measures during construction include fuel and concrete management and a waste management plan which will all be incorporated into the Construction and Environmental Management Plan included in Appendix 2-3.

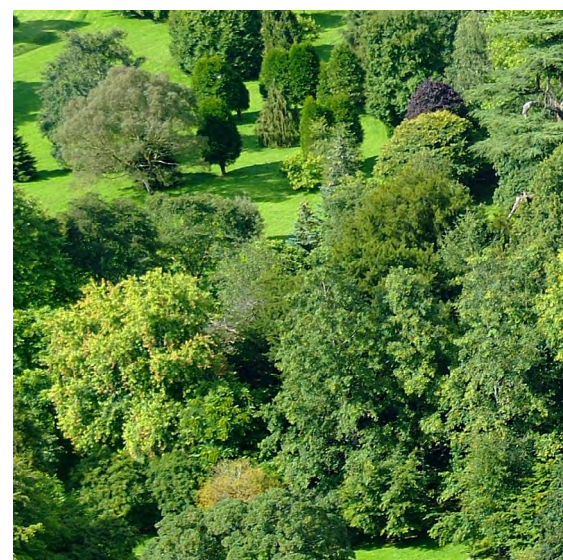
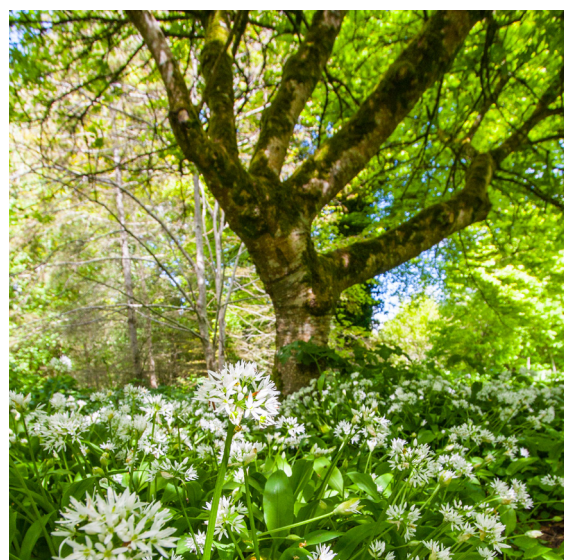
The impacts to surface water and groundwater quality from the proposed development provided the proposed mitigation measures are implemented are considered to be not significant. No significant cumulative impacts on groundwater or designated sites are anticipated.



LACKENROE SHD

CHAPTER 9

Biodiversity



VOLUME II | EIAR

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CHAPTER 9

Biodiversity

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9 Biodiversity

9.1 INTRODUCTION

The biodiversity study and impact assessment of the proposed mixed-use residential development at Lackenroe, Glounthaune, Co. Cork was undertaken by Kelleher Ecology Services Ltd. and Croft Ecology. A series of baseline field surveys were completed at the EIAR study site including: habitat & flora, bird, mammal, bat and other taxa. The baseline field surveys along with desktop review were then used to inform the biodiversity evaluation of the EIAR study site, assessment of potential impacts arising from the proposed development and consideration of appropriate mitigation measures to reduce potential negative impact(s) to an acceptable level where possible.

The biodiversity elements of this EIAR involved consultation and liaison with relevant members of the overall project team in relation to various aspects of the proposed project such as construction management, drainage, design and landscaping.

9.2 STATEMENT OF COMPETENCE

9.2.1 Dr Katherine Kelleher

Katherine Kelleher is a graduate of University College Cork with a BSc in Zoology and PhD in Ecology, and established Kelleher Ecology Services in 2011. She has over 15 years of experience in ecological consultancy, acting as project manager on a range of ecological assessments & projects including solar/wind farm, road, gas pipeline, landfill, grid connection, industrial development, retail and housing. Katherine has significant experience of research, evaluative and analytical work in relation to planning applications, EIAR, appropriate assessment, planning compliance, commitments, licensing, baseline assessments, scoping studies etc. Examples of similar scale projects that Katherine has managed the biodiversity aspect include Castletreasure residential development at Douglas, Shannonpark residential development at Carrigaline, Middleton Distillery Phase 2 & 3 storage facility and Tullamore Dew distillery.

9.2.2 Dr Daphne Roycroft

Daphne has over 10 years of experience in the field of Ecological Consultancy and holds a BSc and PhD in Ecology from the National University of Ireland, Cork. She is a self-employed Ecological consultant, trading as Croft Ecology. Daphne is experienced in the preparation of Ecological Impact Assessment Reports and

Appropriate Assessment screening appraisals as well as Natura Impact Statements for a variety of projects including wind farms, solar farms, roads, pipelines, residential developments, ports and landfill sites. She has published research papers in several peer-reviewed scientific journals and has lectured on several degree and certificate courses in The National University of Ireland, Cork. Examples of similar scale projects that Daphne has been involved with include Shannonpark residential development at Carrigaline, Lisheen Mushroom Composting Facility, Co. Tipperary and Slaghbooly Wind Farm, Co. Clare.

9.2.3 Michelle O'Neill

Michelle (BSc Ecology University of Aberdeen, Diploma Field Ecology UCC) has 10 years of experience working as an ecological consultant within the public and private sector on projects that include habitat and botanical surveys, breeding and winter bird surveys, mammal surveys, data analysis, assessment and report writing. To date, she has completed habitat and botanical surveys for a range of projects as part of National Surveys, Ecological Monitoring, Ecological Impacts Assessments (EiA/EIAR) and Appropriate Assessment (AA/NIS). She has a particular interest in botany and habitats and has worked on an Irish semi-natural grassland survey (2009–2012) and a habitat mapping project for the provision of a Teagasc pilot methodology for farmland habitat assessment of sustainability scheme. She has also contributed to ecological impact assessments for a range of developments including, Rossmore Quarry Extraction Works, Carrigtohill, Cork, Janssen Sciences Ireland Expansion Works, Ringaskiddy, Cork and Aughinish Alumina Burrow Pit Extension Works, Askeaton, Limerick.

9.2.4 Dr Isobel Abbott

Isobel Abbott is a freelance ecological consultant, specialising for over 10 years in bat surveys, monitoring and mitigation. She graduated first in class in 2007 with a BSc in Zoology, and in 2012 with a PhD in Ecology from University College Cork. She has published a number of scientific papers relating to bat ecology and conservation. Isobel has worked on a variety of projects including national bat surveys, wind farms, solar farms, road construction, bridge repairs, quarries, and residential and industrial developments. She has extensive experience of designing and conducting bat surveys, evaluating potential impacts, and designing appropriate mitigation for a range of bat species. Isobel has been granted >35 NPWS

bat licenses associated with planning permission applications or research. She currently holds nationwide NPWS licenses to capture/handle bat species, and to disturb bat roosts for the purpose of impact assessment.

9.2.5 Einne O'Cathasaigh

Éinne Ó Cathasaigh recently completed a MSc in Marine Biology at University College Cork, and previously obtained a BA in Zoology from Trinity College Dublin. For his master's dissertation, «Keeping your Distance on Porpoise», Éinne studied data collected from the OBSERVE program, and used spatial distribution modelling to explore the spatial relationship between bottlenose dolphins and harbor porpoises. As an early career researcher, he worked at the Marine Institute as a bursar cataloguing the benthic invertebrate specimen library while carrying out a ten year report into benthic community health in Irish aquaculture farms. Éinne also gave tours at the Zoological Museum during his time at TCD. Currently he is working as a freelance consultant ecologist and established Éinne Ó Cathasaigh Ecological Service in 2020. He primarily works with bats, monitoring their activity at wind farms and other construction redevelopment projects.

9.2.6 Dr Domhnall Finch

Domhnall Finch is a Senior Ecologist with 8 years' experience working on major national and local scale projects. Domhnall graduated from University College Dublin in 2011 with a B.Sc. degree in Environmental Science, Master's degree in Biodiversity and Conservation from the University of Leeds in 2012 and obtained a PhD from the University of Sussex in 2020. He has a range of ecological skills which include habitat mapping, ecological surveying, data interpretation and report writing. Domhnall is a vegetative plant specialist, who has a wealth of experience classifying riparian habitats and identifying rare floral species. Domhnall has a vast knowledge of riparian and freshwater ecosystems and undertakes freshwater surveys regularly. Domhnall holds 4 national protected species licenses and has a lot of experience optioning surveying licenses for aquatic species such as the white clawed crayfish. He is also a Bat specialist with a wealth of experience, in acoustic surveying and monitoring of bats. Throughout Domhnall's career he has worked on a number of large-scale multifaceted projects such as the Wild Atlantic Way Monitoring Programme. For this work, Domhnall designed and oversaw all ecological field work relating to the Environmental Impact Assessment (EIA) and AA.

9.3 METHODS

This EIAR study involved undertaking a desktop review and a baseline field assessment, which are described in the relevant sections below; where cognisance was taken of guidelines relating to ecological assessments (e.g. EPA 2017, CIEEM 2018).

Field surveys were undertaken in 2019 and 2021 during suitable weather conditions (see Appendix 9-1), taking cognisance of standard ecology survey techniques. The 2021 field surveys also provided an opportunity to verify the status of the study site since some field surveys were undertaken in 2019, in line with an advice note by CIEEM (2019). In this case, no changes of significance had occurred at the study site since the 2019 surveys (e.g. habitat loss/damage, land management changes etc.), such that the outcome of the 2019 surveys are still considered valid for the purposes of this EIAR.

Appropriate survey equipment was used where required (e.g. GPS units, binoculars, bat detector). A desktop review of relevant data available for the study site included online ecology databases (e.g. National Biodiversity Data Centre NBDC, National Parks & Wildlife Service NPWS, Botanical Society of the British Isles BSBI and Environmental Protection Agency EPA) and relevant publicly available documents such as the currently adopted Cork County Development Plan 2015-2021 (CCC 2014) and Cobh Municipal Area Local Area Plan (CCC 2017). Furthermore, relevant organisations/bodies were also consulted (see Appendices 1-1 and 1-2 of this EIAR).

9.3.1 Designated Nature Conservation Sites

Designated nature conservation sites at and/or in the wider area of the study site were identified through a desktop review in order to adequately assess such potential sensitive receptors; where focus was given to sites that a potential impact-receptor pathway or zone of influence with the study site may be relevant. In other words, designated sites that may potentially have a link to the study site (e.g. through hydrological link, overlapping, proximity, ex-situ usage) were focused on for this aspect of the biodiversity assessment.

Such conservation sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Nature Reserves and other Refuges for Fauna. Many designated sites overlap, e.g. a site can be designated as both NHA and SAC.

While NHAs are legally protected by the Irish Wildlife Acts (1976 - 2018), pNHAs are not and only have limited protection through recognition by planning/licensing/forestry authorities and agri-environmental schemes. Nature Reserves and Refuges for Fauna are also protected under the Irish Wildlife Acts (1976 - 2018). SACs and SPAs are European designated nature conservation sites that have been designated under the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC) respectively. SACs and SPAs are collectively known as Natura 2000 sites and are legally protected by Irish law.

A Natura Impact Statement (NIS), in support of the Appropriate Assessment (AA) process, has been undertaken to consider mitigation measures regarding potential significant adverse effects on a Natura 2000 site where relevant to the proposed development here; this NIS is provided in Appendix 9-5, with key findings summarised in this EIAR chapter.

Evaluation of the relevant designated conservation sites in terms of their biodiversity value was assessed using criteria amended after NRA 2009 and Nairn & Fossitt 2004 (see Appendix 9-2).

9.3.2 Habitats & Flora: General

A desktop review of botanical data available for the study site was undertaken by consulting online databases to identify botanical species of interest (e.g. rare, protected) previously recorded within the relevant national grid squares that overlap the study site. In this case, a review was undertaken of the (i) 10km national grid square W77, 2km national grid squares W77R & W77S, and 1km national grid squares W7773 & W7774 from the NBDC online mapping database, (ii) 10km national grid square W77 from the BSBI online mapping database and (iii) legally protected bryophytes that overlap the study site from the NPWS bryophyte online mapping database.

The habitat and flora site assessment was carried out in accordance with current guidelines (Smith *et al.* 2010). This involved a walkover of the study site where the dominant habitats present were classified according to Fossitt (2000) and recorded on a field map. The botanical survey was conducted in-parallel with the habitats survey, where botanical species were identified and recorded according to dominant habitat type, with abundance documented using the DAFOR Scale (*i.e.* Dominant, Abundant, Frequent, Occasional and Rare). Any other records of interest (e.g. invasive plant species) were also noted.

Where applicable, additional vegetative community classification was completed with reference the online resource ERICA; a web application provided by NBDC (in association with BEC Consultants Ltd. and NPWS), which can be used to assign dominant vegetative data collected to groups or communities as defined by the new Irish Vegetation Classification (IVC) system (Perrin 2019, Perrin 2016). ERICA works with both quantitative vegetation cover data (e.g. relevés/quadrats) and presence/absence data such as species lists (Perrin 2019). Relevés were not completed for the dominant habitats present at the study site in this case and as such the dominant species for each habitat (where applicable) was used in subsequent analysis. In this instance, the only habitats where further classification was of relevance or beneficial in describing the communities was in relation to the recolonising bare ground establishing on former agricultural land and an area of mesotrophic wet grassland.

The conservation status of habitats and flora was considered in respect of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson *et al.* 2016); Red List of Bryophytes (Lockhart *et al.* 2012); Flora Protection Order

(2015); Annex I of the EU Habitats Directive (92/43/EEC). Evaluation of the habitats present in terms of their ecological value was assessed using criteria amended from NRA (2009) and Nairn and Fossitt (2004); see Appendix 9-3.

9.3.3 Habitats & Flora: Hedgerow Appraisal

A hedgerow appraisal was also undertaken at the study site by adapting the current standard national hedgerow appraisal system (Foulkes *et al.* 2013), which has been developed for regional/county level assessment where the study site here is at a much smaller site-based scale. Aspects adapted from the standard national hedgerow appraisal system in relation to the study site here included the recording of qualitative field survey hedgerow data and the overall appraisal of hedgerows in terms of historical and ecological significance criteria and condition assessment criteria. The hedgerow appraisal was undertaken in April 2021 (see Table 2.1), which is within the general optimum period for undertaking botanical surveys (*i.e.* April to September inclusive; see Smith *et al.* 2011). The appraisal focused on hedgerows that will be completely removed as a result of the proposed development. In this case, hedgerows at the study site were divided into two discrete hedgerows subject to detailed appraisal (Hedgerows 2 & 4; see Figure 9.1).

9.3.4 Birds

A desktop review of bird data available for the study site was undertaken by consulting online databases to identify avian species of interest (e.g. rare, conservation concern) previously recorded within the relevant national grid squares that overlap the residential area of the study site. In this case, a review was undertaken of the 1km W7773 and W7774 national grid squares from the NBDC online database.

A baseline bird assessment was completed by undertaking line-transect surveys (see Bibby *et al.* 2000 and Sutherland *et al.* 2004). A total of four transects of approximately 100m length were located within the open area of the study site (former farmland section in this case), ensuring that an adequate distance was maintained between them in order to minimise double-counting individual birds across the site (see Figure 9.1). Two surveys of each transect were undertaken overall, where the same transect locations were visited on both occasions.

At each transect, all bird species encountered (seen or heard) within 50m of the observer were recorded and their abundance noted. Only adult birds were counted where possible, although this can be difficult for flocking species that move about quickly (e.g. corvids). The total number of birds per species was derived by adding abundance data from all transects from each survey visit. This allowed a measure of relative abundance to be examined for all bird species recorded during the transect study. The maximum count per visit was then derived for each species and used for subsequent analysis and interpretation of results.

Any species occurring more than 50m from the observer, flying over the site and not using it or noted when walking between transects were not included in subsequent relative abundance analysis, but were considered as 'additional' species for subsequent consideration; additional bird species casually encountered during other aspects of the biodiversity field study but outside of the dedicated bird surveys were also recorded as 'additional' species. This approach allowed a current taxa list of the birds present at/near the study site and their relative abundance to be generated.

The conservation status of bird species recorded was considered in respect of the following: Irish Wildlife Acts (1976 - 2018); Birds of Conservation Concern in Ireland (BoCCI) Red, Amber and Green lists (see Gilbert *et al.* 2021); EU Birds Directive Annex I list. The biodiversity value of the site for birds was assessed using criteria amended after NRA 2009 and Nairn & Fossitt 2004 (see Appendix 9-2).

9.3.5 Mammals: Non-volant

A desktop review of mammal data available for the study site was undertaken by consulting online databases to identify mammal species of interest (e.g. rare, protected, conservation concern) previously recorded within the relevant national grid squares that overlap the study site. In this case, a review was undertaken of the relevant 1km W7773 and W7774 national grid squares from the NBDC online database.

A baseline mammal assessment of the study site was undertaken by completing walkovers of the accessible areas of the study site, especially along existing linear features such as field boundaries (hedgerows, wood edge). The encroachment of relatively heavy scrub and/or presence of steep slopes was a limiting factor for the mammal walkover at affected areas to the south of the study site associated with woodland. Identification of mammal species or signs of mammal activity seen (e.g. droppings, tracks, burrows etc.) was confirmed where possible; observations were recorded using field notes and/or hand-held GPS units. Techniques used to identify mammal activity followed recognised guidelines (e.g. Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004). Trail cameras, which take photographs or video when triggered by heat or motion, were also deployed for various periods from 13 to 43 consecutive nights at three locations overall to record mammal activity (see Figure 9.1 and Appendix 9-1). Contact was also made with Niamh Ryan (District Veterinary Office, Dept. of Agriculture, Food and the Marine) to check for any known Badger *Meles meles* sett locations relative to the study site; no such information was known in this case.

The conservation status of mammals was considered in respect of the following: Irish Wildlife Acts (1976 - 2018); Red List of Terrestrial Mammals (Marnell *et al.* 2019); EU Habitats Directive. The biodiversity value of the site for mammals was assessed using criteria amended after NRA 2009 and Nairn & Fossitt 2004 (see Appendix 9-2).

9.3.6 Mammals: Bats

A desktop review of bat data available for the study site was undertaken by consulting online databases to identify bat species of interest (e.g. rare, conservation concern) previously recorded within the relevant national grid squares that overlap the study site. In this case, a review was undertaken of the 1km W7773 and W7774 national grid squares from the NBDC online database. The NBDC online database also hosts the Model of Bat Landscapes for Ireland, which has assessed the relative importance of landscape and habitat associations for bat species across Ireland (see Lundy *et al.* 2011); therefore, the landscape resource value for bats in the relevant 1km W7773 and W7774 national grid squares overlapping the study site was also included here.

A baseline bat assessment of the study site was achieved by undertaking a combination of active and passive surveys (see Appendix 9-1) in accordance with current best practice guidelines (Collins 2016, Kelleher & Marnell 2006). A **passive detector study** was undertaken by deploying passive bat detectors (Wildlife Acoustics SM3/SM4BAT full spectrum) at five locations within the study site in August 2019 (see Appendix 9-1 & Figure 9.1). Detectors were set to record bat calls (*i.e.* bat passes) from sunset to sunrise every night where GPS locations were set on each detector so that the units could automatically adjust their start and finish times based on sunrise/sunset times relative to the GPS locations. The **active bat survey** comprised of a dusk and dawn emergence/return survey of an unoccupied intact building at the study site to detect bats potentially returning/exiting roost sites associated with the building under consideration (see Figure 9.1 & Appendix 9-1). Both surveys were undertaken by two surveyors who based themselves externally, with each surveyor overlooking an area of the building such that full coverage of the building was achieved. The dusk-based survey commenced c. 15 minutes before sunset until c. 2 hours after, while the dawn-based survey was undertaken from c. 2 hours before sunrise until sunrise. Bat calls (*i.e.* bat passes) were recorded using bat detectors (Wildlife Acoustics Echo Meter EM3+ / SM4BAT full spectrum unit), which were set up to record bat calls in full spectrum, retaining all amplitude and harmonic information from the original signal.

For all bat detectors used here (both passive & active), bat calls were recorded onto SD cards within the detectors that were later analysed using Kaleidoscope Pro software to confirm bat species, times of activity and behaviour where possible. It is important to note that bat recordings are generally a measure of bat activity rather than a measure of abundance as recordings from the same species cannot be readily distinguished between individuals *per se*, especially in the absence of observations as per passive detectors (see Collins 2016). In this case, a bat call or bat pass was defined as a recording of an individual species echolocation within a recording of up to 15 seconds duration (as prescribed in the settings of the Wildlife Acoustic detectors used); this allowed a relative comparison of bat passes between passive monitoring units in this study. To standardise relative comparison between the passive locations and control for the relatively large amount of bat call recordings

that passive detectors can generate, sound analysis focused on (the same) two consecutive nights per passive deployment period where weather conditions¹ were largely dry and winds generally <20km/hr. While bat call recordings from the active emergence/return study confirmed bat species present, recordings from the passive study were also analysed in respect of percentage proportional species activity.

Existing vegetation within the study site was also assessed in relation to roosting, foraging and commuting potential for bats, where the potential suitability of relevant on-site vegetated features for roosting, commuting and foraging bats was visually assessed during daylight hours with reference to guidance after Collins (2016). This included a visual assessment of the majority of standing trees due for removal regarding their potential suitability for roosting bats, which was carried out from ground level using binoculars where necessary to scan tree trunks. Relatively heavy scrub encroachment was a limiting factor for access to eight trees at the south of the study site such that they could not be included in this assessment while another four trees were added to the tree removal list at the latter stages of project design that occurred after this assessment was undertaken and therefore not included. Two stone structures are present at the southern end of the study site that were also subject to a daytime visual inspection to appraise their potential to support bat roosting opportunities with reference to Collins (2016).

The conservation status of bats was considered in respect of the following: Irish Wildlife Acts (1976 - 2018); Red List of Terrestrial Mammals (Marnell *et al.* 2019); EU Habitats Directive. The biodiversity value of the site for bats was assessed using criteria amended after NRA 2009 and Nairn & Fossitt 2004 (see Appendix 9-2).

9.3.7 Other Taxa

A desktop review of other taxa data available for the study site was undertaken by consulting online databases to identify other taxa species of interest (e.g. rare, protected, of ecological concern) previously recorded within the relevant national grid squares that overlap the study site; in this case a review was undertaken of the of the relevant 1km W7773 and W7774 national grid squares from the NBDC online database.

Assessment of other taxa usage of the study site was achieved by noting observations made during other biodiversity field surveys undertaken overall (as described above; see Appendix 9-1).

The conservation status of other taxa was considered in respect of the following: Irish Wildlife Acts (1976 - 2018); Irish Red List for Butterfly (Regan *et al.* 2010); Irish Red List for Damselflies & Dragonflies (Nelson *et al.* 2011); Irish Red List for Amphibians, Reptiles & Freshwater Fish (King *et al.* 2011); Regional Red List of Irish Bees (Fitzpatrick *et al.* 2006); EU Habitats Directive. The biodiversity value of the site for other taxa was assessed using criteria amended after NRA 2009 and Nairn & Fossitt 2004 (see Appendix 9-2).

¹ Weather conditions were reviewed from *past weather* data for Cork on timeanddate.com

9.3.8 Biodiversity Site Evaluation & Impact Assessment

Biodiversity evaluation of the study site follows criteria amended after NRA 2009 and Nairn and Fossitt 2004 (see Appendix 9-2). The description and evaluation of potential and residual impacts associated with the proposed development on the existing ecology of the study site and surrounding area follows guidelines published by the EPA (2017) with reference to CIEEM (2018).

9.4 EXISTING ENVIRONMENT

9.4.1 Designated Nature Conservation Sites

The study site is not part of or adjacent to any designated sites nor does it require any resources from them, thereby ruling out any direct habitat loss at such conservation sites. The closest designated sites are located from c. 42m south of the study site boundary, where they overlap Lough Mahon (Harper’s Island) transitional waterbody; Great Island Channel pNHA, Great Island Channel SAC and Cork Harbour SPA (see Figure 9.2 and Table 9.1).

Cork Harbour Ramsar Site also overlaps with Great Island Channel SAC/ pNHA & Cork Harbour SPA. There are no other Nature Reserves, Ramsar Sites or Refuges for Fauna within or in close proximity to the study site.

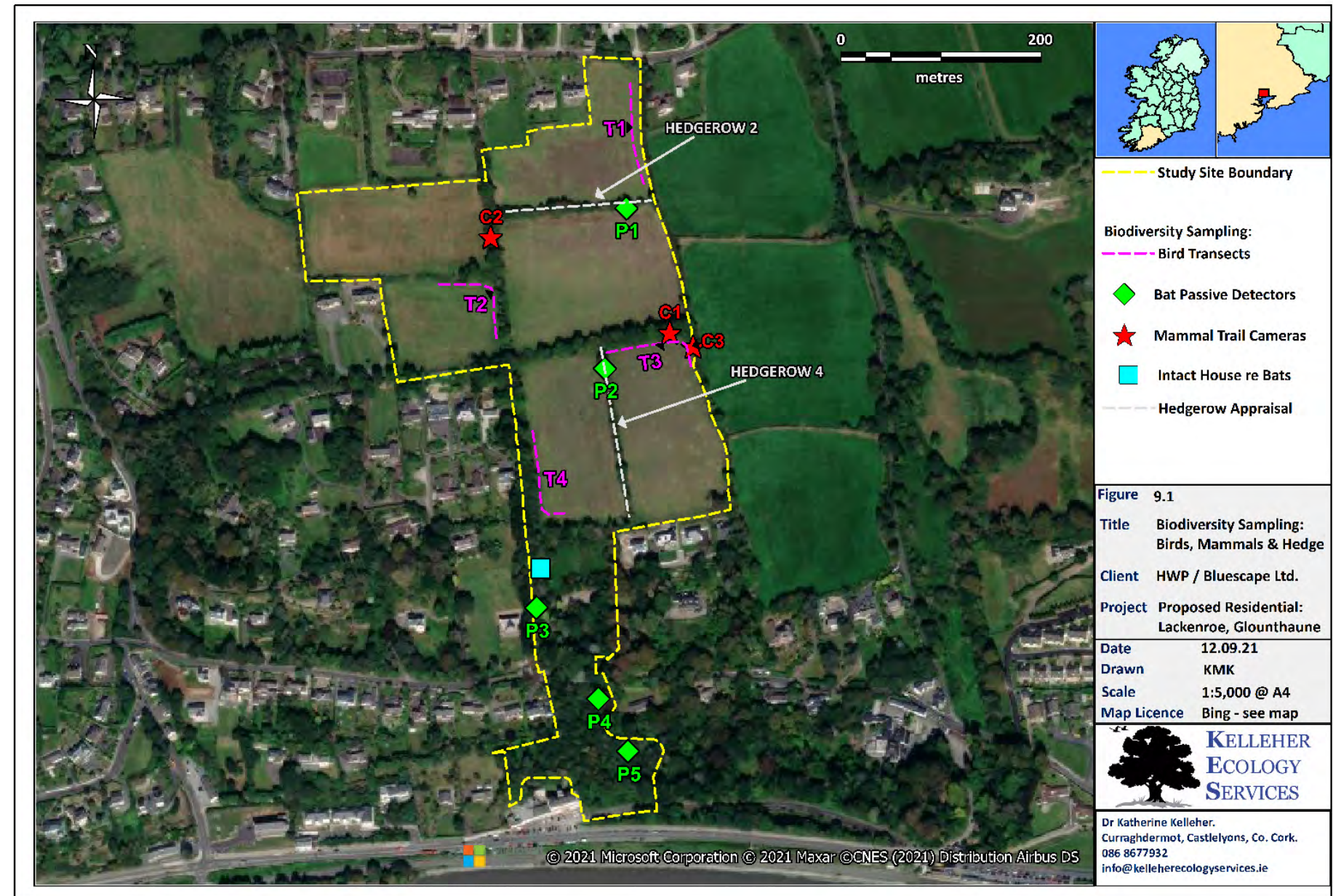
As previously mentioned, a NIS in support of the AA process has been undertaken in relation to the proposed development here (see Appendix 9-5) with key findings summarised in this EIAR chapter.

9.4.1.1 Potential Impact-Receptor Pathways: Overview

Surface-Water Links

There is a potential impact-receptor link between the study site and Great Island Channel pNHA/SAC and Cork Harbour SPA via surface-water run-off into Lough Mahon (Harper’s Island) transitional waterbody. Construction stage surface-water run-off could potentially reach Lough Mahon (Harper’s Island) transitional waterbody given the proposed connection into the public storm-sewer network (part of which may become active as construction works progress) that currently outfalls into this transitional waterbody and/or proximity of the development site to this waterbody (i.e. c. 40m; see Table 9.1). Operational surface-water run-off associated with the site will also be discharged into Lough Mahon (Harper’s Island) transitional waterbody via the same public storm-sewer network (see Table 9.1). Cork Harbour SPA and Great Island Channel pNHA/SAC overlap at the section of Lough Mahon (Harper’s Island) transitional waterbody relevant to here

Figure 9.1 Biodiversity Sampling: Birds, Mammals & Hedge



including at the public outfall discharge point (see Figure 9.2 and Table 9.2). Therefore, the potential for an impact-receptor pathway between the study site and Great Island Channel pNHA/SAC and Cork Harbour SPA via surface-water discharge is given further consideration in Section 9.5.1 of this EIAR chapter.

No other designated sites are considered relevant here due to a lack of hydrological link given their locations that are either (i) not downstream of the surface-water discharge point or (ii) are located within the wider the estuary/harbour area where there is a very significant water throughput associated with the tidal regime as influenced by the Celtic Sea.

Waste-Water/Foul Effluent Links

Prior to the site being connected into the public foul sewer, construction stage waste-water/foul effluent will initially be managed and controlled at the temporary site compound through the use of portaloos and welfare units with storage tanks, where sanitary waste will be removed from site via a licenced waste disposal operator. In this instance, there is no impact-receptor pathway between construction stage waste-water and any designated site.

There is a potential impact-receptor pathway via waste-water/foul effluent links between the study site and two overlapping designated sites; Monkstown Creek pNHA and Cork Harbour SPA. When the site is connected to the public foul sewer network, construction (where relevant) and operational stage waste-water/foul effluent arising from the proposed development will be discharged into the public foul effluent network for treatment at Cork City WWTP that ultimately discharges into Cork Harbour at Lough Mahon, where Monkstown Creek pNHA and sections of Cork Harbour SPA are >4km downstream of the WWTP discharge point (see Table 9.1 & Figure 9.2). Therefore, the potential for indirect hydrological impacts on Monkstown Creek pNHA and Cork Harbour SPA via waste-water arising from the study site are further considered in Section 9.5.1 of this EIAR chapter.

While Great Island Channel SAC is not downstream of the WWTP discharge point, tidal/wind movements could be of some relevance in relation to the pNHA/SAC, where its boundary is c. 550m north-east of the WWTP's discharge point (see Figure 9.2). However, an assessment on the conservation status of the SAC does not highlight potential impacts arising from tidal/wind movements from Cork City WWTP's discharge point as a significant point of concern but instead highlights water quality management in relation to two other WWTPs (Midleton & Carrigrohill WWTPs) to maintain/restore the favourable conservation status of the SAC's qualifying interest 'Mudflats and Sandflats' (O'Neill *et al.* 2014). Taking the above into consideration, no significant adverse effects are considered likely in relation to waste-water/foul effluent arising from the proposed development and Great Island Channel SAC.

None of the other designated sites are considered relevant here due to a lack of hydrological link given their locations that are either (i) not downstream of the WWTP discharge point or (ii) are located within the wider estuary/harbour area where there is a very significant water throughput associated with the tidal regime as influenced by the Celtic Sea (see Figure 9.2).

Disturbance/Displacement

Consideration needs to be given to the potential for disturbance/displacement impacts of fauna that are listed as qualifying interests of a designated site through noise and/or visual cues arising from the proposed development. This also includes ex-situ disturbance/displacement impacts on highly mobile species that are qualifying interests of the relevant designated site; ex-situ impacts occur when highly mobile species occur outside of the boundaries of their designated sites (e.g. to forage or commute).

The study site is located approximately 46m from the nearest section of Cork Harbour SPA as associated with Lough Mahon (Harper's Island) transitional waterbody. Cork Harbour SPA is designated for the protection of a range of qualifying interest waterbird species (see Table 9.1) that typically forage and roost along intertidal mudflats and coastal wetlands or fields. The potential for disturbance/displacement of SPA waterbird qualifying interest species as a result of the development are further considered in Section 9.5.1 of this EIAR chapter.

As the conservation objectives of the relatively nearby Great Island Channel pNHA/SAC relate to habitats and not fauna, there is no impact-receptor pathway in relation to disturbance/displacement for these two designated sites.

Invasive Plants

Activities associated with development works can inadvertently result in the spread of invasive plants, where a water-feature can subsequently act as a potential impact-receptor pathway regarding indirect habitat loss/damage to downstream locations in the wider area including designated nature conservation sites that are present.

A number of non-native invasive plant species are present at the study site, where a dedicated Invasive Plants Survey and Management Plan has been developed in relation to the Third Schedule species (see IPS 2021 in Appendix 9-3) and other non-native plant species that are not listed on the Third Schedule will also require management in accordance with best practice. While several non-native invasive plant species are present, there are no over-ground water-features at the study site that could act as a conduit for the spread of these species into the nearby Lough Mahon (Harper's Island) transitional waterbody and associated designated sites. Taking the above into consideration, there is no impact-receptor pathway in relation to potential habitat loss/damage effects arising from the spread of invasive plants on any designated site.

Flooding/Floodplain

A site specific flood risk assessment has been completed for the proposed development that concludes that the study site does not have a known history of flooding, is within a low probability flooding area (*i.e.* flood zone C, less than 0.1% or 1 in 1,000 year event for river and coastal flooding) and has a low risk in relation to pluvial and groundwater flooding (see AECOM 2021a in Appendix 8-1 of this EIAR). The flood risk assessment also highlights that the proposed development will not increase flood risk elsewhere (see AECOM 2021a in Appendix 8-1 of this EIAR). Taking the above into consideration, no significant adverse effects regarding flooding/floodplain impacts on any designated site are considered likely here.

9.4.1.2 Potential Impact-Receptor Pathways: Summary

In summary, there is a potential impact-receptor link between the study site and the following designated nature conservation sites via; (i) construction/operational surface-water impacts: Great Island Channel pNHA, Great Island Channel SAC and Cork Harbour SPA, (ii) construction (where relevant)/operational waste-water impacts: Monkstown Creek pNHA and Cork Harbour SPA and (iii) potential disturbance/displacement impacts on qualifying waterbird interest species of Cork Harbour SPA. While all pNHAs are of national importance, all SAC/SPAs are of international importance.

Figure 9.2 Designated Sites

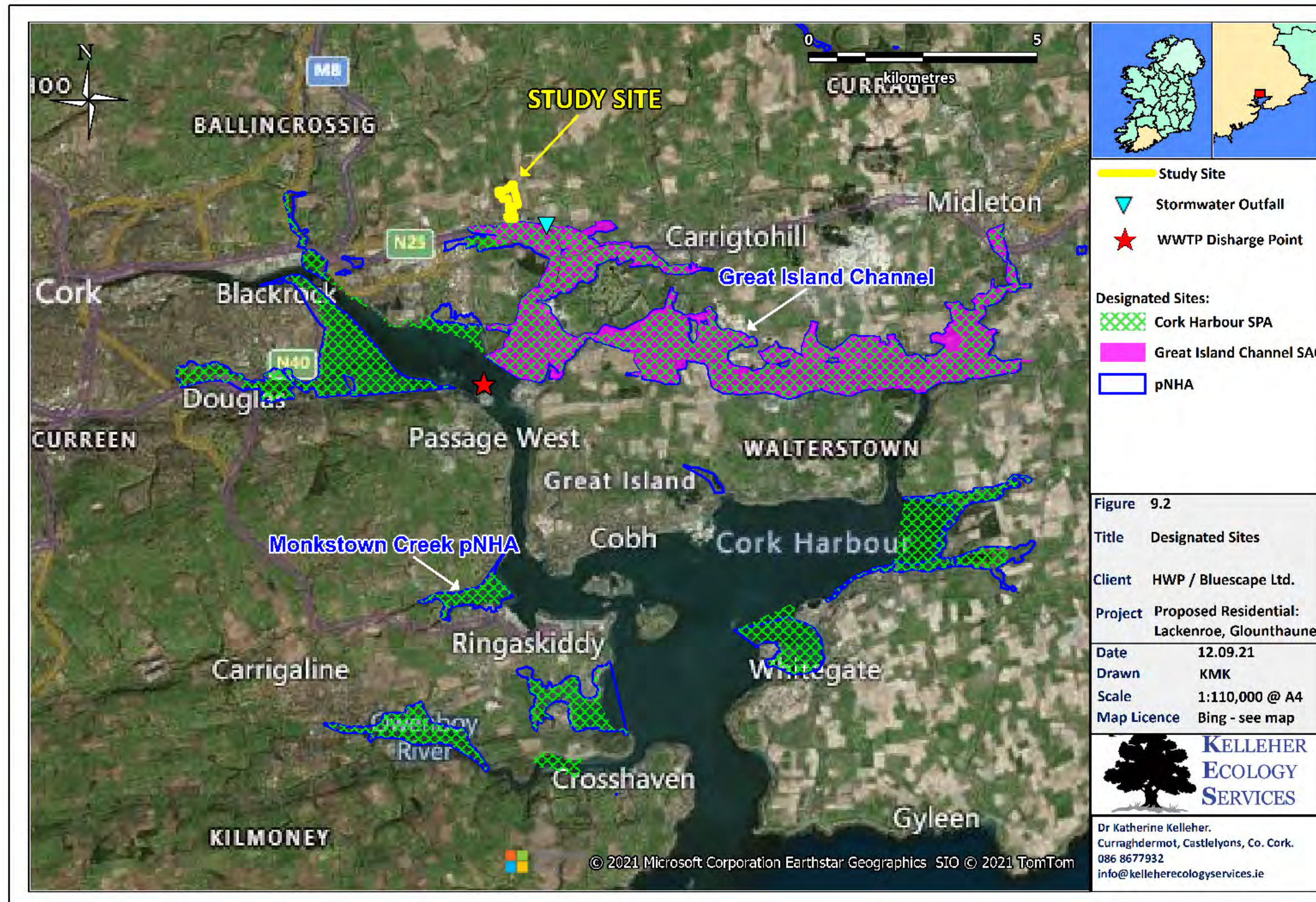


Table 9.1 Designated nature conservation sites with a potential link to the study site.

Site Name & Code	Key Conservation Objective	Relevant Minimum Distances
Cork Harbour SPA 4030	<p>Cork Harbour is of major ornithological significance, being of international importance both for the total numbers of wintering birds (<i>i.e.</i> > 20,000). Several of the species which occur regularly are listed on Annex I of the E.U. Birds Directive. The site provides both feeding and roosting sites for the various bird species that use it. Its conservation objectives relate to maintaining the favourable conservation condition of the following qualifying interests (after NPWS 2014a);</p> <p>Wintering bird species: Little Grebe <i>Tachybaptus ruficollis</i>, Grey Plover <i>Pluvialis squatarola</i>, Great Crested Grebe <i>Podiceps cristatus</i>, Lapwing <i>Vanellus vanellus</i>, Cormorant <i>Phalacrocorax carbo</i>, Dunlin <i>Calidris alpina alpina</i>, Grey Heron <i>Ardea cinerea</i>, Black-tailed Godwit <i>Limosa limosa</i>, Shelduck <i>Tadorna tadorna</i>, Bar-tailed Godwit <i>Limosa lapponica</i>, Wigeon <i>Anas penelope</i>, Curlew <i>Numenius arquata</i>, Teal <i>Anas crecca</i>, Redshank <i>Tringa totanus</i>, Pintail <i>Anas acuta</i>, Black-headed Gull <i>Chroicocephalus ridibundus</i>, Shoveler <i>Anas clypeata</i>, Common Gull <i>Larus canus</i>, Red-breasted Merganser <i>Mergus serrator</i>, Lesser Black-backed Gull <i>Larus fuscus</i>, Oystercatcher <i>Haematopus ostralegus</i>, Golden Plover <i>Pluvialis apricaria</i>;</p> <p>Breeding bird species: Common Tern <i>Sterna hirundo</i></p> <p>Habitat: Wetlands</p>	<p><u>Site Boundary:</u> Over-land: 0.046km</p> <p><u>Discharge Points:</u> Surface-water: c.0.0km Waste-water: > 4.0km</p>
Great Island Channel pNHA & SAC 001058	<p>The Great Island Channel stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. The main habitats of conservation interest in Great Island Channel SAC are the sheltered tidal sand and mudflats and the Atlantic salt meadows. This SAC overlaps with part of the Cork Harbour SPA, with its estuarine habitats providing foraging and roosting resources for wintering waders and wildfowl for which the SPA is designated. Its conservation objectives relate to maintaining the favourable conservation condition of the following qualifying interests (after NPWS 2014b);</p> <p>Annex I Habitats: Tidal Mudflats and Sandflats, Atlantic Salt Meadows.</p>	<p><u>Site Boundary:</u> Over-land: 0.042km</p> <p><u>Discharge Points:</u> Surface-water: 0.0km Waste-water: n/a</p>
Monkstown Creek pNHA 001979	<p>The area is of value because its mudflats provide an important feeding area for waterfowl and it is a natural part of Cork Harbour which, as a complete unit, is of international importance for waterfowl.</p>	<p><u>Site Boundary:</u> Over land: c. 7.2 km</p> <p><u>Discharge Points:</u> Surface-water: n/a Waste-water: > 4.0km</p>

9.4.2 Habitats & Flora: General

Desktop Review

There are three records of plants of conservation interest for the wider 10km grid square W77 as held by the NBDC and BSBI online database: Chives *Allium Schoenoprasum* (listed as vulnerable on the Irish Red Data Book after Wyse Jackson *et al.* 2016), Little Robin *Geranium purpureum* (near threatened after Wyse Jackson *et al.* 2016) and Meadow Barley *Hordeum secalinum* (vulnerable after Wyse Jackson *et al.* 2016, protected under FPO). There are three additional records of rare or protected species for the wider 10km grid square as held by BSBI online database only: Cornflower *Centaurea cyanus*, Common Toadflax *Linaria vulgaris* (near threatened after Wyse Jackson *et al.* 2016) and Pennyroyal *Mentha pulegium* (endangered after Wyse Jackson *et al.* 2016). No records of FPO protected bryophytes are held by the NPWS online database. While there are 17 records for Liverworts (Bryophytes of Ireland 15/05/2006 after NBDC) in the relevant 10km square, all are considered of least concern in Ireland at present.

Native **Chive** are typically found on thin soils in sparsely vegetated, rocky habitats that fluctuate between very wet and very dry, although it can be occasionally found on deeper soils and within rank grassland such as Cock's-foot *Dactylis glomerata* and Red Fescue *Festuca rubra* dominated grassland habitats. This species is also widely recorded as an escapee from cultivation, but such populations are often short-lived (brc.ac.uk). **Little Robin** is an upright annual which grows in stony or rocky places near the sea, on sheltered cliffs, disused railway lines, and particularly by roads and fields on the earth-and-stone sides of hedge banks (brc.ac.uk). **Meadow Barley** has a very local and mainly coastal distribution where it is associated with brackish margins, primarily near the coast across the south and inland along the River Shannon (Parnell & Curtis 2012). It has also been recorded in lowland meadows, pastures and/or coastal grazing marshes in unimproved grasslands on heavy (often calcareous) clay soils (Cope & Gray 2009). **Cornflower** is an annual species found on waste or traditional arable farmland. **Common Toadflax** is typically found in open grassy habitats on stony waste ground, hedgerow banks, roadside verges, railway embankments and cultivated land most often associated with calcareous soils/substrates (after brc.ac.uk). **Penny Royal** is typically found on silt or clay substrates in damp, seasonally inundated grasslands, along margins of shallow pools or poached areas associated with grazing and or vehicular disturbance. Penny Royal has also been recorded in traditionally managed lowland pastures with short swards, on village amenity grassland, coastal grasslands and along the margins of tracks, lakes and reservoirs (Stroh 2014). In Ireland, Penny Royal is documented as occasional in Counties Kerry and Cork (rare elsewhere), where it has primarily been recorded in damp, sandy habitats (Parnell & Curtis 2012). Given the typical habitats described for these rare or protected species and where the main open grassland habitat associated with the study site is largely comprised of recently fallow but previously improved agricultural lands or woodland and hedgerow habitat, it is unlikely that the study site supports such rare or protected species, none of which were recorded during the site walkovers that were completed during the plant growing season.

Study Site Assessment

No Annex I habitats listed under the EU Habitats Directive are present within the study site. The main habitat directly impacted by the proposed development footprint is recolonising bare ground ED3, of lower local importance. Other habitats present within the proposed development footprint include habitats of higher local importance (hedgerow WL1, treelines WL2 and stonewalls & other stonework BL1), habitats of lower local importance (scrub WS1, wet grassland GS4, mixed broadleaved woodland WD1) and habitats of no particular ecological value (buildings and artificial surfaces BL3).

No botanical species protected under the Flora (Protection) Order 2015, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland were recorded at the study site. All species recorded during the botanical survey are considered common for similar habitats in the general area.

A number of non-native invasive plant species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (*i.e.* species of which it is an offense to disperse, spread or otherwise cause to

Figure 9.3 Habitats



grow in any place) are present at the study site as follows; Bohemian Knotweed *Fallopia Bohemica*, Himalayan Knotweed *Persicaria wallichii*, Three-cornered Garlic *Allium triquetrum*, Spanish Bluebell *Hyacinthoides hispanica*, Rhododendron *Rhododendron ponticum* and American Skunk Cabbage *Lysichiton americanus* (see IPS 2021 in Appendix 9-3). A dedicated Invasive Plants Survey and Management Plan has been developed in relation to these Third Schedule species (see IPS 2021 in Appendix 9-3). Other non-native invasive plant species are also present at the study site (that are not listed on the Third Schedule) that will require management in accordance with best practice (e.g. NRA 2010); Buddleia *Buddleia davidii*, Winter Heliotrope *Petasites fragrans*, Snowberry *Symphoricarpos albus*, Cotoneaster *Cotoneaster sp.*, Fuchsia *Fuchsia magellanica*, Lawson Cypress *Chamaecyparis lawsoniana* and Cypress Leyland *Cupressus x leylandii* species.

The following habitats (with Fossitt codes) were recorded within the study site (see Figure 9.3);

- Recolonising Bare Ground ED3 (on former improved agricultural/arable land)
- Mesotrophic Wet Grassland GS4
- Hedgerow WL1
- Treeline WL2
- Scrub WS1
- Mixed Broadleaved Woodland WD1 (including an associated area of Spoil and Bare Ground ED2)
- Buildings and Artificial Surfaces BL3
- Stone Walls and Other Stone Work BL1

9.4.2.1 Recolonising Bare Ground (ED3)

Former agricultural fields make up the majority of the study site, and these previously managed agricultural grassland and/or arable fields have been left unmanaged or fallow which has allowed for a mixed assemblage of vegetation to recolonise over the bare rocky soil or layer of dead/decaying vegetation litter substrates present. The overall cover of recolonising vegetation is greater than 50%, however the recolonising vegetative community is comprised of a very mixed assemblage of species, including frequent to abundant (i.e. DAFOR scale) ruderal species indicative of previous intensive farming practices such as Field Thistle *Cirsium arvensis* and Common Ragwort *Senecio jacobaea*. To date some of the recolonising areas are dominated by grasses such as Creeping Bent *Agrostis stolonifera*, Common Bent *A. capillaris*, Yorkshire Fog *Holcus lanatus*, Annual Meadow Grass *Poa annua* and Perennial Rye Grass *Lolium Perenne*, while other areas are largely dominated by abundant Common Ragwort (see Figure 9.4 below). Other species recorded for this habitat include frequent False Oat Grass *Arrhenatherum elatius*, Rough Meadow Grass *Poa trivialis*, White Clover *Trifolium repens*, Cat's-ear *hypochaeris radicata*, Creeping Buttercup *Ranunculus repens* and occasional

to rare Barren Strawberry *Potentilla sterilis*, Common Nettle *Urtica dioica*, Common Figwort *Scrophularia nodosa*, Thyme-leaved Speedwell *Veronica serpyllifolia*, Bladder Campion *Silene vulgaris*, Scarlet Pimpernel *Anagallis arvensis*, Nipplewort *Lapsana communis*, Red Clover *T. pratense*, Soft Rush *Juncus effesus* and Silverweed *P. anserina*. Young Ash *Fraxinus excelsior* and non-native Buddleia saplings have also begun to establish within the fallow fields, particularly towards the southern boundary of the study site.

Based on the dominant species recorded and with reference to the IVC system the vegetative community types present at best correspond to improved grassland communities such as; GL2C *Holcus lanatus* – *Lolium perenne*, which is a variable community of damp pastures or GL3B *Lolium perenne* – *Trifolium repens*, which is an improved/semi-improved grassland community of drier pastures (after Perrin 2016²). Both of these grassland communities have the closest affinity with improved agricultural grassland GA1 after Fossitt (2000) and as such are considered to be of low conservation value (Perrin 2016). It is important to note that while the vegetative communities correspond at best to these grasslands under the IVC system, this is based on a dominant species list only (i.e. not more detailed relevé data), and as bare substrate and/or a decaying vegetative layer is a common component here, the habitat has been documented as recolonising bare ground ED3. Based on the dominant species documented, the community types do not affiliate with any of the weed communities described by the IVC. However, it is felt that reference to the new IVC classification helps provide an additional understanding of the modified or improved agricultural nature of the habitat and associated recolonising vegetative community present and as such the overall low conservation value of this habitat type.

Based on the previous land-use, the modified and/or disturbed nature of this habitat type and the limited diversity of flora species documented this habitat is considered of lower local importance.

² see synopsis at <https://www.biodiversityireland.ie/projects/national-vegetation-database/irish-vegetation-classification/explore/>

Figure 9.4. Recolonising bare ground ED3 in general, with recolonising bare ground ED3 dominated by Common Ragwort also shown.



9.4.2.2 Mesotrophic Wet Grassland (GS4)

Two fields situated to the west of the study site do not appear to have been managed as recently, or to the same extent as the other fields present and as such the grassland sward is more established overall (see Figure 9.5). These fields were therefore recorded separately and with reference to the frequency of Soft Rush and lower abundance of Perennial Rye Grass were recorded as mesotrophic wet grassland GS4 or a *Juncus effesus* – *Holcus lanatus* grassland community GL2B (after Perrin 2016³). Other typical species recorded here include abundant grasses such as Yorkshire Fog, Creeping Bent and frequent Soft Rush and occasional broadleaved herbs; Meadow Buttercup, Common Sorrel *Rumex acetosa*, Ribwort Plantain *Plantago lanceolata*, Broadleaved Dock *R. obtusifolius*, Germander Speedwell *V. chamaedrys* and White Clover *Trifolium repens* (Figure 9.5). Grey Willow *Salix cinerea* subsp. *Oleifolia* saplings are frequent within one of the fields here and low growing Bramble *Rubus fruticosus* agg. has also established in parts.

Similarly to the above, based on the historic agricultural land-use and as such the previously modified and/or disturbed nature of this habitat type with limited diversity of flora species documented this habitat is considered of lower local importance.



Plate 9.5. Mesotrophic wet grassland GS4.

9.4.2.3 Hedgerow (WL1)

Native hedgerows WL1 are common across the study site where they form the existing agricultural field boundaries. The hedgerows WL1 present are typically comprised of native shrubs and small trees of abundant Ash, Hawthorn *Crataegus monogyna*, Blackthorn *Prunus spinosa* with occasional

³ see synopsis at <https://www.biodiversityireland.ie/projects/national-vegetation-data-base/irish-vegetation-classification/explore/>

Gorse *Ulex europaeus*, Holly *Ilex aquifolium*, Hazel *Corylus avellana*, Elder *Sambucus nigra*, Grey Willow and Goat Willow *S. caprea*. The climbers Bramble and Ivy *Hedera Hibernica* are also abundant and Honeysuckle *Lonicera periclymenum* and Dog Rose *Rosa canina* are occasional. Larger mature tree species of native Ash and Oak *Quercus robur* are frequent in the hedgerow WL1 running east to west through the centre of the study site. Dead or dying Elm *Elmus* species are frequent in the overgrown hedgerow to the south of the study site. Mature non-native/naturalised Beech *Fagus sylvatica*, Sycamore and non-native Cypress Leyland trees are common in the hedgerow towards the western boundary of the study site. Typical ground flora documented for the hedgerows present include Herb Robert *Geranium robertianum*, Cleavers *Galium aparine*, Wood Speedwell *V. montana*, Ground Ivy *Glechoma hederacea*, Foxglove *Digitalis purpurea* and Common Nettle. The hedgerows are generally associated with medium to high earthen banks with occasional dry stone in parts. There are no drainage channels or natural watercourse features associated with the hedgerows WL1 present. The hedgerows WL1 are largely unmanaged in recent times (at least the last five years) and as such have become overgrown with gaps forming throughout (Figure 9.6). Low growing Bramble scrub is also establishing out from the hedgerows WL1 bases and into the adjacent fields for most of the hedgerows WL1.

To the south, new Beech and Laurel hedges has been planted along part of the southern boundary where they are associated with adjoining residential properties located off-site here. Both hedgerows are newly established, low growing and narrow in width and are not associated with any additional features such as earthen banks or drainage features. Similarly, a section of relatively new Laurel dominated hedgerow is also present on the northern boundary of the study site, where it also forms a property boundary here. Both Beech and Laurel are non-native species.

Hedgerow sections that have to be fully removed on a permanent basis to accommodate the proposed development footprint have been subjected to a more detailed appraisal adapted after a national Hedgerow Appraisal system (after Foulkes et al. 2013) as outlined in Section 9.4.3 below.

Overall, the semi-natural native hedgerows WL1 present have high biodiversity in a local context and are as such of higher local importance. The non-native Laurel and Beech dominated hedgerows WL1 forming boundaries with adjoining properties are of no to lower local importance.

Figure 9.6. Hedgerow WL1 example from the study site.



9.4.2.4 Treeline (WL2)

Sections of mature treeline WL2 are present along parts of the southern boundaries of the study site (Figure 9.3). The treelines WL2 present are comprised of a single line of mature non-native/naturalised Beech trees.

Although the treelines WL2 present are comprised of non-native/naturalised Beech trees only, this habitat is considered of higher local importance due to the biodiversity value of such mature treeline features.

9.4.2.5 Scrub (WS1)

One area of scrub WS1 is present towards the south of the study site where it is associated with an abandoned area of ground here. This scrub WS1 is dominated by a dense and impenetrable layer of low growing Bramble with occasional Cleavers, Common Nettle, Cock's-foot and Hawthorn and Elder shrubs.

Another area of scrub WS1 is present to the west of the study site, where a hedgerow may have been historically removed, and as such this area is now largely comprised of a remnant earthen bank/shelf feature with abundant low growing Bramble. One Elder shrub and two semi-mature Ash trees are present towards the eastern end of this scrub WS1 feature. A similar area of low growing bramble scrub WS1 is also present on the northern boundary where it has established along a wire and post fence line here; Cypress Leyland trees are also present here.

Areas of scrub WS1 are largely comprised of dense low growing Bramble shrubs and are of lower local value overall (Figure 9.7).

Figure 9.7. Scrub WS1 at the study site.



9.4.2.6 Mixed Broadleaved Woodland WD1

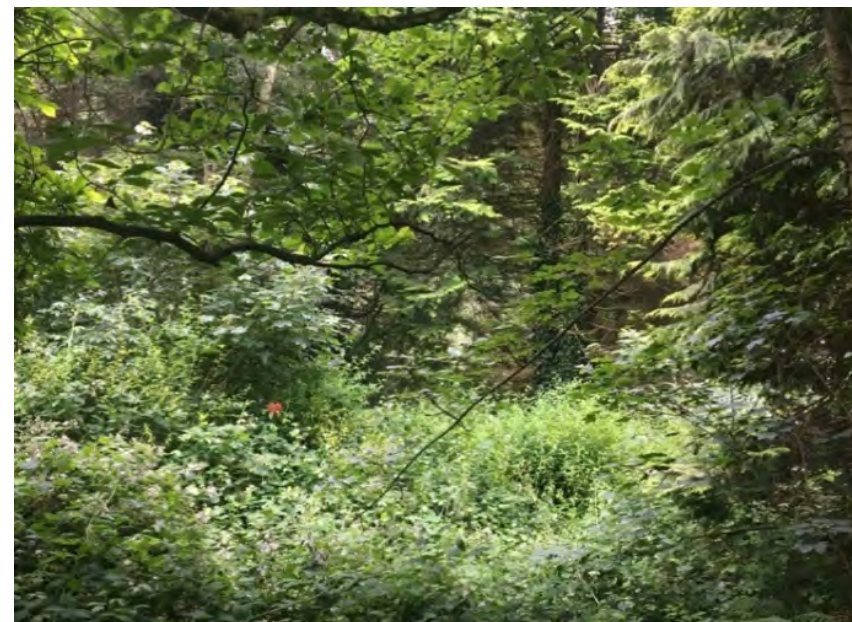
Mixed broadleaved woodland WD1 is located to the south of the study site where this habitat is associated with an unmanaged and as such overgrown historic garden, which also extends as a narrow linear woodland feature along the south-western, western boundary of the study site (see Figure 9.3 & Figure 9.8). Mixed broadleaved woodland WD1 is also present further south, where modified woodland, comprised predominately of self-seeding Sycamore have established within an area of steeply sloping ground (see Figure 9.8).

Typical tree and shrub species recorded within the former garden area include non-native/naturalised Beech, Sycamore, Maple Acer species Lawson's Cypress, Cypress Leyland, Monterey Cypress *Cupressus macrocarpa*, Larch *Larix* species and more recently established Holly, Elder and Hawthorn shrubs.

Non-native invasive Laurel, Rhododendron and Cotoneaster are common in the understory as is dense low growing Bramble. Other non-native species such as Snowberry, Buddleia, Fuchsia and Winter Heliotrope are also common throughout. The dominance of these non-native shrubs limits other native ground flora. As the woodland WD1 extends linearly along the western/south-western boundary of the study site additional mature Sycamore, Ash, Beech, Scot's-Pine *Pinus sylvestris* and other pine species are frequent. Non-native Laurel and Snowberry are common in the understory. As described to the south where woodland has established on steep, sloping ground the canopy is dominated by self-seeding Sycamore with occasional Cypress Leyland trees. The understory and ground flora are also comprised of a number of non-native species such as invasive Cotoneaster, invasive Winter Heliotrope and Periwinkle and other garden escapees. Some of this woodland has been recently cleared as part of site investigative works, with one section to the south-west corner mapped as spoil and bare ground ED2 for this reason (see Figure 9.3).

The narrow band of woodland WD1 along part of the western boundary is comprised of very mature stands of native and non-native/naturalised trees species which have biodiversity value in a local context of higher local importance. While the woodland associated with the abandoned gardens has some local biodiversity value, this woodland habitat feature is considered of lower local importance due to the overall dominance of non-native plant species including invasive species. The broadleaved woodland WD1 to the very south of the study site is dominated by Sycamore with occasional Cypress Leyland and an understory comprised of abundant non-natives including invasive species; due to the abundance of such non-native/invasive species, this woodland habitat feature is of lower local importance.

Figure 9.8. Broadleaved woodland WD1, former garden (left) and self-established Sycamore dominated area (right).



9.4.2.7 Buildings and Artificial Surfaces (BL3)

Buildings and artificial surfaces BL3 present within the study site include an intact but abandoned house (Figure 9.9) with associated small outbuildings, existing gravel/stone driveway access to the south of the study site and boundary stake and wire fencing situated along part of the northern boundary of the study site. The intact but abandoned house BL3 is comprised of man-made materials such as concreted, plastered walls, PVC arches, tiles, corrugated metal roofing and processed wooden panels used to secure the building BL3. A tarmacked public road (*i.e.* The Terrace) is also present within the study site boundary where it transverses the woodlands (*i.e.* former garden and Sycamore dominated woodlands) to the south of the study site.

The buildings and artificial surfaces BL3 present are modified, manmade habitats with limited biodiversity and are of low to no particular ecological value.

Plate 9.9. Buildings and artificial surfaces BL3, abandoned house with associated driveway at the study site.



9.4.2.8 Stone Walls and Other Stone Work (BL1)

The is one relatively high stone wall BL1 present along part of the western boundary of the study site where it forms a boundary with an existing residential property here. This stone wall BL1 is relatively intact although it has fallen onto some disrepair in parts. Bramble is frequent along and immediately adjacent to this wall BL1 (Figure 9.10) as is Common Nettle. Other flora recorded include Ivy, Nipplewort, Smooth Sow Thistle *Sonchus oleraceus*, Yorkshire Fog, Red Fescue *Festuca rubra*, Maidenhair Spleenwort *Asplenium trichomanes* and Polyploidy species.

Sections of natural dry stone walls BL1 are also present to the south of the study site where it is situated along the existing access lane here. This is a lower wall BL1 feature that is associated with earthen embankments and has fallen into disrepair.

Natural stone walls BL1 support local biodiversity by providing additional substrate for associated flora and are of higher local importance.

Plate 9.10. Dry stone wall BL1 example from the study site.



9.4.3 Habitats & Flora: Hedgerow Appraisal

As previously mentioned, the hedgerow appraisal focused on Hedgerows 2 & 4 as these will be completely removed as a result of the proposed development (see Figure 9.1).

9.4.3.1 Hedgerow Appraisal: General Description

Hedgerow 2

Hedgerow 2 is situated to the north of the study site where it forms an agricultural field boundary (see Figures 9.1 & 9.11). The feature is made up of a medium height and width earth and stone bank or shelf which has been colonised by a range of typical species including climbers Bramble and Ivy that both form a relative dense layer. Typical broadleaved herbs include; Common Nettle, Cleavers, Foxglove, Herb Robert, Lord's-and-Ladies *Arum maculatum* and Soft Shield Fern *Polystichum setiferum*. Wall Pennywort/ Navelwort *Umbilicus rupestris* is also present on the occasional dry stone features. This hedgerow does not appear to have been managed in the last 5 years (after evaluation criteria see Foulkes *et al.* 2013) and as such the shrub layer is overgrown with shrubs and small trees of Hawthorn, Ash and non-native/naturalised Sycamore common throughout. Larger semi-mature/ mature Sycamore are also present along the hedgerow. As the hedgerow is largely unmanaged dense low-growing Bramble is establishing out into the adjacent fields. While the hedgerow is currently unmanaged, it appears to have been managed in the past (>5 years ago), where some mature trees were heavily topped at the time. This hedgerow feature appears on the historic 6-inch mapping (1837-1842, first edition OS 6 inch mapping) and as such has historic or heritage value.

Figure 9.11. Hedgerow 2.



Hedgerow 4

Hedgerow 4 is located towards the south of the study site where it forms a boundary between two agricultural fields here (see Figures 9.1 & 9.12). This feature consists of a low to medium stone and earth bank mainly vegetated by climbers Bramble and Ivy. The climber Honeysuckle is occasional, with typical ground flora including Lord's-and-Ladies, Common Nettle, Foxglove and Herb Robert. There is no evidence of management of this hedgerow in the last 5 years and as such the shrub and tree layer is overgrown with a

resulting loss of hedgerow structure and gaps forming throughout. The shrub layer is comprised of frequent Hawthorn, Ash and Gorse, with Gorse extending out from the hedgerow base in parts. Hawthorn and Ash trees are present along the hedgerow. Non-native Cotoneaster shrubs are also occasional. The hedgerow is not associated with any additional features such as drainage features. This hedgerow does not appear on historic 6-inch mapping (1837-1842, first edition OS 6 inch mapping), although its former use as an agricultural field boundary gives a slight significance to this feature under the Foulkes *et al.* (2013) scheme.

Figure 9.12. Hedgerow 4.



9.4.3.1.1 Hedgerow Appraisal: Significance & Condition Assessment

Qualitative data collected from the field survey here were inputted into the standard hedgerow appraisal data recording forms (after Foulkes *et al.* 2013) that comprise of the following four forms: Structural Recording Form; Shrub Recording Form; Climber Trees Recording Form; Ground Flora etc. Recording Form.

The forms relevant to the study site here are available in Appendix 9-4, where the data was then used to assess the significance and condition of each hedgerow appraised according to criteria and associated scores outlined in Foulkes *et al.* (2013) and as summarised in Section 9.3.3 above.

Hedgerow Significance

Hedgerow significance for each hedgerow assessed is summarised in Table 9.2 below, where scores are given in parentheses for each of the significance criteria in question (after Foulkes *et al.* 2013).

Significance criteria scores for Hedgerow 2 under the Foulkes *et al.* (2013) scheme suggest that it is of high significance overall due to it having a score of 4 in at least one criteria category (species diversity in this case) as well as a combined score >6 for the three criteria related to historical, species diversity and structure (see Table 9.2). While Hedgerow 4 does not have a score of 4 in any criteria category, it has a combined score of 6 for the three historical, species diversity and structure criteria categories, which under the Foulkes *et al.* (2013) scheme indicates that it is also of high significance overall (see Table 9.2).

Ecological significance criteria (*i.e.* species diversity; ground flora; structure, construction & associated features; habitat connectivity; see Table 9.2) is relatively high for Hedgerow 2 (combined score of 11 out of a possible 16 for these four criteria) and moderate for Hedgerow 4 overall (combined score of 8 out of a possible 16 for these four criteria).

Table 9.2 Hedgerow significance summary for each criteria and hedgerow.

Significance Criteria	Hedgerow	
	Hedgerow 2	Hedgerow 4
Historical	Significant (3)	Slightly (1)
Species Diversity	High (4)	Significant (3)
Ground Flora	Significant (3)	Slightly (1)
Structure/Construction/Associated Features	Moderate (2)	Moderate (2)
Habitat Connectivity	Moderate (2)	Moderate (2)
Landscape	Low (0)	Low (0)

Hedgerow Condition

Hedgerow condition for each hedgerow assessed at the study site is summarised in Table 9.3 below, where scores are given in parentheses for each of the condition criteria in question (after Foulkes *et al.* 2013).

Condition criteria scores for Hedgerows 2 and 4 under the Foulkes *et al.* (2013) scheme suggest that both are of unfavourable condition overall due to each having a score of 4 in at least one criteria category (continuity and negativity categories for both in this case; see Table 9.3). For both hedgerows, a lack of management has compromised their overall structure and continuity.

Table 9.3 Hedgerow condition summary for each criteria and hedgerow.

Condition Criteria	Hedgerow	
	Hedgerow 2	Hedgerow 4
Structural variables	Adequate (1)	Adequate (1)
Continuity	Unfavourable (0)	Unfavourable (0)
Negative indicators. Degradation, issues affecting long-term viability	Unfavourable (0)	Unfavourable (0)

9.4.4 Birds

A total of 16 bird species were recorded within 50m of the observer during the avian transect surveys of the study site (see Table 9.4). No Annex I species of the EU Birds Directive or Red listed species of high conservation concern in Ireland (Gilbert *et al.* 2020) were noted. One Amber-Listed species of medium conservation concern in Ireland was noted; Starling *Sturnus vulgaris* (see Table 9.4). This species is amber-listed as it is of unfavourable status in Europe, however it has a widespread distribution in Ireland, especially in association with open pasture habitat such as that at the study site here. The remaining species recorded are not currently of conservation concern in Ireland. Wren *Troglodytes troglodytes* had the highest overall relative abundance at the study site transects, with all other species being 2 or less (see Table 9.4). Two other species were additionally recorded during the transect surveys (>50m or flying over); Hooded Crow *Corvus cornix* and Rook *Corvus frugilegus*. Both species are not currently of conservation concern in Ireland (Gilbert *et al.* 2020). An additional two species have been recorded at the study site on a casual basis during other ecological surveys at the study site; Jay *Garrulus glandarius* and Kestrel *Falco tinnunculus*. Jay are currently not of conservation concern in Ireland, however Kestrel are Red listed due to a decline in its breeding population (Gilbert *et al.* 2020).

Table 9.4 Summary of bird species recorded during the transect survey.

Species	Total Abundance Early Season	Total Abundance Late Season	Transects: Overall Maximum Abundance	BoCCI Conservation Status*
Blackbird <i>Turdus merula</i>	1	2	2	Green
Blackcap <i>Sylvia atricapilla</i>	0	1	1	Green
Blue Tit <i>Cyanistes caeruleus</i>	2	1	2	Green
Bullfinch <i>Pyrrhula pyrrhula</i>	0	1	1	Green
Chaffinch <i>Fringilla coelebs</i>	1	1	1	Green
Chiffchaff <i>Phylloscopus collybita</i>	1	0	1	Green
Coal Tit <i>Parus ater</i>	0	1	1	Green
Dunnock <i>Prunella modularis</i>	2	1	2	Green
Jackdaw <i>Corvus monedula</i>	0	1	1	Green
Magpie <i>Pica pica</i>	2	1	2	Green
Mistle Thrush <i>Turdus viscivorus</i>	1	0	1	Green
Song Thrush <i>Turdus philomelos</i>	2	1	2	Green
Starling <i>Sturnus vulgaris</i>	2	0	2	Amber
Willow Warbler <i>Phylloscopus trochilus</i>	2	1	2	Amber
Woodpigeon <i>Columba palumbus</i>	2	2	2	Green
Wren <i>Troglodytes troglodytes</i>	8	5	8	Green

*after Gilbert *et al.* 2020

One additional terrestrial bird species has been recorded historically in the 1km national grid squares overlapping the study site (*i.e.* W7773 & W7774, after NBDC database); Pied Wagtail *Motacilla alba*. While a range of waterbird species have also been historically noted, these are in association with the 1km W7773 square that also overlaps Lough Mahon (Harper's Island) transitional waterbody where relevant habitat features are present (*i.e.* mudflats, wetlands, riparian habitats); as such habitat features are absent at the study site, the range of waterbird species in question are not relevant to the proposed development site under consideration here. No Annex I species have been recorded historically in the relevant 1km grid squares.

Most bird species are protected under the Irish Wildlife Acts (1976 - 2018), where it is an offence to hunt, interfere with or destroy their breeding or resting places (unless under statutory licence/permission). The bird species recorded are typically associated with the woody habitat features present (*i.e.* hedgerow, treeline, woodland and scrub), where the study site provides commuting (*i.e.* wildlife corridors), nesting, resting and foraging opportunities for birds in general. The wood features at the study site also have connectivity with other similar woody features in the surrounding landscape (*i.e.* wildlife corridor). Such opportunities are also present in the wider area that is dominated by agricultural land with associated woody boundaries. The open recolonising bare ground habitat that dominates the proposed development area is of lower ecological value for most avian species. The study site is therefore considered to be of lower to higher local value for birds overall.

9.4.5 Mammals: Non-volant

Evidence of seven non-volant mammal species was recorded at the study site with one additional species historically recorded in the wider area.

Rabbit *Oryctolagus cuniculus* signs (droppings, digging, burrows) were widespread at the site and direct observations of this species were also made during the site walkover and from the trail camera study, indicating that this species is relatively abundant at the study site. Relatively frequent Fox *Vulpes vulpes* activity was also noted at the site through direct observations during the site walkover and from the trail camera study (at least two adults), where this species is likely to predate on Rabbits at the study site.

No Badger *Meles meles* setts were noted at the study site, although evidence of badger activity was however noted through the presence of signs (*i.e.* latrines occurred from time to time, not consistently present) and observations from the trail camera study (at least one individual). As previously mentioned, the encroachment of relatively heavy scrub and/or presence of steep slopes was a limiting factor for the mammal walkover at affected areas associated with woodland to the south of the study site. While no distinctive mammal trails were noted at the edge of these inaccessible areas and there are no known setts for the general area (1km grid squares W7773 & W7774, NBDC database), the presence of a sett cannot be entirely ruled out at the woodland areas in question. Evidence noted as part of this EIAR assessment suggests that Badger engages in occasional territorial marking (latrines), forages and commutes through the northern part of the study site (where the formerly managed fields are present).

Irish Stoat *Mustela erminea hibernica* was observed using a Rabbit burrow at the study site and this species is also known to occur historically in the area (NBDC database, 1km grid square W7773). This species is likely to use the hedgerows/treelines and woodland at the study site at least on an occasional basis.

Brown Rat *Rattus norvegicus* was confirmed to occur on the site from the trail camera study and rat distress calls were also recorded during the passive bat detector survey on two passive detectors (P2 & P5, see Figure 9.1). This non-native species is likely to be relatively widespread at the site.

Field Mouse *Apodemus sylvaticus* and Hedgehog *Erinaceus europaeus* were confirmed to occur at one trail camera location (C3) in association with a hedgerow on the eastern boundary of the site during the trail camera study. Field Mouse is likely to be relatively widespread on the study site with Hedgehog having a more localised distribution.

One additional species, Red Squirrel *Sciurus vulgaris*, has been recorded historically in the wider area (*i.e.* 1km grid square W7773, NBDC database). Suitable habitat is present for this species in the south of the study site where broadleaf woodland is present.

All of the mammal species mentioned above are currently of least conservation concern and are relatively widespread and common nationally (see Lysaght & Marnell 2016, Marnell *et al.* 2019). With the exception of Brown Rat, Field Mouse, Rabbit and Fox, all of the other mammal species noted are legally protected by the Irish Wildlife Acts (1976 – 2018), where it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence / permission).

The study site currently provides commuting (*i.e.* wildlife corridors), resting and feeding opportunities for a number of non-volant mammals, largely through the presence of woody habitat features (*i.e.* hedgerow, treeline, woodland and scrub) that also have connectivity with other similar woody features in the surrounding landscape (*i.e.* wildlife corridor). It should be noted that the biodiversity value of the southern woodland areas is compromised by the dominance of non-native plants including invasive plant species, while the open recolonising bare ground fields at the study site are considered to be of lower value for non-volant mammals in general. The study site is considered to be of lower to higher local value for non-volant mammals overall.

9.4.6 Mammals: Bats

Lundy *et al.* (2011) suggest that the study site is part of a landscape that has a moderate to high resource value for bat species in general with the main exceptions being Nathusius' Pipistrelle and Lesser Horseshoe Bat as the study site is primarily outside of their known national distribution (see Roche *et al.* 2014).

A total of four bat species were confirmed using the study site during the **passive detector** surveys, with some 50 kHz Pipistrelles that could not be discerned to pipistrelle species as well as some Myotis species calls that could not be confirmed to species level but which were considered most likely to be Whiskered Bat *Myotis mystacinus* (see Table 9.5). No additional bat species have been historically recorded in the wider area (after NBDC, 1km grid squares W7773 & 7774). Common and/or Soprano Pipistrelle dominated overall relative activity at all five passive detector locations followed by Leisler's Bat, with these three species being present at all five detector locations (see Table 9.5 and Figure 9.1). Brown Long-eared Bat *Plecotus auritus* was noted at relatively low activity levels (<5 recordings) at just two passive detector locations (see Table 9.5). Recorded bat activity confirmed feeding (Common/Soprano Pipistrelle) and social (Soprano Pipistrelle and Leisler's Bat) behaviour. The relatively high amount of Soprano Pipistrelle activity at passive detector P3 in comparison to the other passive detectors (Table 9.5, Figure 9.1) combined with the fact that its activity was dominated by social calls on both nights analysed suggests that this bat species likely has a roost nearby (where several off-site buildings/dwellings are present).

The bat species assemblage recorded during the active dusk emergence and dawn return surveys (*i.e.* Common/Soprano/50 kHz Pipistrelle, Leisler's Bat, Myotis sp.) was similar to that noted from the passive detector survey with no additional species confirmed. No evidence of a bat roost (*e.g.* emergence or return activity) was noted during the dusk/dawn surveys undertaken at the only intact building at the study site that was considered to have bat roosting potential given its intact roof structure. Two other small stone structures are present at the southern end of the study site within existing woodland but a daytime visual inspection confirmed that these structures do not support roosting opportunities of significance for bats.

Table 9.5 Summary of bat species recorded during the passive detector study*.

Species	P1	P2	P3	P4	P5
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	61% (58)	58% (174)	7.4% (60)	2.9% (1)	24.4% (75)
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	24.2 (23)	28.3% (85)	88.4% (713)	60% (21)	43.6% (134)
Pipistrelle @ 50kHz <i>Pipistrellus sp.</i>	1% (1)	0.7% (2)	1.7% (14)	5.7% (2)	1% (3)
Leisler's Bat <i>Nyctalus leisleri</i>	13.6% (13)	8.7% (26)	0.9% (7)	31.4% (11)	29% (89)
Myotis sp.	0.0 (0)	2.7% (8)	1.5% (12)	0.0 (0)	2% (6)
Brown Long-eared Bat <i>Plecotus auritus</i>	0.0 (0)	1.7% (5)	0.1% (1)	0.0 (0)	0.0 (0)
Totals	100% (95)	100% (300)	100% (807)	100% (35)	100% (307)

*Total bat recordings are in brackets

The visual assessment of 122 trees earmarked for felling recorded 13 tree specimens with bat roosting potential (see Table 9.6). As previously mentioned, eight trees at the south of the study site that are due for removal could not be accessed during this EIAR study due to the presence of relatively heavy scrub (tree tag nos. 1315-1320 inclusive, 1355, 1356), while another four due for removal were not included in this assessment as they were only added to the tree removal list at the latter stages of project design that occurred after this assessment was undertaken (tree tag nos. 1358, 1278, 1279, 367). A total of two tree specimens were considered to support features of high bat roosting potential, while the remaining were of low potential due to the presence of ivy as the primary feature of potential bat roosting interest (Table 9.6). Tree based bat roosting opportunities in this case are likely to involve transient roosting opportunities for small numbers of non-breeding bats during the summer period. It is possible that some existing trees that will be retained may potentially provide bat roosting opportunities.

Table 9.6 Summary of trees due for removal with bat roosting potential.

Tree Tag Reference	Species	Age*	Height	Bat Roosting Potential	Tree Details
247	<i>Cedrus</i> Spp. Cedar	M	22	Low	Ivy
250	<i>Pinus</i> Spp. (Pine)	EM	8	Low	Ivy
253	<i>Pinus</i> Spp. (Pine)	M	11	Low	Ivy
261	<i>Picea</i> Spp. (Spruce)	M	22	Low	Ivy
263	<i>Fraxinus excelsior</i> (Ash)	EM	13	Low	Ivy
291	<i>Fraxinus excelsior</i> (Ash)	EM	16	Low	Ivy
305	<i>Quercus robur</i> (English oak)	EM	8	High	Hazard beams
317	<i>Fraxinus excelsior</i> (Ash)	EM	14	Low	Ivy
1166	<i>Ulmus minor</i> (Elm)	M	10	Low	Ivy
1238	<i>Ulmus minor</i> (Elm)	M	12	Low	Ivy
1257	<i>Fraxinus excelsior</i> (Ash)	M	16	Low	Ivy
1264	<i>Fagus sylvatica</i> (beech)	M	16	Low	Ivy
1388	<i>Quercus petraea</i> (Sessile Oak)	M	16	High	Hazard beams

* M=Mature, SM = Semi-mature - A tree that has grown less than 1/3 its expected height, EM = Early mature - tree between 50% & 80% its expected height

In terms of commuting/foraging opportunities for bats, the potential suitability of on-site vegetation for commuting/foraging bats is considered high here given the presence of linear woody habitat features (hedgerow, treeline, woodland edge and scrub) that also have connectivity with other similar woody features in the surrounding landscape thereby providing a wildlife corridor that bats are likely to regularly use.

All of the bat species noted at site are considered to be relatively widespread and common nationally (Roche *et al.* 2014, Marnell *et al.* 2019) and are considered to be of least concern in terms of conservation status (Marnell *et al.* 2019). All bat species occurring in Ireland are legally protected under the Irish Wildlife Acts (1976 - 2018), where it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence / permission). Furthermore, all bat species are listed on Annex IV of the EU Habitats Directive as species requiring strict protection.

The study site currently provides commuting (*i.e.* wildlife corridors) and feeding opportunities for bats through the presence of linear woody habitat features (hedgerow, treeline, woodland edge and scrub) that also have connectivity with other similar woody features in the surrounding landscape (*i.e.* wildlife corridor). Bat roosting potential has also been identified in a small number of trees at the study site that are due for removal, albeit the extent in question is relatively limited. It should be noted that the biodiversity value of the southern woodland areas is compromised by the dominance of non-native plants including invasive plant species, while the open recolonising bare ground fields at the study site are considered to be of lower value for bats in general. The study site is therefore considered to be of lower to higher local value for bats overall.

9.4.7 Other Taxa

Several other taxa were noted during this EIAR study along with several other taxa records also historically noted in the wider area, one of which is of conservation interest (Table 9.7).

One bee species of conservation concern was casually recorded at the study site; Red-tailed Bumblebee *Bombus lapidarius* (Table 9.7). Red-tailed bumblebee is 'near threatened' in Ireland and is associated with coastal dunes and unimproved grasslands (see Regan *et al.* 2010, Fitzpatrick *et al.* 2006); in this case, no habitats of ecological significance for this bee species are present at the study site.

Common Frog *Rana temporaria* has been recorded historically within the wider area (1km grid square W7773, after NBDC database). While Common Frog is nationally widespread/common and of no particular conservation concern at present (Reid *et al.* 2013 and King *et al.* 2011), it is listed on the Irish Wildlife Acts (1976 – 2018) and on Annex V of the EU Habitats Directive as a species of 'community interest whose taking in the wild and exploitation may be subject to management measures', under the Irish Wildlife Acts protection, it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence / permission). There is a lack of wet habitat (including drainage ditches) for this species at the study site.

The study site currently provides resting, breeding and feeding opportunities for other taxa in general through a mixture of woody and disturbed habitats (recolonising bare ground) present that also have connectivity with other woody features in the surrounding landscape (*i.e.* wildlife corridor). It should be noted that the biodiversity value of the southern woodland areas is compromised by the dominance of non-native plants including invasive plant species. The study site is therefore considered to be of lower to higher local value for other taxa overall.

Table 9.7 Overall summary of other taxa species: study site & historical 1km records.

Species	Occurrence at Residential Area of the Study Site	Conservation Status
Butterfly Species		
Meadow Brown <i>Maniola jurtina</i>	Throughout	Least Concern ^{**} ; no legal protection.
Painted Lady <i>Cynthia cardui</i>	Throughout	Least Concern ^{**} ; no legal protection.
Peacock <i>Inachis io</i>	Occasional	Least Concern ^{**} ; no legal protection.
Red Admiral <i>Vanessa atalanta</i>	Occasional	Least Concern ^{**} ; no legal protection.
Ringlet <i>Aphantopus hyperantus</i>	Throughout	Least Concern ^{**} ; no legal protection.
Small Tortoiseshell <i>Aglais urticae</i>	Occasional	Least Concern ^{**} ; no legal protection.
Small White <i>Pieris rapae</i>		Least Concern ^{**} ; no legal protection.
Speckled Wood <i>Pararge aegeria</i>	Occasional	Least Concern ^{**} ; no legal protection.
Bee Species		
Honeybee <i>Apis mellifera</i>	One specimen observed	Not Evaluated [^] ; no legal protection.
Buff-tailed Bumblebee <i>Bombus terrestris</i>	Occasional	Least Concern [^] ; no legal protection.
Early Bumblebee <i>Bombus pratorum</i>	Occasional	Least Concern [^] ; no legal protection.
Red-tailed Bumblebee <i>Bombus lapidarius</i>	Occasional	Near Threatened [^] ; no legal protection.

^{**} after Regan *et al.* 2010; [^] after Fitzpatrick *et al.* 2006

9.4.8 Study Site: Overall Biodiversity Evaluation

Taking the above into consideration, the study site is considered to be of lower to higher local biodiversity value overall; where the higher value is driven by the presence of semi-natural woody habitat features (hedgerows, treelines and scrub). While areas of broadleaf woodland are present at the site, the biodiversity value of same is currently compromised by the dominance of non-native plants including several invasive plant species.

9.5 POTENTIAL IMPACTS

The proposed development area will primarily impact features of lower local biodiversity value, although some hedgerows of higher local value will require full or partial removal to facilitate the proposed development.

Potential impacts on existing biodiversity of the site and wider area arising from the proposed development requires consideration. Such impacts can arise during the construction and/or operational phases of the proposed development and are considered below for each biodiversity aspect examined here, as well as the do-nothing and cumulative scenarios.

9.5.1 Designated Nature Conservation Sites

The study site is not located within or adjacent to any designated conservation site, nor does it require any resources from any such designated site. The closest designated sites are located from c. 42m south of the study site boundary, where they overlap Lough Mahon (Harper's Island) transitional waterbody; Great Island Channel pNHA, Great Island Channel SAC and Cork Harbour SPA

As outlined in Section 9.4.1 above, there is a potential link between the study site and the following designated nature conservation sites via; (i) construction/operational surface-water impacts: Great Island Channel pNHA, Great Island Channel SAC and Cork Harbour SPA, (ii) construction (where relevant) and operational waste-water impacts: Monkstown Creek pNHA and Cork Harbour SPA and (iii) potential disturbance/displacement impacts on qualifying waterbird interest species of Cork Harbour SPA.

As previously mentioned, a NIS in support of the AA process has been undertaken in relation to the proposed development here (see Appendix 9-5), with key findings summarised in this EIAR chapter.

9.5.1.1 Construction Phase Impacts: Indirect Habitat Loss or Deterioration

Indirect habitat loss or deterioration of designated sites within the surrounding area can occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination. This requires connectivity between the site and the Natura 2000 site in question through watercourses and/or drainage. In this case, there is a potential impact-receptor pathway between the study site and Cork Harbour SPA and Great Island Channel pNHA/SAC in relation to surface-water run-off as follows.

Surface Water Run-off/Discharge

The construction phase of the proposed development will involve various activities such as site clearance, vegetation removal, building demolition, excavation/earthworks, the import of building materials, use of heavy

machinery and refuelling. Such activities have the potential to release silt or other contamination into Lough Mahon (Harper's Island) transitional waterbody given the proposed connection into the public storm-sewer network (where part of the proposed on-site drainage system may become active as construction works progress) that currently outfalls into this transitional waterbody and/or proximity of the development site to this waterbody (*i.e.* c. 40m). Both Cork Harbour SPA and Great Island Channel pNHA/SAC overlap at the section of Lough Mahon (Harper's Island) transitional waterbody relevant to here including at the public outfall discharge point.

While surface-water run-off will generally percolate to ground during the construction phase, standard environmental controls will be implemented as part of the project to ensure the appropriate management and control of construction stage surface-water run-off potentially arising from development activities at the site (as outlined in the CEMP by AECOM 2021b in Appendix 2-3 of this EIAR). Such construction related controls will be specific to the site, works and Lough Mahon (Harper's Island) transitional waterbody with associated Cork Harbour SPA and Great Island Channel pNHA/SAC. Construction phase surface-water environmental controls are thereby listed as part of mitigation measures under Section 9.6.1 of this report. Furthermore, other wastes associated with the development will be collected and removed from site by licensed operators during the construction stage that will allow for the appropriate control and management of other wastes at site, with no uncontrolled releases of same into the environment including any designated conservation site (see CDWMP by AECOM 2021d in Appendix 2-2 of this EIAR).

Taking the above into consideration, potential construction phase impacts in relation to surface-water run-off drainage on designated sites are considered neutral.

Waste-Water/Foul Effluent

When the site is connected to the public foul sewer network, there is a potential impact-receptor pathway via (where relevant) construction waste-water/foul effluent links between the study site and Cork Harbour SPA via Cork City WWTP that ultimately discharges into Cork Harbour at Lough Mahon, where sections of Cork Harbour SPA and Monkstown Creek pNHA are >4km downstream of the WWTP discharge point.

Even though Cork City WWTP is currently non-compliant in relation to Total Nitrogen and Phosphorus, ambient monitoring of transitional and coastal receiving waters indicates that discharge from the WWTP does not have an observable negative impact on water quality or the WFD status of the receiving waters (Irish Water 2021). Furthermore, the WWTP has sufficient capacity to accept the additional organic loading of 1,168 PE arising from the proposed occupied development, where remaining organic capacity is >100k PE (see Irish Water 2021); this has also been confirmed by Irish Water's pre-connection enquiry response that the proposed foul connection can be facilitated (letter dated 28th September 2021; see AECOM 2021c in Appendix 2-1 of this EIAR).

Taking the above into consideration, potential construction phase effects on

designated sites in relation to treated waste-water discharge are considered neutral.

9.5.1.2 Construction Phase Impacts: Disturbance/Displacement

Activities associated with the construction phase of the proposed development could disturb and/or displace waterbird species associated with the nearby Cork Harbour SPA through noise and/or visual cues such as artificial lighting and the movement of construction machinery/personnel, where the nearest area of suitable waterbird habitat (mudflats) associated with this Natura 2000 site is located from c. 40m of the study site. Disturbance/displacement also includes ex-situ related impacts on highly mobile species that are qualifying interests of the relevant designated site; ex-situ impacts occur when highly mobile species occur outside of the boundaries of their designated sites (*e.g.* to forage or commute).

The busy Cork to Middleton / Cork to Cobh railway lines as well as a local road are located between the study site and these mudflats however, while the study site is also screened from the estuary/mudflats by a mature treeline/woodland strip along the inner side of the local road. The very busy N25 dual carriageway is also present c. 500m south of the study site on the opposite side of the mudflats. The existing and on-going background noise levels associated with vehicular/train movement on the public road and railway adjacent to the estuary/mudflats as well as the other existing urban infrastructure associated with the wider Glounthaune/Little Island area will effectively outweigh the noise from the proposed construction works, particularly for waterbird qualifying interests located on mudflats adjacent to the public road/railway such that significant adverse effects regarding direct disturbance/displacement impacts on qualifying interest waterbirds occurring within Cork Harbour SPA are not considered likely here.

It is also considered that the project will not result in artificial light spillage into the SPA area as follows. During the construction phase, external based construction works will largely occur during daylight hours only, such that artificial lighting of external areas during the hours of darkness will be largely irrelevant with only limited occasions where construction works may occur during darkness. Also, the study site is screened from the SPA by a mature treeline/woodland strip and the southern part of the site will retain a portion of the existing woodland as well as introduce relatively extensive new tree planting (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) that will minimise the visibility of the overall site from the nearby estuary. It should also be noted that railway infrastructure (*i.e.* Glounthaune platform), which is located between the study site and the estuary, is already subject to artificial lighting such that the local waterbird population are already habituated to these lighting levels.

In relation to ex-situ disturbance/displacement, the study site does not support habitats of ex-situ ecological value for qualifying interest species of the SPA in question where it is largely dominated by recolonising bare ground and

woodland with associated hedgerows and treelines that obscure the view of the estuary from the study site. Furthermore, no qualifying interest species of Cork Harbour SPA were noted during the field surveys at the study site where the study site is not of known importance for waterbirds (see Crowe 2005 and IWeBS online mapping⁴).

Taking the above into consideration, potential construction phase effects in relation to disturbance/displacement impacts on the qualifying interest species of Cork Harbour SPA are considered neutral.

9.5.1.3 Construction Phase Impacts: Other Impacts

As outlined in Section 9.4.1 above, potential construction phase effects on designated sites via other impacts such as direct habitat loss/damage, invasive plants and flooding/floodplain are not relevant here and are therefore considered neutral.

9.5.1.4 Operational Phase Impacts: Indirect Habitat Loss or Deterioration

Surface Water Run-off/Discharge

Operational surface-water run-off associated with the site will be discharged into Lough Mahon (Harper's Island) transitional waterbody via the same public storm-sewer network outlined above for the construction phase, where Cork Harbour SPA and Great Island Channel pNHA/SAC are present at the outfall discharge point (see Figure 9.2).

Operational phase surface-water run-off will be managed and controlled prior to discharge into the environment, where the proposed SuDS drainage design will incorporate various features such as green roofs, permeable paving and rainwater harvesting butts as well as hydrocarbon interceptors and attenuation tanks to ensure discharge to greenfield rates (see AECOM 2021c in Appendix 2-1 of this EIAR). Furthermore, the surface-water drainage network will be maintained on a regular basis in accordance with established guidelines (see AECOM 2021c in Appendix 2-1 of this EIAR). Such operational related run-off controls will be specific to the site, activities and Lough Mahon (Harper's Island) transitional waterbody with associated Cork Harbour SPA and Great Island Channel pNHA/SAC. Also, other wastes associated with the development will be collected and removed from site by licensed operators during the operational stage that will allow for the appropriate control and management of other wastes at site, with no uncontrolled releases of same into the environment including any designated conservation site

Taking the above into consideration, potential operational phase impacts in relation to surface-water run-off drainage on designated sites are considered neutral.

⁴ <https://bwi.maps.arcgis.com/apps/View/index.html?appid=1043ba01fcb74c78b-c75e306eda48d3a>

Waste Water/Foul Effluent

Potential operational phase effects on designated sites in relation to treated waste-water discharge from Cork City WWTP are not considered relevant here for the same reasons outlined in the construction phase above (Section 9.5.1.1 above), such that potential operational impacts on the designated sites via treated waste-water discharge from Cork City WWTP are considered neutral.

9.5.1.5 Operational Phase Impacts: Disturbance/Displacement

Operational phase noise/visual disturbance impacts on the qualifying interests of Cork Harbour SPA are not deemed relevant here for the same reasons as outlined above for the construction phase (see Section 9.5.1.2). During the operational phase, no artificial lighting will be installed that will result in any light spillage into the SPA area during the hours of darkness (see AECOM (2021e) and Glounthaune Development Public Lighting drawing by Lighting Reality in Appendix 9-6 of this EIAR). Furthermore, the apartment block will not be fitted with aviation warning lights or other bright lights that might attract or disorientate waterbirds. Also, the study site is screened from the SPA by a mature treeline/woodland strip and the southern part of the site will retain a portion of the existing woodland as well as introduce relatively extensive new tree planting (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) that will minimise the visibility of the overall site from the nearby estuary. It should also be noted that the railway infrastructure (*i.e.* Glounthaune platform), which is located between the study site and the estuary is already subject to artificial lighting such that the local waterbird population are already habituated to these lighting levels. Taking the above into consideration, potential disturbance/displacement impacts on the qualifying interests of Cork Harbour SPA arising from the operation of the proposed development are considered neutral.

9.5.1.6 Operational Phase Impacts: Other Impacts

As outlined in Section 9.4.1 above, potential operational phase impacts on designated sites via other impacts such as direct habitat loss/damage, invasive plants and flooding/floodplain are not relevant here and are therefore considered neutral.

9.5.2 Habitats & Flora

No Annex I habitats listed under the EU Habitats Directive are present within the study site. Also, no botanical species protected under the Flora (Protection) Order 2015, listed in the EU Habitats Directive, or Red listed in Ireland (compromising of species that are Critically Endangered, Endangered or Vulnerable; Wyse Jackson et al. 2016) were recorded within the study site.

The main habitat that will be directly impacted by the proposed development

footprint is recolonising bare ground ED3, which is of lower local importance. Other habitats present within the proposed development footprint include habitats of higher local importance (hedgerow WL1, treelines WL2, stonewalls & other stonework BL1), lower local importance (scrub WS1, wet grassland GS4, mixed broadleaved woodland WD1) and habitats of no particular ecological value at present (buildings and artificial surfaces BL3). Treelines WL2 and stonewalls & other stonework BL1 habitat features are associated with the outer boundary of the study site and will be retained. The biodiversity value of broadleaf woodland present at the site is currently compromised by the dominance of non-native plants including several invasive plant species.

9.5.2.1 Construction Phase Impacts

Habitat Loss/Change

The majority of the habitats to be impacted during the construction phase of the proposed development have been evaluated as lower local value (*e.g.* recolonising bare ground ED3, scrub WS1, wet grassland GS4, non-native dominated mixed broadleaved woodland WD1). Construction related impacts will include the overall removal of 133 trees (see Tree Removal Plan, Drawing No. 21543-2-103 by Cunnane Stratton Reynolds accompanying the planning application), X of which are associated with the existing non-native dominated broadleaved woodland habitat areas north and south of The Terrace public road. The permanent loss impact of the lower local value habitats and associated trees as a result of the proposed development construction activities will result in a slight to moderate negative effect. However, native/non-native pollinator friendly dominant planting is proposed as part of the Landscape Master Plan (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR). Such landscaping proposals will include shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers, native hedgerow planting as well as relatively extensive native-dominant tree planting overall (*i.e.* 316 native-dominant woodland trees, 158 street trees, 284 open space native-dominant trees, 214 back garden trees and 8 replacement heritage trees along with native boundary tree planting and specimen ornamental tree planting) in line with All Ireland Pollinator Plan recommendations; the tree planting proposals will compensate for construction related tree loss and, in fact, result in a net gain of native trees at the study site. The extent of proposed native tree planting will also, combined with invasive plant management, provide an opportunity to improve existing non-native dominated broadleaved woodland to a native-dominant woodland feature. It is therefore considered that the overall effect for habitats of lower local value will become slight to moderate positive with the successful implementation of the native/non-native pollinator friendly dominant landscaping proposals as construction progresses.

Some hedgerow WL1 habitat features of higher local value will also be impacted by the proposed development through the removal of approximately 593 linear metres of existing hedgerow, including two entire sections that

are of high significance (*i.e.* Hedgerows 2 & 4). This hedgerow loss is in the context that 973 linear metres of existing hedgerow will be retained. The permanent loss of hedgerows arising from construction related development activities will result in a moderate negative effect of such features through direct habitat loss, fragmentation and/or reduced habitat connectivity. However, hedgerow loss impacts and associated effects will be compensated through the planting of 800 linear metres of native hedgerow planting as part of the Landscape Master Plan that comprises of a native hedgerow species mix (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) and will result in a net gain of native hedgerow at the study site. Landscaping proposals also include for supplementary planting along existing hedgerows being retained where for example gaps currently exist. It is therefore considered that the overall effect for hedgerow habitats of higher local value will become slight positive with the successful implementation of native hedgerow planting with hedgerow species combined with relatively extensive native-dominant tree planting elsewhere.

Other higher local value habitats (treelines WL2, stonewalls & other stonework BL1) will not be impacted by the proposed development such that effects resulting from the proposed development on such features will be neutral. The permanent loss of existing buildings and artificial surfaces BL3, which are of no biodiversity value, due to the proposed development will also be of neutral effect.

Invasive Plants

The presence and potential for the inadvertent spread of invasive non-native plant species also needs consideration. A number of non-native invasive plant species are present at the study site, where a dedicated Invasive Plants Survey and Management Plan has been developed in relation to the Third Schedule species (see IPS 2021 in Appendix 9-3) and other non-native plant species that are not listed on the Third Schedule will also require management in accordance with best practice. As there are no over-ground water-features at the study site that could act as a conduit for the spread of invasive plant species into downstream aquatic habitats in the wider area, potential effects related to invasive plant spread are relevant to the study site in itself. The spread of invasive plant species should not be facilitated and cognisance of current guidelines for the appropriate management and removal of such species (e.g. NRA 2010) needs to be integrated into the proposed site development works where relevant through a site specific management plan and final Construction Environmental Management Plan or equivalent for the proposed development. The management plan for on-site Third Schedule plants will prevent the spread of invasive species across the site through a range of measures such as; fencing of infested zones, warning/advisory signage, multi-annual in-situ herbicide control and physical remediation where appropriate (see IPS 2021 in Appendix 9-3). The appropriate management/eradication of invasive non-native plants would have a moderate to significant positive effect for the study site here (given the dominance of non-native invasive plants at some areas) as well as the wider locality in general, while a

failure resulting in the spread of same would potentially have a moderate to significant negative effect.

Off-Site Aquatic Links

Habitats and flora associated with aquatic habitats in the wider area can be negatively affected by a proposed development through hydrological or water quality impacts such as increased siltation, nutrient release and/or contaminated run-off arising from the development works area. This potentially applies to Lough Mahon (Harper's Island) transitional waterbody that surface-water run-off associated with the site could discharge into via the public storm-sewer network (where part of the proposed on-site drainage system may become active as construction works progress) and/or due to proximity of the development site to this waterbody (*i.e.* c. 40m), and Lough Mahon transitional waterbody that waste-water/foul effluent will discharge into via the public foul sewer network and associated Cork City WWTP when connected to the network during construction (where relevant). Standard environmental controls will be implemented as part of the project to ensure the appropriate management and control of construction stage surface-water run-off potentially arising from development activities at the site (as outlined in the CEMP by AECOM 2021b in Appendix 2-3 of this EIAR). Furthermore, other wastes associated with the development will be collected and removed from site by licensed operators during the construction stage that will allow for the appropriate control and management of other wastes at site, with no uncontrolled releases of same into the environment-(see CDWMP by AECOM 2021d in Appendix 2-2 of this EIAR). Regarding treated waste-water/foul effluent, while Cork City WWTP is currently non-compliant in relation to Total Nitrogen and Phosphorus, ambient monitoring of transitional and coastal receiving waters indicates that discharge from the WWTP does not have an observable negative impact on water quality or the WFD status of the receiving waters (Irish Water 2021). Furthermore, Cork City WWTP currently has significant remaining organic capacity to accept additional organic loadings for the foreseeable (capacity is >100k PE; see Irish Water 2021). Taking the above into consideration, potential construction related effects on habitats/flora associated with downstream water-features in the wider area via surface-water and waste-water run-off impacts are considered neutral.

9.5.2.2 Operational Phase Impacts

Habitat Loss/Change

No additional removal of habitat or flora is anticipated during the operational phase of the proposed development, such that no further potential impacts and associated effects are relevant in relation to habitats and flora loss are relevant in general. Potential additional loss impacts arising from the operation of the proposed development on habitats/flora are therefore considered neutral.

Landscaping proposals (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) will compensate

for the loss of existing hedgerow and trees (many of which are non-native) at the site through relatively extensive native-dominated tree/hedge planting, resulting in a net gain of native tree and hedgerow features at the site overall. Furthermore, other areas of native/non-native pollinator friendly dominant planting will be established as part of the Landscape Master Plan including shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers in line with All Ireland Pollinator Plan recommendations. Following the successful implementation of the landscape plan, in combination with the continued control of non-native invasive species at the site (see IPS 2021 in Appendix 9-3), the resulting effect on overall habitats and flora from the current situation is considered as slight to moderate positive. In the event that the landscape plan is not successfully implemented and does not mature into a relatively extensive native/non-native pollinator friendly dominant planting scheme, the resulting effect on habitats and flora overall is considered slight to moderate negative from the current situation. There is an opportunity to maximise the biodiversity effects on habitats/landscaping during the operational phase through the successful implementation of a management plan of same (see mitigation measures in Section 9.6.2.2 below).

Invasive Plants

As previously mentioned, a number of non-native invasive plant species are present at the study site. A dedicated Invasive Plants Survey and Management Plan has been developed in relation to the Third Schedule species (see IPS 2021 in Appendix 9-3) and other non-native plant species that are not listed on the Third Schedule will also require management in accordance with best practice. The appropriate management/eradication of such invasive non-native plants may still be of relevance for at least some invasive plants during the operational phase depending on progress of same made during the construction phase, where the woodland sections to the south of the study site are the most likely areas to be of potential relevance in this case. Where invasive plants continue to be successfully managed/eradicated at the study site during the operational phase, the associated effect would potentially be moderate to significant positive. In the event that the management/eradication of invasive plants at the study site fails for whatever reason allowing for the spread of same, the associated effect would potentially be moderate to significant negative during the operational phase.

Off-Site Aquatic Links

The operational phase of a development can result in impacts on habitats and flora associated with aquatic habitats in the wider area through hydrological or water quality impacts. This potentially applies to Lough Mahon (Harper's Island) transitional waterbody that operational surface-water run-off associated with the site will discharge into via the public storm-sewer network and Lough Mahon transitional waterbody that operational waste-water/foul effluent will discharge into via the public foul sewer network and associated Cork City WWTP. Operational phase surface-water run-off will be managed and controlled prior to discharge into the environment, where the proposed SuDS drainage design will incorporate various features such as green roofs,

permeable paving and rainwater harvesting butts as well as hydrocarbon interceptors and attenuation tanks to ensure discharge to greenfield rates (see AECOM 2021c in Appendix 2-1 of this EIAR). Furthermore, the surface-water drainage network will be maintained on a regular basis in accordance with established guidelines (see AECOM 2021c in Appendix 2-1 of this EIAR). Also, other wastes associated with the development will be collected and removed from site by licensed operators during the operational stage that will allow for the appropriate control and management of other wastes at site, with no uncontrolled releases of same into the environment. Regarding treated waste-water/foul effluent, while Cork City WWTP is currently non-compliant in relation to Total Nitrogen and Phosphorus, ambient monitoring of transitional and coastal receiving waters indicates that discharge from the WWTP does not have an observable negative impact on water quality or the WFD status of the receiving waters (Irish Water 2021). Furthermore, Cork City WWTP currently has significant remaining organic capacity to accept additional organic loadings for the foreseeable (capacity is >100k PE; see Irish Water 2021). Taking the above into consideration, potential operational related effects on habitats/flora associated with downstream water-features in the wider area via surface-water and waste-water run-off impacts are considered neutral.

9.5.3 Fauna: Birds, Non-volant Mammals, Bats & Other Taxa

The study site is of lower to higher local importance for fauna overall, where no faunal species of high conservation concern were noted using the study site. While the Red listed Kestrel and 'near threatened' Red-tailed Bumblebee were recorded using the study site; Kestrel is widespread and common nationally, while no habitats of ecological significance for the bee are currently present at the study site.

Relatively linear vegetated and/or natural water-features function as commuting wildlife corridors when connected to ecological receptors in the wider landscape, where wildlife corridors provide a necessary and essential role for the movement and connectivity of biodiversity to fulfill their various ecological needs and support species richness (see Bennett 2003). Such features also support associated biodiversity in general by providing commuting, resting/roosting, breeding, feeding and growing opportunities. In this case, woody habitats (i.e. hedgerow, treeline, scrub and woodland) currently present at the study site represents the most valuable wildlife corridor here. It should be noted that the biodiversity value of the woodland present is compromised by the extent of non-native tree and shrub species present however. Supporting biodiversity and associated features is of significant benefit to humans in terms of ecosystem services (air quality, clean water, food supply etc.) and general well-being (see Science for Environment Policy 2015, Sandifer *et al.* 2015, Harrison *et al.* 2014). The importance of wildlife corridors and the protection of same is recognised by the currently adopted Cork County Development Plan (e.g. paragraphs 13.1.7 & 14.3.22 in CCC 2014).

9.5.3.1 Construction Phase Impacts

Habitat Loss/Change

The permanent loss of woody (hedgerow, scrub, woodland) and grassy (recolonising bare ground) habitats arising from construction of the development will negatively affect fauna through reduced commuting, resting/roosting, breeding and feeding opportunities. Woody and grassy habitats are available in the surrounding residential gardens as well as the rural environment further afield such that affected fauna could move into the wider area in general.

The loss of woody features will involve the removal of 133 trees and 593 linear metres of hedgerow. Although, it should be noted that much of the tree loss associated with woodland at the south of the study site comprises of non-native species that reduces their biodiversity value such that they are of lower local value. A total of 973 linear metres of existing hedgerow will be retained and enhanced where appropriate through supplementary native hedgerow planting. The loss of hedgerow will be compensated by the creation of 800 linear metres of new hedgerow (boundary tree planting) as part of the Landscape Master Plan (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR), resulting in an overall net gain of native hedgerow at the study site. In addition, relatively extensive native-dominant tree planting is also proposed (316 native-dominant woodland trees, 158 street trees, 284 open space native-dominant trees, 214 back garden trees and 8 replacement heritage trees along with native boundary tree planting and specimen ornamental tree planting; see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) such that there will be a net increase in native-dominant woody features at the site overall. Furthermore, areas of native/non-native pollinator friendly dominant planting will also be established including shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers in line with All Ireland Pollinator Plan recommendations. While the removal of woody features will have a moderate negative effect on fauna at the study site initially, this will become slight to moderate positive overall with the successful implementation of the landscaping proposals, particularly considering the net gain of native-dominant woody features at the study site.

Disturbance/Displacement

Construction works and associated activities can potentially lead to disturbance/displacement of fauna at or close to the study site through noise and/or visual cues. This also includes the potential disturbance/displacement of Badger setts; although not found or thought to occur at the study site, occurrence cannot be entirely ruled out at woodland areas to the south where accessibility was limited due to the presence of relatively heavy scrub and/or presence of steep slopes. Woody/grassy habitat features are available in the surrounding area so that affected fauna can move into the wider area during the three-phased development programme that will take c. 48 months to complete overall (see CEMP by AECOM 2021b in Appendix 2-3 of this EIAR).

The faunal assemblage occurring at the study site largely comprises common and widespread species with no legal protection (e.g. Rabbit, Fox, Brown Rat), where no breeding sites of protected species were confirmed. Species such as Badger and Irish Stoat that are known to forage/commute through the study site may continue to occur in the southern portion of the study site where the extent of construction activity will be less (i.e. in association with the pedestrian access route). Taking the above into consideration, potential effects on fauna arising from disturbance/displacement impacts associated with the construction phase are considered potentially negative but not significant.

Potential construction phase disturbance/displacement related impacts on waterbirds associated with the off-site Lough Mahon (Harper's Island) transitional waterbody are considered in Section 9.5.1.2 above as being neutral given the screening in place between the study site and nearby estuary as well as the existing high levels of background noise in the area in association with the adjacent train line, local road and dual carriageway.

For bats, disturbance/displacement also arises from (externally based) artificial light used during the construction stage, where bats are active at night and most bat species are negatively affected by artificial light in general (see Bat Conservation Ireland 2010, Stone 2013). However, the use of artificial lighting during the construction stage is largely considered irrelevant as works will generally occur during daylight hours (see CEMP by AECOM 2021b in Appendix 2-3 of this EIAR) when bats are not active. Measures can otherwise be taken to reduce light spillage nuisance on bats as well as other fauna generally active at night during relatively limited periods where some works may occur during some hours of darkness (see mitigation measures in Section 5 below).

The permanent loss of structures (intact buildings, mature trees) can potentially negatively affect bats that are protected under the Irish Wildlife Acts (1976 - 2018) through reduced roosting opportunities and/or injury or fatality of roosting individuals if present during demolition/felling works. While no bat roosting was noted at the unoccupied intact building due for removal, the structure potentially provides roosting opportunities for bats given its intact roof structure where such roosting opportunities are more likely to involve transient roosting activity by small numbers of non-breeding bats during the summer period, if they occur at all. At least 13 of the trees due for removal may provide transient roosting opportunities for small numbers of non-breeding bats during the summer period, where the potential suitability of these features for roosting bats is largely considered as low with the exception of one Oak tree of high roost potential. Therefore, there is a possibility that bat roosting activity could be present at the site when building/tree removal is due, where the removal of bat roosting features during the active bat summer/autumn season also has the potential to cause injury or fatality of bats. Where no roosting activity is present at the time of building/tree removal, potential effects on bats at the study site/locality arising from the loss of such structures is considered neutral imperceptible. In the event that a small number of non-breeding roosting bats are present at the time

of building/tree removal, potential effects are possibly negative and not significant with the relatively limited loss of likely non-breeding roosting sites, and possibly significant negative in general terms with injury/fatality of a small number of non-breeding roosting bats. However, such possible injury/fatality effects on roosting bats can be reduced to neutral by implementing various measures as part of building/tree removal works to ensure the protection of such non-breeding transient roosting bats (see mitigation measures in Section 5 below).

The removal of woody vegetation (trees associated with the scrub/hedgerow/treeline and woodland at the study site) during the bird nesting season has the potential to cause injury, fatality or nest failure of adult birds and eggs/chick that are protected under the Irish Wildlife Acts (1976 - 2018). While fatality for adult nesting birds is unlikely as they can escape, eggs and chicks are likely to suffer fatality in such a scenario. The significance of such impact on nesting birds depends on variables involved such as scale (number of affected nests), seasonal timing (the later the season, the less likely that nesting pairs will try another breeding attempt for that season) and species (multi or single brooders, conservation concern). In general terms, a significant negative temporary effect is possible for bird nests that fail due to woody vegetation removal during the bird nesting season. However, such impacts can be avoided by removing woody vegetation outside of the bird nesting season.

Other potential disturbance/displacement issues in relation to fauna that can also arise during the construction phase include unforeseen and generally rare scenarios such as breeding/resting activity or accidental trapping within excavations left open overnight; measures can be taken to address such potential disturbance/displacement scenarios in relation to fauna during the construction phase (see mitigation measures in Section 5 below).

Off-Site Aquatic Links

As per designated sites (Section 9.5.1.1) and habitats/flora above (Section 9.5.2.1), construction related indirect habitat-loss/deterioration impacts on fauna associated with aquatic habitats located downstream of proposed surface-water and waste-water/foul effluent outputs (where relevant to construction phase) are considered neutral with the implementation of standard environmental measures in relation to silt control/contaminated run-off and treatment of waste-water at Cork City WWTP. Taking the above into consideration, potential construction related effects on fauna associated with water-features in the wider area via disturbance/displacement, surface-water run-off or waste-water discharge impacts are considered neutral.

9.5.3.2 Operational Phase Impacts

Habitat Loss/Change

The Landscape Master Plan (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) proposes relatively extensive native/non-native pollinator friendly planting in line with All

Ireland Pollinator Plan recommendations that will result in a net gain of native-dominant woody features/habitats for fauna (including pollinators) that will provide resting/roosting, breeding and feeding opportunities for various fauna by supporting a diversity of woody habitats/features during the operational phase in tandem with the management/eradication of non-native invasive plants. It is considered that the successful implementation of such new planting proposals will result in a slight to moderate positive effect on fauna at the study site in general as native/non-native pollinator friendly dominant planting matures. In the event that such native/non-native pollinator friendly dominant landscaping fails, the resulting effect on overall fauna is considered as slight to moderate negative. There is an opportunity to maximise the biodiversity effects of habitats/landscaping during the operational phase through the successful implementation of a management plan of same (see mitigation measures Section 9.6.3.2 below).

Disturbance/Displacement

There will be an on-going level of disturbance potentially affecting fauna at the study site during the operational phase of the proposed development. While affected fauna will be able to move into the surrounding landscape, other fauna will become habituated to anthropogenic activity associated with the operational development. As no further tree removal is required during the operational phase, potential impacts on tree-based bat roosts are not relevant. Potential operational phase disturbance/displacement related impacts (including lighting) on waterbirds associated with the off-site Lough Mahon (Harper's Island) transitional waterbody are considered in Section 9.5.1.5 above as being neutral given the screening in place between the study site and nearby estuary as well as the existing high levels of background noise in the area in association with the adjacent train line, local road and dual carriageway. Taking the above into consideration, potential operational phase effects regarding disturbance/displacements impacts on fauna are therefore considered neutral.

Operational stage disturbance/displacement effects also include disturbance to bats arising from artificial light spillage into the environment from the associated lighting scheme. Lighting types that emit a narrow spectrum with no UV (e.g. low pressure sodium) attract relatively less insects than broad spectrum types with high or low UV (e.g. high pressure sodium, Metal halide and mercury; see Bat Conservation Ireland 2010, Stone 2013). Therefore, the narrow spectrum types with no UV have a relatively lower impact on bats by not attracting their insect prey base away from the nearby habitats where bats will be searching for prey (see Bat Conservation Ireland 2010, Stone 2013). The use of directional lighting and luminaire accessories (shield, louvre) are also very successful approaches to reducing light spillage nuisance into the surrounding environment (see Bat Conservation Ireland 2010, Stone 2013, BCT & ILP 2018) in relation to bats. Of course, minimising light spillage nuisance also benefits other fauna that are active/resting at night. In this case, areas of the study site that are considered sensitive to artificial lighting in relation to bats coincide with retained/new woody features (hedgerow, woodland/woodland edge, tree lines/groups) at the study site or

the adjoining area in general. The proposed lighting scheme here will focus lighting on areas where it is needed (roads, streets, footpaths) and minimise spillage onto relevant sensitive areas comprising of retained/new woody features (hedgerow, woodland/woodland edge, tree lines/groups) at the study site or the adjoining area in general (see AECOM 2021e and Glounthaune Development Public Lighting drawing by Lighting Reality in Appendix 9-6 of this EIAR). Potential effects on fauna at the study site arising from the operation of the proposed development are considered neutral imperceptible where the lighting scheme ensures that artificial light spillage is minimised in relation to relevant woody features at the study site and the adjoining area in general (see mitigation measures in Section 5 below).

Access

A relatively small section of the western outer boundary comprises of an existing wall that will be maintained, with the remaining outer boundary comprising of natural features (hedgerow, treeline, woodland, scrub) that are readily accessible by small and medium sized mammals in the current scenario. While natural features of the outer boundary will be largely maintained, boundary treatment proposals include fencing (concrete post and concrete panel fence, weldmesh fence) along sections (see Boundary Treatment Plan Drawing No. 21543-2-105 by Cunnane Stratton Reynolds accompanying the planning application). Such perimeter fencing could impact negatively on mammal movement by creating an impediment or barrier during the operational phase. However, potential effects on fauna at the study site arising from impediment/barrier associated with new fencing during the operational phase could be neutral imperceptible where continued access for mammals is maintained (i) either through the incorporation of mammal access points at regular intervals (at least every 50-75m) along the proposed new outer boundary fencing in question (*i.e.* concrete post and concrete panel fence or weldmesh fence) or (ii) ensuring that a minimum gap of 200mm is maintained between the bottom of this fence and ground throughout (see mitigation measures in Section 5 below). Such measures will be designed to allow small and medium sized mammals to pass through freely. In the case where access points are incorporated into the perimeter fence at regular intervals, such mammal access points will be designed in accordance with standard guidelines for the provision of mammal access (e.g. DMRB 1997), where openings will be at least 250mm high x 220mm wide.

Off-Site Aquatic Links

As per designated sites (Section 9.5.1.4) and habitats/flora above (Section 9.5.2.2), potential operational related indirect habitat-loss/deterioration impacts on fauna associated with aquatic habitats located downstream of surface-water and waste-water/foul effluent outputs are considered neutral with the implementation of the proposed SuDS drainage network regarding surface-water management and treatment of waste-water at Cork City WWTP.

9.5.4 Do-Nothing Scenario

If the existing situation in relation to habitats continues at the study site in terms of a 'do-nothing' scenario, then the site will primarily continue to be of lower local importance for biodiversity due to the dominance of modified habitats (recolonising bare ground ED3, scrub WS1, wet grassland GS4 and non-native dominant mixed broadleaved woodland WD1). Habitat features of higher local value present (hedgerow WL1, treeline WL2, stonewalls & other stonework BL1) will also continue to persist as associated with existing outer and internal boundaries. While the northern part of the study site was previously managed as improved agricultural grassland, no such management has taken place in recent years. In such a scenario where management is largely lacking, it is very likely that scrub habitat/species present will expand in area and encroach into other existing habitats in the short-term to long-term/permanent, including the former fields that currently comprise of open recolonising bare ground areas. Alternatively, the former fields could be brought back to agricultural use if such management was re-instigated. The mixed broadleaf woodland at the southern part of the study site will continue to be dominated by non-native species of lower local value and existing invasive plant species would continue to spread across the study site in general as well as adjoining areas in the locality over time in the absence of management/eradication.

However, a change from the existing scenario is most likely to involve future residential development given that the study site is part of an area highlighted for such development (*i.e.* areas north and south-east of Glounthaune village) as part of the Cobh Municipal Area Local Area Plan (CCC 2017, Section 4.5.9 and 4.5.10).

9.5.5 Cumulative Effects

9.5.5.1 Habitat Loss/Change

Cumulative effects could potentially relate to a reduction in biodiversity through habitat loss/change collectively arising from other relevant developments. The proposed project represents the second phase of residential development in accordance with a Masterplan developed by Deady Gahan Architects in 2017, where construction has recently commenced on the first phase that is west of the northern land parcel of the study site (under planning references 17/5699, 300128-17, 18/6312 and 20/5864; see Chapter 2 of this EIAR). A proposed extension to the first phase, comprising of the demolition of two agricultural buildings and the construction of 21 units to the south of the phase 1 site has been submitted (Planning Reference 21/6851). Other proposed and permitted developments are present in the wider area, including: (i) a permitted Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune (Cork County Council Part 8 Application), (ii) proposed construction of 94no. residential units (Barlow Properties Ltd., planning number 21/5072), (iii) proposed construction of 12 no. residential units (Glounthaune Homes Trust, 21/4622) and (iv) permitted

SHD of 174 residential units under construction (O'Mahony Developments Ltd., ABP-301197-18).

The proposed development area in this case will primarily impact features that are of lower local value, although some hedgerows of higher local value will require full or partial removal. However, the landscaping plan (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) will compensate for hedgerow and tree loss through relatively extensive native-dominant tree/hedge planting that will result in a net gain of native woody features at the site overall. Furthermore, other areas of native/non-native pollinator friendly dominant planting will be established as part of landscaping proposals including shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers in line with All Ireland Pollinator Plan recommendations. Following the successful implementation of the landscape plan, in combination with the continued control of non-native invasive species at the site (see IPS 2021 in Appendix 9-3), the resulting effect on overall biodiversity from the current situation is considered as slight to moderate positive.

Taking the above into consideration, no significant adverse cumulative effects in respect of loss/change impacts in habitat and associated flora/fauna are considered likely as a result of the proposed development in combination with other relevant permitted developments.

9.5.5.2 Indirect Impacts on Designated Sites

Potential cumulative effects on designated sites include construction/operational related surface-water and construction (where relevant)/operational related foul effluent inputs, where qualifying interests associated with Cork Harbour SPA and Great Island Channel pNHA/SAC could be subject to cumulative impact through hydrological or water quality impacts such as increased siltation, nutrient release and contaminated run-off arising from other developments.

The current Cork County Development Plan outlines a county-based objective in relation to the management of surface-water by new developments through the incorporation of SuDS and provision of adequate stormwater infrastructure (Section 11.5 & Objective WS 5-1; CCC 2014) that is reiterated in the current Cobh Municipal District Local Area Plan that includes Glounthaune (Objective LAS-01; CCC 2017). The current Cobh Municipal District Local Area Plan also includes an objective for Glounthaune regarding protection of the SPA and SAC in relation to new development in the area (Objective U-02; CCC 2017). The SuDS surface-water management strategy associated with the proposed development here compliments the Cork County Development Plan objective through the inclusion of various aspects such as such as green roofs, permeable paving and rainwater harvesting butts along with hydrocarbon interceptors and attenuation tanks (as outlined in Section 9.6.1 below).

While Cork City WWTP is currently non-compliant in relation to Total Nitrogen and Phosphorus, ambient monitoring of transitional and coastal receiving waters indicates that discharge from the WWTP does not have an observable

negative impact on water quality or the WFD status of the receiving waters (Irish Water 2021). Furthermore, there is significant remaining capacity currently available at Cork City WWTP to cater for the additional proposed foul effluent here.

Assuming that all other Cork County related developments closely adhere to standard environmental practice regarding soil and water management during construction and operational phases, as per the development under consideration here (as outlined in Section 9.6.1 below), then significant adverse cumulative effects are considered unlikely in relation to water-features and associated designated nature conservation sites.

Taking the above into consideration, along with the proposed environmental management and controls integrated into the project design here (see Section 9.6.1 below), significant adverse effects on designated sites related to cumulative and in-combination impacts are considered unlikely in this case.

9.6 MITIGATION

The following mitigation measures will be implemented as part of the proposed project in order to minimise potential impacts on existing ecology as discussed above, where these measures have taken cognisance of the currently adopted Cork County Development Plan regarding the protection/enhancement of biodiversity and associated objectives (*e.g.* Chapter 12 of CCC 2014).

9.6.1 Designated Nature Conservation Sites

The following mitigation measures will be integrated as part of the proposed development regarding environmental protection specific to the site, works/operations and Lough Mahon (Harper's Island) transitional waterbody with associated Cork Harbour SPA and Great Island Channel SAC in relation to potential construction/operational phase surface-water run-off drainage effects:

9.6.1.1 Construction Phase

Implement the following construction related run-off controls that are proposed as part of the development in question (after AECOM 2021b in Appendix 2-3 of this EIAR);

Spill Control Measures

It is not proposed to store any oils/fuels for the purpose of refuelling on the site.

Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles are not to be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.

The following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- Eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other suitable material. Do not spread or flush away the spill.
- Cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
- Clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
- The Employers Representative will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.

Run-off Control Measures

- Dewatering measures will only be employed where there are no other alternatives.
- For groundwater encountered during construction phase, mitigation measures will include;
 - Dewatering by pumping to a soakaway.
 - Excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.
- If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.
- Existing surface drainage channels within the site that serve adjacent lands will be retained where possible to prevent causing increased flooding impacts.
- Any surface water sewer connections will be made under the supervision of the Local Authority/Irish Water and checked prior to commissioning.
- New onsite surface water drains will be tested and surveyed prior to commissioning to prevent any possibility of ingress of ground water.
- All surface water manholes and drains will be inspected and sealed to ensure that uncontrolled ground water inflow does not occur.

- Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.
- Areas surrounding the site are to be protected as necessary from sedimentation and erosion due to direct surface water runoff generated onsite during construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works, as noted in the points above, until the permanent surface water drainage system of the proposed site is complete.
- Regular inspections of de-watering settlement tanks, if used, are to be carried out and additional treatment used if settlement is not adequate.
- Bunded areas will be created for the storage or use of any fuels, oils, greases, cement, etc.
- Emergency spill kits will be kept close to the works.

9.6.1.2 Operational Phase

Implement operational stage run-off proposals that will be integrated into the development under consideration here that are summarised as follows (see AECOM 2021c in Appendix 2-1 of this EIAR);

- The proposed SuDS surface-water drainage design includes green roofing and permeable paving along with hydrocarbon interceptors and attenuation tanks.
- Maintenance of the drainage system will be carried out on an on-going basis to ensure the system is operating correctly. Maintenance will consist of inspection and assessment, with remedial measures undertaken where required.

9.6.2 Habitats & Flora

9.6.2.1 Construction Phase

- No removal/damage of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the development site works area/footprint will be clearly marked for associated site staff.
- The final landscape plan will incorporate a native/non-native pollinator friendly dominant tree/shrub and ground flora planting scheme (in line with All Ireland Pollinator Plan recommendations and associated guidance such as NBDC 2016) that will result in a net gain of native tree/hedge/shrub planting. This is achieved by landscaping proposals for the proposed development here (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR).

- A site assessment will be undertaken by a suitably qualified/experienced Ecologist or Invasive Plant Specialist prior to enabling/construction activities to assess the most up-to-date status of invasive plants at the site relative to the works area. The Invasive Plants Survey and Management Plan that has been developed in relation to the Third Schedule species for the study site will be implemented (see IPS 2021 in Appendix 9-3). All other non-native plant species that are not listed on the Third Schedule will also be managed/eradicated in line with current guidelines where available (e.g. NRA 2010) under the advice/supervision of a suitably qualified/experienced Ecologist or Invasive Plant Specialist. The management of invasive plants will need to be incorporated into the final Construction and Environmental Management Plan for the project (see CEMP by AECOM 2021b in Appendix 2-3 of this EIAR).
- Existing trees/hedgerow being retained at/close to the development area will be protected in line with tree protection recommendations where relevant (e.g. Arbor Care 2019, Dermot Casey Tree Care 2021 and TMS 2021) as well as current guidelines (e.g. NRA 2006, BS 5837).
- Measures summarised in Section 9.6.1.1 above regarding potential surface-water related impacts and associated effects will be implemented to ensure protection of downstream water-features in the wider area (i.e. Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora.

9.6.2.2 Operational Phase

- Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing frequency; avoidance/reduction of pesticide/herbicide use within green areas; native supplementary planting at retained hedgerow sections; reduced hedgerow trimming frequency. This measure overlaps with operational phase mitigation for fauna below.
- As mentioned in Section 9.6.1.2 above, the surface-water drainage network (including hydrocarbon interceptors etc.) will be maintained on a regular basis in accordance with established guidelines. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation to downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora.

9.6.3 Fauna: Birds, Non-volant Mammals, Bats & Other Taxa

9.6.3.1 Construction Phase

- Subject to other environmental concerns (e.g. soil and water management) and as far as is reasonable, the removal of woody vegetation (scrub, hedgerow, trees) during site enabling/clearance/construction activities will not be undertaken during the bird nesting season (currently defined by the Irish Wildlife Acts 1976 – 2018 as March 1st to August 31st inclusive); this will protect nesting birds and eggs/chicks from disturbance (especially through nest failure), injury, fatality.
- In tandem with study site enabling/clearance/construction activities, a suitably qualified/experienced Ecologist will supervise/check areas where woody vegetation removal is due (e.g. hedgerow, scrub, woodland undergrowth) to identify potential unforeseen wildlife issues (e.g. unknown badger sett) so that appropriate measures can be undertaken in accordance with best practice guidelines and in consultation with NPWS where relevant.
- All trees due for felling that have been identified with potential to support bat roosts (as outlined in Table 9.6 of Section 9.4.6 above) or were inaccessible for visual assessment as part of this EIAR study (as outlined in Section 9.4.6 above) will be assessed in advance of felling by a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. BTHK 2018, Collins 2016). All such trees will be marked in the field to allow easy identification for all site staff and thereby ensure protection from inappropriate felling (e.g. erect a notice as per NRA 2005). The subsequent felling of all such trees to be undertaken under the advice/supervision of a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. NRA 2005) and in consultation with NPWS where relevant (e.g. derogation licence to remove bat tree roost; see NRA 2005).
- Where the removal of the unoccupied building will occur during the months of April to October inclusive, the building will be reassessed for bat roosting activity in advance of removal works by a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. BTHK 2018, Collins 2016). The subsequent demolition of the building will be undertaken under the advice/supervision of a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. NRA 2005) and in consultation with NPWS where relevant (e.g. derogation licence to remove bat roost; see NRA 2005).
- Where a fauna species is found actively using the development footprint for breeding/resting (e.g. bird nest, bat roosting, hedgehog) during site enabling/clearance/construction activities, relevant works will cease immediately and the area will be cordoned off until advice is sought from a suitably qualified/experienced Ecologist.

- Construction operations during the hours of darkness will be kept to a minimum; this will minimise disturbance to species that are roosting/resting or active at night.
- Where open excavations must be left in-situ overnight during the construction phase, measures will be taken to ensure that fauna such as mammals do not become inadvertently trapped and potentially injured within such open excavations. Such measures (covering, fencing off, allowing access/egress) will be decided under the advice of an Ecologist.
- The construction phase lighting scheme will be designed to minimise light spillage nuisance at retained/new woody vegetation features of the study site (i.e. hedgerow, tree line/groups, woodland/woodland edge) by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). This will benefit bats as well as other fauna active/resting at night.
- The final landscape plan will incorporate a native/non-native pollinator friendly dominant tree/shrub and ground flora planting scheme (in line with All Ireland Pollinator Plan recommendations and associated guidance such as NBDC 2016) that will result in a net gain of native tree/hedge/shrub planting, while also ensuring that new planting connects to woody habitat/other vegetation in order to maintain and provide connectivity for fauna via wildlife corridors. This is achieved by landscaping proposals for the proposed development here (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR).
- Measures summarised in Section 9.6.1.1 regarding potential surface-water related impacts and associated effects will be implemented to ensure protection of downstream water-features in the wider area (i.e. Lough Mahon (Harper's Island) transitional waterbody in this case) and associated fauna.-

9.6.3.2 Operational Phase

- Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing frequency; avoidance/reduction of pesticide/herbicide use within green areas; native supplementary planting at retained hedgerow sections; reduced hedgerow trimming frequency. This measure overlaps with operational phase mitigation for habitats and flora above.

- The operational phase lighting scheme will be designed to minimise light spillage nuisance at retained/new woody features (i.e. hedgerow, tree line/groups, woodland/woodland edge) by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). This will benefit bats as well as other fauna active/resting at night. The proposed lighting scheme achieves this by focusing lighting on areas where it is needed as much as possible (roads, streets, footpaths) and minimising spillage onto relevant retained/new woody features (i.e. hedgerow, tree line/groups, woodland/woodland edge) at the study site or the adjoining area (see AECOM 2021e and Glounthaune Development Public Lighting drawing by Lighting Reality in Appendix 9-6 of this EIAR). – in the event the proposed operational artificial lighting scheme will be changed, the revised scheme will also be reviewed by an Ecologist/Bat Specialist and altered accordingly under their advice.
- As mentioned in Section 9.6.1.2 above, the surface-water drainage network (including hydrocarbon interceptors etc.) will be maintained on a regular basis in accordance with established guidelines. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation to downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated fauna.
- Mammal access to the study site will be maintained (i) either through the incorporation of mammal access points at regular intervals (at least every 50-75m) along the proposed new outer boundary perimeter fencing (i.e. concrete post and concrete panel fence or weldmesh fence) or (ii) ensuring that a minimum gap of 200mm is maintained between the bottom of the perimeter fence and ground throughout. In the case where access points are incorporated into the perimeter fence at regular intervals, such mammal access points will be designed in accordance with standard guidelines for the provision of mammal access (e.g. DMRB 1997), where openings will be at least 250mm high x 220mm wide. Such measures will be designed to allow small and medium sized mammals to pass through freely under the advice and/or supervision of an ecologist.

9.7 MONITORING

9.7.1 Construction Phase Monitoring

A suitably qualified/experienced Ecologist will be engaged in the role of Ecological Clerk of Works (ECoW) for the construction phase of the project, whose role will include the following monitoring in relation to relevant proposed mitigation measures (as outlined in Section 9.6 above) through liaising with relevant experts/team-members where required;

- Ensure that the development works area/footprint is clearly marked out with no removal of habitats or movement of construction machinery outside of this area.
- Review final landscaping plan to ensure it is in line with/equivalent to proposed mitigation regarding native and non-native pollinator friendly dominant tree/hedge/shrub planting and wildlife corridor connectivity.
- Ensure that retained trees/hedgerow are adequately protected.
- Ensure that invasive plants are appropriately managed/eradicated in accordance with best practice (e.g. Invasive Species Management Plan for Third Schedule invasive plant species after IPS 2021 in Appendix 9-3).
- Ensure that measures outlined in Sections 6.4 and 6.6 of the Construction Management Plan by AECOM (2021b in Appendix 2-3 of this EIAR) and summarised in Section 9.6.1 above regarding potential surface-water related impacts and associated effects will be implemented to ensure protection of downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora and fauna.
- Ensure that the removal of woody vegetation features (scrub, hedgerow, trees) does not occur during the bird nesting season subject to other environmental concerns (e.g. soil and water management) and as far as is reasonable.
- Ensure that areas where woody vegetation removal is due (e.g. hedgerow, scrub, woodland undergrowth) are checked for unforeseen wildlife issues (e.g. unknown badger sett) with appropriate follow-up actions where required.
- Ensure that a pre-felling/removal assessment of bat roosting potential/activity in relation to relevant trees/buildings due for removal is undertaken, with subsequent protection and appropriate follow-up actions where required.
- Ensure that where a fauna species is found actively using the development footprint for breeding/resting (e.g. bird nest, bat roost) during site clearance/construction phase, relevant works are ceased immediately and that the area is cordoned off until appropriate follow-up actions are undertaken where required.
- Assess the potential for overnight open excavations to inadvertently trap mammals with appropriate follow-up actions where required.

- Review construction/operational phase lighting plan to ensure minimal light spillage nuisance on retained/new woody vegetation features of the study site (i.e. hedgerow, tree line/groups, woodland/woodland edge).
- Ensure that mammal access is correctly incorporated into proposed new outer boundary perimeter fencing comprising of concrete post and concrete panel fence or weldmesh fence.

9.7.2 Operational Phase Monitoring

The following operational stage monitoring will be undertaken in relation to relevant proposed mitigation measures (as outlined in Section 9.6 above) by engaging the relevant experts;

- Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified/experienced Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing frequency; avoidance/reduction of pesticide/herbicide use within green areas; native supplementary planting at retained hedgerow sections; reduced hedgerow trimming frequency.
- The surface-water drainage network (including hydrocarbon interceptors etc.) will be maintained on a regular basis in accordance with established guidelines (see AECOM 2021c in Appendix 2-1 of this EIAR). Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation to downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora and fauna.

9.8 CONCLUSION: RESIDUAL EFFECTS

The study site and associated proposed development works footprint is of lower to higher local biodiversity value overall. While the proposed development will require full or partial removal of some hedgerows of higher local value, it will primarily impact features of lower local value. However, the landscaping plan (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds in Appendix 4-5 of this EIAR) will compensate for hedgerow and tree loss through relatively extensive native-dominant tree/hedge planting that will result in a net gain of native woody features at the site overall. Furthermore, other areas of native/non-native pollinator friendly dominant planting will be established as part of landscaping proposals including shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers in line with All Ireland Pollinator Plan recommendations.

In relation to the proposed development, the spread of invasive plants is the only aspect identified with the potential for significant negative effects in the absence of mitigation. Various biodiversity related mitigation measures will be implemented as part of the proposed project that will also address the potential significant negative effects regarding the spread of invasive plants. Residual effects associated with potential ecological impacts arising from the proposed residential development (as discussed in Section 9.5 above) are considered;

- Neutral for designated sites in the wider area, where a NIS in support of the AA process has been undertaken in relation to Natura 2000 sites of relevance here (see Appendix 9-5).
- Neutral for the downstream water-features in the wider area (Lough Mahon (Harper's Island) and Lough Mahon transitional waterbodies in this case) and associated habitats/flora and fauna.
- Slight to moderate positive for habitats/flora overall at the study site as new planting/landscaping successfully matures into a native/non-native pollinator friendly dominant scheme with a net gain of native trees/hedgerow in line with All Ireland Pollinator Plan recommendations (e.g. NBDC 2016) **or** slight to moderate negative for habitats/flora overall at the study site where new planting/landscaping fails to successfully mature into a native/non-native pollinator friendly dominant scheme with a net gain of native trees/hedgerow in line with All Ireland Pollinator Plan recommendations (e.g. NBDC 2016).
- Moderate to significant positive for the study site and wider locality in general with the successful management/eradication of non-native invasive plants **or** moderate to significant negative for the study site and wider locality in general where management/eradication of invasive plants at the study site fails for whatever reason allowing for the spread of same.
- Slight to moderate positive for fauna at the study site in general where new planting/landscaping successfully matures into a native/non-native pollinator friendly dominant scheme with a net gain of native trees/hedgerow in line with All Ireland Pollinator Plan recommendations (e.g. NBDC 2016) **or** slight to moderate negative for fauna at the study site in general where new planting/landscaping fails to successfully mature into a native/non-native pollinator friendly dominant scheme with a net gain of native trees/hedgerow in line with All Ireland Pollinator Plan recommendations (e.g. NBDC 2016).
- Neutral for fauna (including bats and off-site waterbirds associated with Lough Mahon (Harper's Island) transitional waterbody) in relation to general on-going operational disturbance/displacement impacts including a lighting scheme that ensures artificial light spillage is minimal onto relevant woody features at the study site and adjoining area along with continued access for small and medium sized mammals.

9.9 REFERENCES

- AECOM. 2021a. Site Specific Flood Risk Assessment. Glounthaune SHD. Available in Appendix 8-1 of this EIAR.
- AECOM. 2021b. Outline Construction & Environmental Management Plan. Glounthaune SHD. Available in Appendix 2-3 of this EIAR.
- AECOM. 2021c. Glounthaune SHD Infrastructure Report. Available in Appendix 2-1 of this EIAR.
- AECOM. 2021d. Outline Construction and Demolition Waste Management Plan. Proposed Residential Development at Glounthaune, Co. Cork. Available in Appendix 2-2 of this EIAR.
- AECOM. 2021e. Proposed Residential Development, Glounthaune, Co. Cork. Site Lighting Design Proposal. Available in Appendix 9-6 of this EIAR.
- Arbor Care 2019. Tree Survey Report, Glounthaune, Co. Cork. Arbor-Care (Ltd) Professional Consulting Tree Service.
- Bang, P. & Dahlstrom, P. 2004. Animal Tracks and Signs. Oxford University Press, Oxford.
- Bat Conservation Ireland 2010. Bats and Lighting: Guidance Notes for Planners, Engineers, Architects and Developers. Bat Conservation Ireland (www.batconservationireland.org).
- BCT (Bat Conservation Trust) and ILP (Institution of Lighting Professionals). 2018. Bats and Artificial Lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18. England, UK.
- Bennett, A.F. 2003 (Second Edition). Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation. IUCN, Gland, Switzerland and Cambridge.
- BTHK. 2018. Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Pelagic Publishing, Exeter UK.
- CCC (Cork County Council). 2014. Cork County Development Plan 2014. Volume One: Main Policy Material.
- CCC (Cork County Council). 2017. Cobh Municipal District Local Area Plan. Volume 1, Main Document.
- CIEEM. 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM. 2019. Advice Note on the Lifespan of Ecological Reports & Surveys. CIEEM, UK.
- Clark, M. 1988. Badgers. Whittet Books, London.
- Collins J. (Ed.). 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.
- Cope, T. & Gray, 2009. A. Grasses of the British Isles. B.S.B.I Handbook No. 13. Botanical Society of the British Isles, c/o Department of Botany, The Natural History Museum, Cromwell Road, London SW7 5BH.
- Dermot Casey Tree Care 2021. Arboricultural Survey. Glounthaune, Co. Cork.
- DMRB 1997. Mitigating Against Effects on Badgers. UK Highways Agency. <http://www.standardsforhighways.co.uk/dmrb/vol10/section4/ha5992.pdf>
- EPA. 2017. Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Draft, August 2017. Environmental Protection Agency.
- Fitzpatrick, U., Murray, T.E., Byrne, A., Paxton, R.J. & Brown, M.J.F. 2006. The Regional Red List of Irish Bees. Queens University Belfast, Northern Ireland.
- Fossitt J.A. 2000. A Guide to Habitats in Ireland. Heritage Council, Kilkenny.
- Foulkes N., Fuller J., Little D., McCourt S. and Murphy P. 2013. Hedgerow Appraisal System – Best Practice Guidance on Hedgerow Survey, Data Collation and Appraisal. Woodlands of Ireland, Dublin.
- Gilbert, G., Stanbury A. and Lewis, L 2021. Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds 43: 1–22.
- Harrison P.A., Berry P.M., Simpson G., Haslett J.R., Blicharska M., Bucur M., Dunford R., Egoh B., Garcia-Llorente M., Geamăna N., Geertsema W., Lommelen E., Meiresonne L., Turkelboom F. 2014. Linkages Between Biodiversity Attributes and Ecosystem Services: A Systematic Review. Ecosystem Services 9 (2014) 191–203.
- IPS. 2021. Invasive Alien Plant Species: Site Assessment Report & Management Plan. Residential Development Lands, Lackenroe & Johnstown, Glounthaune, Co. Cork. Invasive Plant Solutions. For IDV Glanmire.
- Irish Water. 2021. Annual Environmental Report 2020. Cork City D0033-01.
- JNCC. 2004, Common Standards Monitoring Guidance for Terrestrial Mammals, Version August 2004, ISSN 1743-8160.
- Kelleher, C. & Marnell, F. 2006. Bat Mitigation Guidelines for Ireland. Irish Wildlife Manual No. 25.
- King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O’Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. 2011. Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Lockhart, N., Hodgetts, N. & Holyoak, D. 2012. Ireland Red List No.8: Bryophytes. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Lundy, M.G., Aughney, T., Montgomery, W.I. & Roche, N. 2011. Landscape Conservation for Irish Bats & Species Specific Roosting Characteristics. Bat Conservation Ireland.
- Lysaght, L. & Marnell, F. 2016. Atlas of Mammals in Ireland 2010-2015. National Biodiversity Data Centre, Waterford.
- Marnell, F., Looney, D. & Lawton, C. 2019. Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.
- Nairn, R. & Fossitt, J. 2004. The Ecological Impacts of Roads, and an Approach to their Assessment for National Roads Schemes. In: J. Davenport & J.L. Davenport (eds) The Effects of Human Transport on Ecosystems: Cars and Planes, Boats and Trains, 98-114. Royal Irish Academy, Dublin.
- NBDC (National Biodiversity Data Centre). 2016. Councils: Actions to Help Pollinators. All-Ireland Pollinator Plan, Guidelines 4. National Biodiversity Data Centre Series No.12, Waterford. November, 2016.
- Nelson, B., Ronayne, C. & Thompson, R. 2011. Ireland Red List No.6: Damselflies & Dragonflies (Odonata). National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
- NPWS. 2014a. Conservation Objectives: Cork Harbour SPA 004030. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
- NPWS 2014b. Conservation Objectives: Great Island Channel SAC 001058. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
- NRA (National Roads Authority; now TII). 2010. The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. Revision 1. December 2010.
- NRA (National Roads Authority, now TII). 2009. Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revision 2, 1st June, 2009. NRA, Dublin.
- NRA (National Roads Authority; now TII). 2006. Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post -Construction of National Road Schemes. National Roads Authority, Dublin.
- NRA (National Roads Authority; now TII). 2005. Guidelines for the Treatment of Bats during the Construction of National Road Schemes. National Roads Authority, Dublin.
- O’Neill, F.H., Brophy, J.T., Devaney, F.M., Nash, R. & Barron, S.J. 2014. Assessment of the Conservation Status of the Great Island Channel SAC (001058). Report for Cork County Council.

Parnell J. & Curtis T. 2012. Webb's An Irish Flora. 8th Edition. Cork University Press, Youngline Industrial Estate, Pouladuff Road, Togher, Cork, Ireland.

Perrin P.M. 2016. Irish Vegetation Classification (IVC). Community Synopsis. Ver.1. *Bolboschoenus maritimus* – *Agrostis Stolonifera* saltmarsh – swamp SM6A. www.biodiveristyireland.ie/ivc.

Perrin, P.M. 2019. Irish Vegetation Classification. ERICA. Engine for Relevés to Irish Community Assignment. V5.0. Users Manual. BEC Consultants Ltd., in association with the National Biodiversity Data Centre and the Department of Culture, Heritage and the Gaeltacht.

Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. 2010. Ireland Red List No. 4 – Butterflies. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

Reid, N., Dingerkus, S.K., Stone, R.E., Pietravallo, S., Kelly, R., Buckley, J., Beebee, T.J.C. & Wilkinson, J.W. 2013. National Frog Survey of Ireland 2010/11. Irish Wildlife Manuals, No. 58. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Roche, N., Aughney, T., Marnell, F. and Lundy M. 2014. Irish Bats in the 21st Century. Bat Conservation Ireland, Cavan.

Sandifer P.A., Sutton-Grier A.E., Ward B.P. 2015. Exploring Connections Among Nature, Biodiversity, Ecosystem Services, and Human Health and Well-Being: Opportunities to Enhance Health and Biodiversity Conservation. *Ecosystem Services* 12 (2015) 1–15.

Science for Environment Policy. 2015. Ecosystem Services and the Environment. In-depth Report 11 produced for the European Commission, DG Environment by the Science Communication Unit, UWE, Bristol. Available at: <http://ec.europa.eu/science-environment-policy>.

Shiel C.B., Shiel R.E. and Fairley J.S. 1999. Seasonal Changes in the Foraging Behaviour of Leisler's Bats (*Nyctalus Leisleri*) in Ireland as Revealed by Radio-Telemetry. *J. Zool., Lond.* (1999) 249, 347-358.

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

Stone, E.L. 2013. Bats and lighting: Overview of Current Evidence and Mitigation. University of Bristol.

Stroh, P.A. 2015. *Saxifraga granulata* L. Meadow Saxifrage. Species Account. Botanical Society of Britain and Ireland.

Sutherland W.J (Ed.). 1996. Ecological Census Techniques, a Handbook. Cambridge, UK.

TMS. 2021. Glounthaune SHD - South of Terrace Road, Glounthaune Co. Cork. Arboricultural Tree Report. Tree Management Services Arboriculture, Landscape and Forestry Consultants.

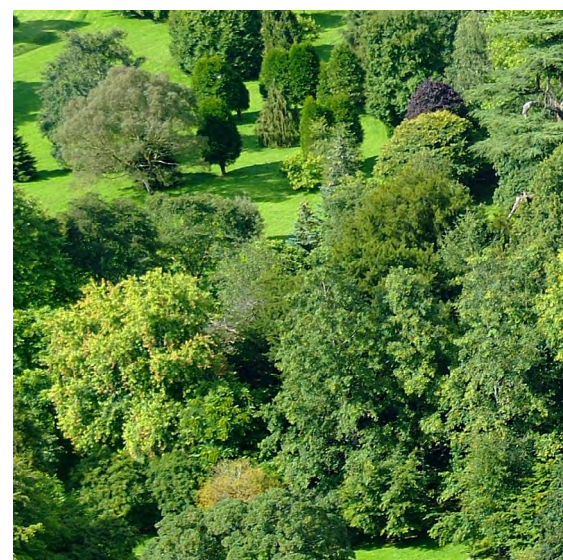
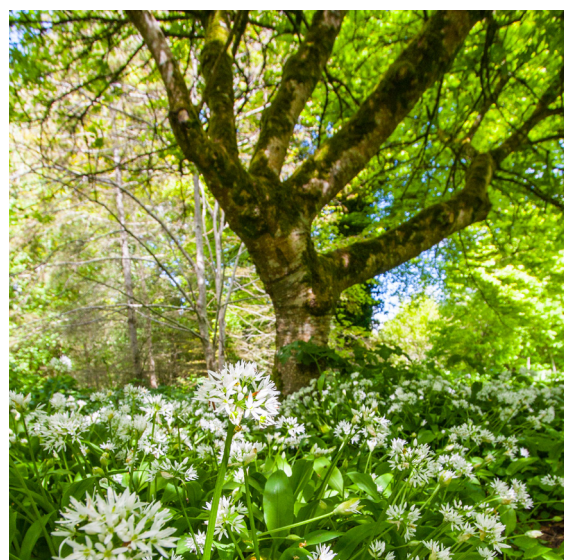
Wyse Jackson M., FitzPatrick Ú., Cole E., Jebb M., McFerran D., Sheehy Skeffington M. & Wright M. 2016. Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.



LACKENROE SHD

CHAPTER 10

Noise & Vibration



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LACKENROE SHD

CHAPTER 10

Noise & Vibration

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10 NOISE & VIBRATION

10.1 INTRODUCTION

This chapter of the EIAR has been prepared by AWN Consulting Limited (AWN) to assess the potential noise and vibration impact of the residential project described in detail in Chapter 2 of the EIAR. The assessment considers both the short-term construction phase and the long-term operational phase in terms of direct, indirect and cumulative noise and vibration impacts on the surrounding environment.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated with minimal impact on the receiving noise environment.

This chapter was prepared by Alex Ryan of AWN Consulting. Alex holds a BA, BAI and MAI in Mechanical and Manufacturing Engineering from Trinity College Dublin. At master's level, he specialised in aircraft noise reduction using aeroacoustic simulations. He is an associate member of the Institute of Acoustics. He has experience in the measurement and assessment of environmental noise including the preparation of noise and vibration impact assessments and EIARs (Noise and Vibration chapter). Furthermore, he has experience in acoustic measurement relating to environmental projects, infrastructure projects, wind farms and building acoustics.

10.2 METHODOLOGY

The assessment of effects 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 report. In addition to specific guidance documents for the assessment of noise and vibration effects, which are discussed further in the relevant sections, the following guidelines were considered and consulted for the purposes of this report:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017), and;
- Noise Action Plan 2018-2023 for the Cork Agglomeration Area.

The study has been undertaken using the following methodology:

- Environmental noise surveys have been conducted in the vicinity of the nearest noise-sensitive locations to assess the existing baseline noise environment;
- A review of the most applicable standards and guidelines has been carried out in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development;
- Predictive calculations have been performed to determine the noise and vibration impact on the nearest sensitive locations during the construction phase;
- Predictive calculations have been performed to determine the noise impact on the nearest noise-sensitive locations during the operational phase;
- A schedule of mitigation measures has been proposed for both the construction and operational phases to reduce, where necessary, the outward noise and vibration from the development;
- An assessment of the inward noise impact on the proposed development has been carried out, and;
- An assessment of cumulative impact has been carried out considering other developments in the vicinity.

10.3 ASSESSMENT CRITERIA

10.3.1 Construction Phase – Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. Construction noise sources include construction plant and machinery and construction related traffic on surrounding roads.

The British Standard BS 5228-1: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Noise* is referenced here for the purposes of setting appropriate construction noise limits for the development. This is the most widely accepted standard for this purpose

in Ireland. This document sets out a method whereby construction noise thresholds are determined based on ambient noise level. This method is summarised in Table 10.1.

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

Table 10.1: Threshold of potential significant effect at dwellings

- 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.

Ambient noise levels should be rounded to the nearest 5 dB before being compared to Category A values. This determines the appropriate category. Construction noise limits are then set according to the category definitions above. This method is commonly referred to as the 'ABC' Method.

10.3.2 Construction Phase – Vibration

BS 7385 - 2 (BSI 1993) gives guidance regarding acceptable vibration in order to avoid damage to buildings. BS 5228 - 2 (BSI 2014b) reproduces these same guidance values.

These standards differentiate between transient and continuous vibration. Surface construction activities are transient because they occur for a limited period of time at a given location. Both documents recommend that, for soundly constructed residential property and similar light framed structures

that are generally in good repair, a threshold for minor or cosmetic damage (i.e. non-structural damage) should be taken as a PPV (in frequency range of predominant pulse) of 15mm/s at 4 Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5mm/s PPV the risk of damage tends to zero. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in BS 5228 - 2 (BSI 2014b) Table B.2 might need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. 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 groundborne disturbance. The vibration limit range for protected and historical buildings is 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. For other structures and buildings that are determined to be potentially vulnerable to vibration due to significant structural defects, a further stringent criteria has been applied for transient vibration. It is assumed that known buildings and structures of this kind will be subject to condition surveys well in advance of the works and any defects identified repaired. The results of conditions surveys will determine whether a building or structure is classed as "vulnerable". Table 10.2 sets out the limits as they apply to vibration frequencies at 4 Hz where the most conservative limits are required. At higher frequencies, the relevant limit values for transient vibration within Table B.2 and Figure B.1 of BS5228-2 (BSI 2014b) will apply, with similar reductions applied for continuous vibration and those for protected structures. For line 2 of Figure B.1 at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded. Taking the above into consideration the vibration criteria for building response is set out in Table 10.2.

Vibration Limits for Buildings (PPV) at the closest part of building to the source of vibration at a frequency of 4Hz		
Building Type	Transient Vibration	Continuous Vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s	25 mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15 mm/s	7.5 mm/s
Protected and Historic Buildings ^{Note 1}	6 mm/s - 15 mm/s	3 mm/s - 7 mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3 mm/s	

Table 10.2: Recommended construction vibration thresholds for buildings

Note 1: The relevant threshold value to be determined on a case by case basis. Where sufficient structural information is unavailable at the time of assessment, the lower values within the range will be used, depending on the specific vibration frequency.

BS 5228-2 also provides guidance relating to the human response to vibration. Guidance is again provided in terms of PPV in mm/s since this parameter is routinely measured when monitoring the structural effects of vibration. The potential human response at different vibration levels, as set out in BS 5228-2, is summarised in Table 10.3.

Vibration level ^{Note} A) B) C) (mm/s)	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

Table 10.3: Guidance on human response to vibration levels

- A) The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.
- B) A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
- C) Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment.

10.3.3 Operational Phase – Building Services Plant

In the case that heating, cooling or other active process is carried out on site, there is the potential for additional plant noise to be introduced to the environment. To assess this, reference is made here to the British Standard BS 4142: 2014: *Methods for Rating and Assessing Industrial and Commercial Sound*. This standard can be used to assess the impact of a new continuous source to a residential environment and is used commonly by local authorities in their standard planning conditions and also in complaint investigations.

The method for assessing plant noise set out in BS 4142 is based on the following definitions:

- “Specific noise level, $L_{Aeq, T}$ ” is the equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T. This level has been determined with reference to manufacturer’s information for specific plant items;
- “Rating level, $L_{Ar, T}$ ” is the specific noise level plus adjustments for the character features of the sound (if any);
- “Residual noise level, $L_{Aeq, T}$ ” is the noise level produced by all sources excluding the sources of concern, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval, T;
- “Background noise level, $L_{A90, T}$ ” is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T. This level is expressed using the LA90 parameter. These levels were measured as part of the baseline survey.

Adjustments to the rating level are appropriate where noise emissions are found to be tonal, impulsive in nature or irregular enough to attract attention. In these cases, penalties are applied of either an additional 2 dB, 4 dB or 6 dB depending on how perceptible the tone is at the noise receptor.

The background level should then be subtracted from the rating level. The greater this difference, the greater the magnitude of the impact will be, in general. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, while a difference of around +5 dB is likely to be an indication of an adverse impact (as referred to in BS 4142), depending on the context.

In relation to day-to-day operational phase noise impacts on off-site residential locations, local authorities would typically apply the following condition to a development of this nature:

Noise levels from the proposed development shall not be so loud, so continuous, so repeated, of such duration or pitch or occurring at such times as to give reasonable cause for annoyance to a person in any premises in the neighbourhood or to a person lawfully using any public place. In particular, the rated noise levels from the proposed development shall not constitute reasonable grounds for complaint as provided for in BS 4142. Method for rating industrial noise affecting mixed residential and industrial areas. This is to ensure a satisfactory standard of development, in the interests of residential amenity.

This wording is most relevant to the noise emissions from mechanical plant serving the Proposed Project and careful consideration will be given to this issue as part of the detailed assessment.

10.3.4 Operational Phase – Additional Traffic on Surrounding Roads

Vehicular movement to and from the proposed development, such as associated trucks and staff car trips, 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: Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (UK Highways Agency et al, 2020); and Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017). Table 9.4 relates changes in noise level to impact on human perception based on the guidance contained in these documents.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0	Inaudible	No impact	Imperceptible
0.1 – 2.9	Barely Perceptible	Negligible	Not significant
3 – 4.9	Perceptible	Minor	Slight, Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very significant

Table 10.4: Classification of magnitude of noise impacts in the long term

10.3.5 Operational Phase – Deliveries and Waste Collections

In a residential development, such as the one under consideration, there is the potential for noise sources relating to deliveries and waste collection. Acceptable noise limits for these sources, both internally and externally, can be determined by referring to the British Standard BS 8233: 2014: *Guidance on Sound Insulation and Noise Reduction for Buildings*. The following guidance, summarised in Table 10.5, is provided in this standard for internal ambient noise levels in dwellings:

Activity	Location	Daytime (07:00 to 23:00hrs)	Night (23:00 to 07:00hrs)	Derived External Levels
Resting	Living room	35 dB L _{Aeq, 16hr}	-	50 dB L _{Aeq, 16hr}
Dining	Dining room	40 dB L _{Aeq, 16hr}	-	55 dB L _{Aeq, 16hr}
Sleeping (daytime resting)	Bedroom	35 dB L _{Aeq, 16hr}	30 dB L _{Aeq, 8hr}	50 dB L _{Aeq, 16hr} (45 dB L _{Aeq, 8hr} at night)

Table 10.5: Guidance on Indoor Ambient Noise Levels for Dwellings

The derived external levels are based on the approximate attenuation provided by a partially open window of 15 dB, as advised in BS 8233, and represent the appropriate noise level at the external façade of the building.

10.3.4 Operational Phase – Vibration

The development is residential in nature, therefore, it is not anticipated that there will be any outward impact associated with vibration for the operational phase.

10.4 RECEIVING ENVIRONMENT

Environmental noise surveys have been conducted at the site (shown in Figure 10.1) in order to quantify the existing noise environment. The surveys were conducted in general accordance with ISO 1996: 2017 *Acoustics – Description, measurement and assessment of environmental noise*.

10.4.1 Baseline Noise Survey Locations

The measurement locations were selected to represent the noise environment at noise-sensitive locations surrounding the proposed development. The selected locations are shown in Figure 10.1 and described as follows:

- AT01** Attended location selected to capture the daytime noise environment at the properties to the north of the site.
- AT02** Attended location selected to capture the daytime noise environment at the properties to the west of the site.
- AT03** Attended location selected to capture the daytime noise environment at the properties to the south of the site.
- AT04/UN02** Selected to capture the daytime and night-time noise environment at the southern end of the site. Both attended and unattended measurements were carried out at this location. Note that the unattended meter was set back 10 m from the attended location.
- UN01** Unattended location selected to capture the daytime and night-time environment to the north and west of the site.

Figure 10.1: Baseline noise survey locations (Google Earth, 2021)



10.4.2 Survey Periods

All attended noise measurements were conducted between 10:00 and 17:00 on Wednesday 9 June 2021.

Unattended noise measurements were conducted between 11:00 on Wednesday 9 June and 14:00 on Thursday 10 June 2021.

Weather conditions during attended surveys were dry and overcast with temperatures between 16 and 17 degrees Celsius. Wind speeds were below 5 m/s and representative of suitable noise surveying conditions.

Weather conditions during unattended surveys were dry and overcast with temperatures between 14 and 17 degrees Celsius.

10.4.3 Personnel and Instrumentation

AWN installed and collected the noise monitoring equipment. The following instrumentation was used in conducting the noise surveys:

Equipment	Type	Serial Number	Calibration Date	Calibration Due
Sound Level Meter	Brüel & Kjaer 2250L	3008402	4/11/2019	4/11/2021
Sound Level Meter	Rion NL-52	164427	5/5/2020	5/5/2022
Sound Level Meter	Rion NL-52	564808	15/9/2020	15/9/2022

Table 10.6: Instrumentation details

10.4.4 Noise Measurement Parameters

The noise survey results are presented in terms of the following parameters:

- L_{Aeq}** is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- L_{A10}** is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- L_{A90}** is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.
- L_{AFmax}** is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.
- L_{AFmin}** is the instantaneous minimum sound level measured during the sample period using the 'F' time weighting.

The "A" suffix for the noise parameters 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 2×10^{-5} Pa.

10.4.5 Survey Results

The results of the attended daytime noise surveys at AT01, AT02, AT03 and AT04 are summarised in Table 10.7, Table 10.8, Table 10.9 and Table 10.10, respectively. It should be noted that a logarithmic average is used for the L_{Aeq} parameter, while an arithmetic average is used for the L_{A10} and L_{A90} parameters.

AT01

Start Time	Measured Noise Levels (dB)				
	L _{Aeq}	L _{AFmax}	L _{AFmin}	L _{A10}	L _{A90}
10:51	50	54	43	51	47
13:27	49	58	45	50	48
15:02	49	59	46	50	48

Table 10.7: Summary of attended daytime noise measurements at AT01

The main noise sources at this location were road traffic from N25 and L3004 and birdsong.

AT02

Start Time	Measured Noise Levels (dB)				
	L _{Aeq}	L _{AFmax}	L _{AFmin}	L _{A10}	L _{A90}
11:35	49	57	45	50	47
13:50	50	64	45	51	47
15:22	48	55	45	50	47

Table 10.8: Summary of attended daytime noise measurements at AT02

The main noise sources at this location were road traffic from N25 and L3004 and birdsong.

AT03

Start Time	Measured Noise Levels (dB)				
	L _{Aeq}	L _{AFmax}	L _{AFmin}	L _{A10}	L _{A90}
11:58	52	59	48	54	50
14:10	51	57	47	53	49
15:42	51	58	47	53	50

Table 10.9: Summary of attended daytime noise measurements at AT03

The main noise sources at this location were road traffic from N25 and L3004 and birdsong.

AT04

Start Time	Measured Noise Levels (dB)				
	L _{Aeq}	L _{AFmax}	L _{AFmin}	L _{A10}	L _{A90}
12:29	59	73	54	61	56
14:40	60	73	54	61	57
16:19	59	83	53	61	56

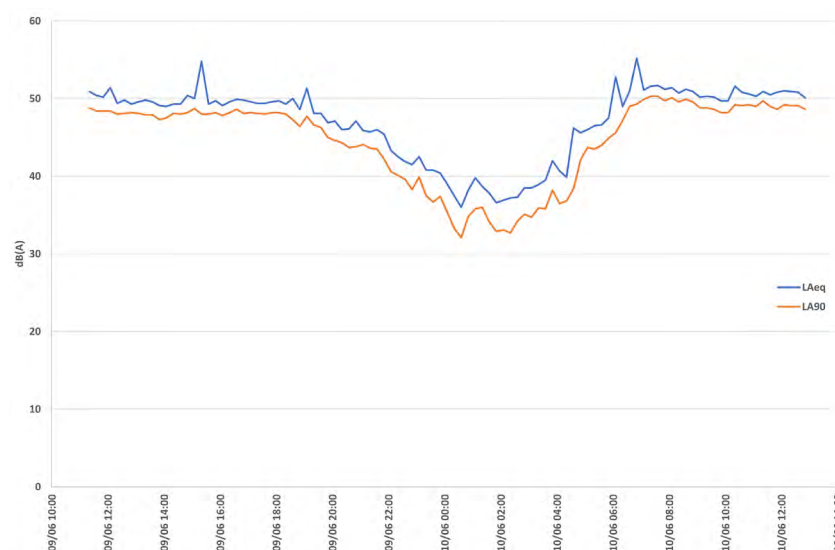
Table 10.10: Summary of attended daytime noise measurements at AT04

The main noise sources at this location were road traffic from N25 and L3004 and birdsong.

The results of the unattended noise surveys at UN01 and UN02 are plotted in Figure 10.2 and Figure 10.3 and are summarised in Table 10.11 and Table 10.12, respectively. Once again, a logarithmic average is used for the L_{Aeq} parameter, while an arithmetic average is used for the L_{A10} and L_{A90} parameters.

UN01

Figure 10.2: Time history plot of L_{Aeq} and L_{A90} at UN01



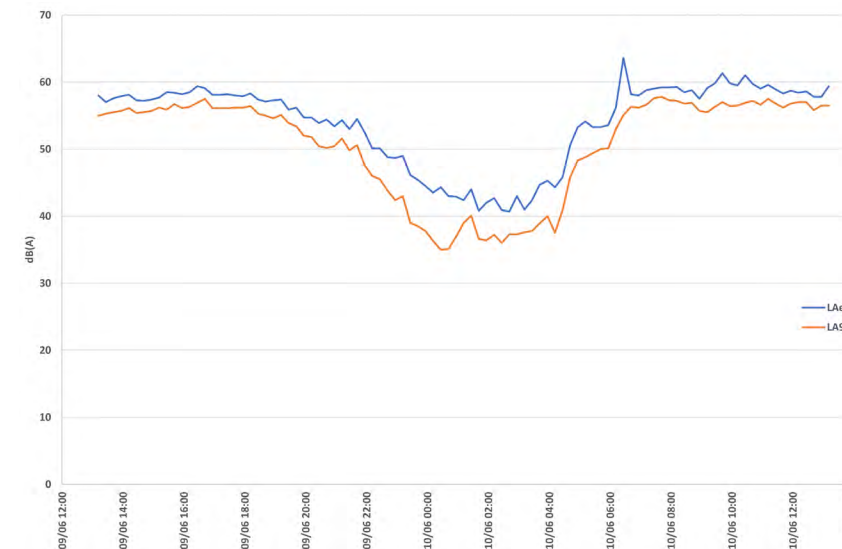
Date	Average Daytime Level	Background Daytime Level	Average Night-time Level	Background Night-time Level
	L _{Aeq,16hr}	L _{A90,16hr}	L _{Aeq,8hr}	L _{A90,8hr}
09/06/2021	49	46	46	38

Table 10.11: Summary of unattended noise measurements at UN01

The main noise sources at this location were road traffic from N25 and L3004 and birdsong.

UN02

Figure 10.3: Time history plot of LAeq and LA90 at UN02



Date	Average Daytime Level	Background Daytime Level	Average Night-time Level	Background Night-time Level
	L _{Aeq,16hr}	L _{A90,16hr}	L _{Aeq,8hr}	L _{A90,8hr}
09/06/2021	57	53	52	42

Table 10.12: Summary of unattended noise measurements at UN02

The main noise sources at this location were road traffic from N25 and L3004 and birdsong.

10.5 CHARACTERISTICS OF THE DEVELOPMENT

Phase 2 of the proposed mixed-use residential development is located in Lackenroe, Glounthaune, Co. Cork and comprises 289 residential units consisting of 201 dwelling houses and 88 apartments, and a 2-storey creche. A full description of the development is available in Chapter 2. When considering a development of this nature, the potential noise and vibration impact on the surroundings must be considered for each of two distinct stages:

- Construction phase, and;
- Operational phase.

During the construction phase, the main source of noise and vibration will be plant items operating on site for the purposes of construction. During the operational phase, the main potential sources of outward noise from the development will be mechanical and electrical plant used to service the buildings, additional traffic on surrounding roads and deliveries and waste collections.

10.6 POTENTIAL IMPACTS OF THE DEVELOPMENT

10.6.1 Construction Phase

The largest noise and vibration impact of the proposed development will occur during the construction phase due to the operation of various plant machinery and HGV movements to, from and around the site. However, the construction phase can be classed as a short-term phase (approximately four years in duration).

The nearest noise-sensitive locations to the site are described as follows (distances refer to the nearest point of the development):

- Residential property 10 m from the site boundary at the northern end;
- Residential property 10 m from the site boundary at the western end;
- Residential property 10 m from the site boundary at the south-eastern end;
- Residential property 10 m from the site boundary at the south-western end.

Thresholds for significant noise from construction can be determined by referring to Table 10.1 (BS 5228-1) and the baseline ambient noise levels, as outlined in the assessment criteria section. These thresholds are shown in Table 10.13. A night-time threshold is not included as construction work

will not be taking place at night. Note that the BS 5228-1 method is only valid for residential properties, therefore, the higher threshold of 75 dB $L_{Aeq,T}$ is deemed appropriate for commercial premises.

Location	Period	Significance Threshold
Noise-sensitive locations	Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65 dB $L_{Aeq,T}$
Commercial premises	Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	75 dB $L_{Aeq,T}$

Table 10.13: Significance thresholds for construction noise

Based on the ‘ABC’ method described in BS 5228-1 and shown in Table 10.1, all noise-sensitive locations (NSLs) are in Category A.

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation and loading lorries (dozers, tracked excavators and wheeled loaders) reach a maximum of 81 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10 m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10 m. This worst-case scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other.

Guidance on the approximate attenuation achieved by barriers surrounding the site is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

The latter scenario can be assumed in this case due to the proximity of the noise-sensitive locations, i.e. a barrier height will be chosen so as to completely hide the source. Table 10.14 shows the potential noise levels calculated at various distances based on the assumed sound power level and attenuation provided by the barrier of 10 dB.

Description of Noise Source	Calculated noise levels at varying distances (dB $L_{Aeq,T}$)				
	10	20	30	50	100
3 no. items each with SPL of 81 dB at 10 m operating simultaneously.	76	70	66	62	56

Table 10.14: Potential construction noise levels at varying distances assuming attenuation of 10 dB from site barrier

The calculated noise levels in Table 10.14 show that the significance thresholds for construction noise set out in Table 10.13 are exceeded at distances within 30 m of areas of ongoing construction work. The closest NSLs are at 10 m. At this distance, in the worst-case scenario described above, the noise level may be as high as 76 dB. This indicates that mitigation measures will be necessary to prevent likely significant impacts at the noise-sensitive locations. Mitigation measures are set out in Section 10.7.

A commercial premises is located close to the works boundary, approximately 10 m, and, therefore, may require additional mitigation to prevent exceeding the significance threshold of 75 dB $L_{Aeq,T}$ set out above. The mitigation measures set out in Section 10.7 should be followed to reduce the likelihood of a significant impact.

In terms of the potential vibration impact during the construction phase, the grotto located to the north-east of the apartment block (at the southern end of the site) has been identified as a vulnerable structure and, therefore, the vibration threshold of 3 mm/s PPV recommended in BS 7385 and BS 5228 applies to it (see Section 10.3). There is potential for this threshold to be exceeded during the construction phase of the apartment block due to necessary rock breaking works. Therefore, it will be necessary to carry out vibration monitoring during this phase to ensure that the threshold of 3 mm/s PPV is not exceeded.

10.6.2 Operational Phase

The main potential sources of outward noise from the development during the operational phase will be mechanical and electrical plant used to service the buildings, additional traffic on surrounding roads and deliveries and waste collections.

10.6.3 Operational Phase – Building Services Plant

BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound sets out a method for assessing the impact of a new continuous noise source to a residential environment such as plant items used to service the buildings of the proposed development. It states that if the rating level of the item exceeds the background noise level by 5 dB, an adverse impact is likely to occur, while an exceedance of 10 dB is likely to cause a significant adverse impact, depending on the context.

The background noise level at the boundaries of the site were determined through baseline noise surveys. Background noise levels during the day were in the range 46 to 57 dB $L_{A90,15min}$. During the night, the minimum background noise level was 32 dB $L_{A90,15min}$.

Based on the above, it is recommended that cumulative plant noise from mechanical plant associated with the development does not exceed 32 dB $L_{Aeq,15min}$ and does not contain audible tones at any noise sensitive locations.

The location or type of building services plant has not yet been established, therefore it is not possible to calculate the potential noise levels. In this instance, it is best practice to use the above guidance (BS 4142) to inform the detailed design during the selection and layout of building services for the development.

Plant items will be selected, designed and located so that there is no negative impact on noise-sensitive locations.

10.6.4 Operational Phase – Additional Traffic on Surrounding Roads

Traffic to and from the Proposed Development will make use of the existing road network. Therefore, it is considered appropriate to assess the noise impact of increases in traffic volumes on these roads. In Chapter 5 Traffic and Transportation, changes to Annual Average Daily Traffic (AADT) are predicted for the opening year (2026). Table 10.15 presents these changes in relation to the affected links for the AM period. Table 10.16 presents these changes for the PM period. Approximate corresponding changes to noise level are also presented in Table 10.15 and Table 10.16.

Road Link	AADT for Opening Year (2026) for the AM Period		
	Without Development	With Development	Increase
Glounthaune Road (North)	3690	4050	9.8% (+0.4 dB)
Glounthaune Road (Middle)	3860	4930	27.7% (+1.1 dB)
The Terrace	2090	2190	4.8% (+0.2 dB)
Glounthaune Road (South)	3950	4500	13.9% (+0.6 dB)
Johnstown Close (West)	7760	8140	4.9% (+0.2 dB)
Johnstown Close (East)	6460	6620	2.5% (+0.1 dB)

Table 10.15: Predicted changes to AADT with and without the development in place for the AM period

Road Link	AADT for Opening Year (2026) for the PM Period		
	Without Development	With Development	Increase
Glounthaune Road (North)	2450	2600	6.1% (+0.3 dB)
Glounthaune Road (Middle)	2580	3190	23.6% (+0.9 dB)
The Terrace	780	920	17.9% (+0.7 dB)

Glounthaune Road (South)	3230	3470	7.4% (+0.3 dB)
Johnstown Close (West)	6650	6780	2.0% (+0.1 dB)
Johnstown Close (East)	5530	5640	2.0% (+0.1 dB)

Table 10.16: Predicted changes to AADT with and without the development in place for the PM period

With reference to Table 10.4 (DMRB), for the Opening Year 2026, the predicted change in noise level associated with additional traffic due to the proposed development has a negligible effect. The impact is therefore imperceptible and long term.

10.6.5 Operational Phase – Deliveries and Waste Collections

The internal layout of the proposed development has been designed to accommodate incoming service requirements such as deliveries and waste collection. Set-down spaces will be provided to accommodate this.

Waste collection from the apartment building within the proposed development will be organised and facilitated by the management company responsible for the upkeep of the proposed development's communal areas. Waste collection from the dwelling houses within the proposed development will be the responsibility of the individual householders who will engage an authorised waste collector for this purpose. As such, waste collection will follow a similar pattern to that of the existing surrounding area (e.g. weekly collections) and is not expected to result in a significant noise impact.

Due to the expected frequency of waste collection and deliveries to the proposed development, based on the number of residents, and since the proposed development has been designed to accommodate these services, deliveries and waste collection will not result in a significant noise impact on the surrounding area.

10.7 REMEDIAL AND MITIGATION MEASURES

10.7.1 Construction Phase

BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites Parts 1 and 2 provide guidance on noise and vibration control in the context of construction. The control of noise from construction works can be divided into two categories:

- Controlling the noise at source, and;
- Controlling the spread of noise.

Mitigation measures that will be employed in order to control construction noise at its source include the following:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise;
- Minimise drop height of materials;
- Start up plant and vehicles sequentially rather than all together;
- The normal operating hours of the site will be adhered to. This also applies to the movement of plant onto and around the site;
- The plant and activities chosen to carry out the construction work will be the quietest available means of achieving the required purpose;
- Modifications may be made to plant and equipment, if appropriate, for noise attenuation purposes, provided the manufacturer has been consulted. For example, a more effective exhaust silencer may be fitted to a diesel engine;
- As far as is reasonably practicable, sources of significant noise will be enclosed provided that ventilation and potential hazards to operators have been considered;
- Plant and noisy activities will be located away from noise-sensitive areas where practicable and sources of directional noise should be oriented away from noise-sensitive areas;
- All plant and equipment will be regularly maintained (increases in plant noise are often indicative of future mechanical failure).

Mitigation measures that will be employed in order to control the spread of construction noise include the following:

- The distance between noise sources and noise-sensitive areas will be increased as much as is reasonably practicable;

Where noise control at source is insufficient and the distance between source and receiver is restricted, screening will be implemented. The location of barriers providing screening is an important consideration. Barriers will be located either close to the source of noise (as with stationary plant) or close to the listener. The height of the barrier must also be considered. BS 5228-1 states that an approximate attenuation of 5 dB is achieved when the top of the plant is just visible to the receiver over the noise barrier, while an attenuation of 10 dB is achieved when the noise screen completely hides the sources from the receiver. A barrier height will be chosen so as to completely hide the source at least along the boundaries adjacent to the commercial premises. Furthermore, where the noise source is 1 m from the façade of a building, an allowance of +3 dB will be made for reflection.

Mitigation measures that will be employed in order to control vibration from construction works, with reference to BS 5228-2, include the following:

- The plant and activities chosen to carry out the construction work will be chosen to cause as little vibration as possible while achieving the required purpose;
- All plant and equipment will be regularly maintained to reduce unnecessary vibration;

Activities causing significant vibration will be located away from sensitive areas and/or isolated using resilient mountings where practicable;

Vibration monitoring will be carried out at the grotto site located to the north-east of the apartment block (southern end of the site) to ensure the applied threshold is not exceeded since the grotto has been identified as a vulnerable structure.

10.7.2 Operational Phase – Building Services Plant

At the detailed design stage, best practice measures relating to building services plant will be taken to ensure there is no significant noise impact on noise-sensitive locations. Best practice measures in this context include the following:

- Where ventilation is required for plant rooms, consideration will be given to acoustic louvers or attenuated acoustic vents, where required, to reduce noise breakout;
- Ventilation plant serving plant rooms and car parks will be fitted with effective acoustic attenuators to reduce noise emissions to the external environment;
- The use of perimeter plant screens will be used, where required, for roof-top plant areas to screen noise sources;
- The use of attenuators or silencers will be installed on external air-handling plant;
- All mechanical plant items, e.g. fans, pumps etc., shall be regularly maintained to ensure that excessive noise generated by worn or rattling components is minimised;
- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document;
- Installed plant will have no tonal or impulsive characteristics when in operation.

10.7.3 Operational Phase – Additional Traffic on Surrounding Roads

As discussed in Section 10.6.4, it is predicted that the changes to traffic flows associated with the proposed development will not result in a significant increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary.

10.7.4 Operational Phase – Deliveries and Waste Collections

Based on the assessment in Section 10.6.5, it is not expected that deliveries and waste collections are likely to cause a significant impact. Therefore, no mitigation measures are necessary.

10.8 CUMULATIVE IMPACT

The risk of cumulative noise impact pertains to Phase 1 of the Proposed Development, the construction of which has recently commenced. There is potential for the construction phase of Phase 1 and Phase 2 to coincide. However, the worst-case assessment of construction noise presented in Section 10.6.1 will still apply in this scenario since it is not expected that the number of plant items operating at the closest works boundary to NSLs will exceed the worst-case assumptions in this chapter in the case that the construction phases coincide.

As a result, the predicted cumulative impact is considered to be temporary to short-term, negative and not significant.

10.9 INTERACTIONS

In compiling this impact assessment, reference has been made to the project description provided by the project co-ordinators, project drawings provided by the project architects and traffic flow projections associated with the development provided by the traffic consultants. Furthermore, this chapter has informed the Biodiversity and Population and Human Health chapters.

10.10 INWARD IMPACT

For the proposed development, the potential sources of inward noise are road traffic from N25, L3004 and the surrounding road network. The baseline noise surveys carried out, summarised in Section 10.4, indicate that road traffic noise dominates the noise environment of the site.

10.10.1 Methodology

The approach taken is that recommended in the Professional Guidance on Planning & Noise (ProPG) document published in May 2017. This is the most relevant and recent document used to assess new residential developments in an area with an existing climate of environmental noise. ProPG is a systematic, proportionate, risk-based, 2-stage approach. Stage 1 is an initial noise risk assessment of the proposed development site. Stage 2 is a systematic consideration of the following four elements:

- Demonstrating a good acoustic design process;
- Observing internal noise level guidelines;
- Undertaking an external amenity area noise assessment;
- Consideration of other relevant issues.

Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the proposed site. The selected software, Brüel & Kjær Type 7810 Predictor, calculates noise levels in accordance with the ISO 9613: *Acoustics – Attenuation of sound during propagation outdoors*.

The following information was included in the model:

- Site layout drawings of the proposed development;
- OS mapping of the surrounding environment.

10.10.2 Model Calibration

The results of the baseline noise surveys were used to calibrate the model. A strong agreement was achieved, as shown in Table 10.17.

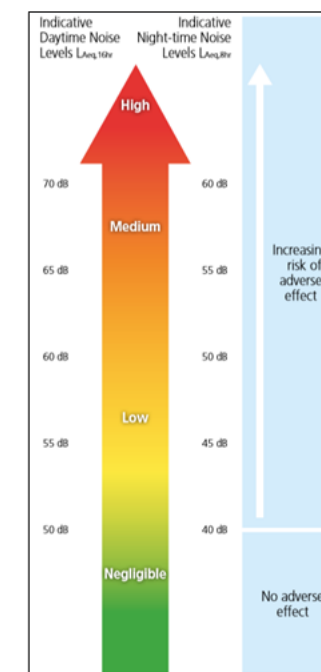
Location	Period	Measured (dB L _{Aeq})	Predicted (dB L _{Aeq})
AT01	Daytime	49	49
AT02	Daytime	49	49
AT03	Daytime	52	50
AT04	Daytime	59	59
UN01	Daytime	50	51
	Night-time	46	44
UN02	Daytime	58	60
	Night-time	52	52

Table 10.17: Demonstration of model calibration using baseline noise survey results

10.10.3 Stage 1 Assessment

Figure 10.4, taken from the ProPG document, outlines the recommended method of assigning risk relating to adverse noise effects.

Figure 10.4: ProPG initial noise risk assessment

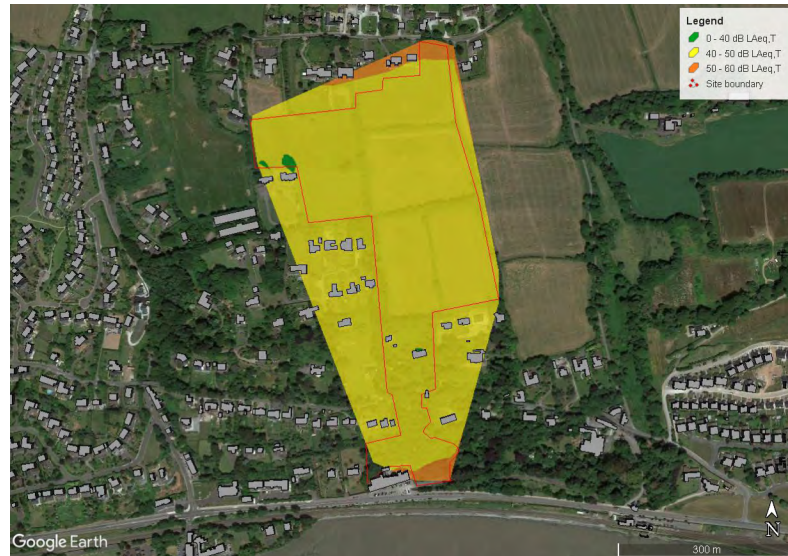


In order to assess the level of risk associated with the proposed development, the current noise model was used to calculate the daytime and night-time noise level across the cleared site. The results of this calculation are presented using contours in Figure 10.5 and Figure 10.6.

Figure 10.5: Daytime noise level across the cleared site



Figure 10.6: Night-time noise level across the cleared site



Based on the ProPG risk assessment method outlined in Figure 10.4 and the calculated daytime and night-time noise levels, the majority of the site is considered to be negligible to low risk while the extreme southern end of the site is considered to be medium risk (orange contour band in Figure 10.5 and Figure 10.6). For the night-time period, the extreme northern end of the site is also considered to be medium risk. The Stage 2 assessment in the following section will focus on the medium risk portions of the site. The following pre-planning application advice is provided in the ProPG document in relation to medium risk sites:

“The site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.”

The noise model was updated to incorporate the proposed buildings in order to determine noise levels across the site taking into account the screening effect of the new buildings and to determine specific noise levels at the most exposed residential facades. The results of this model showing the daytime and night-time noise levels across the site with the development in place are provided in Figure 10.7 and Figure 10.8. The noise levels shown in these figures were calculated at a height of 4 m.

Figure 10.7: Daytime noise level across the site with the development in place



Figure 10.8: Night-time noise level across the site with the development in place



With the development in place, the majority of the site is predicted to be in the negligible risk category for both the daytime and night-time periods. During the daytime, the façade of the proposed apartment building at the extreme southern end of the site is shown to be in a medium risk zone. During the night-time, the apartment building façade as well as the facades of the two northern-most houses are shown to be in medium risk zones.

10.9.4 Stage 2 Assessment

Element 1 – Good Acoustic Design Process

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life of occupants or compromising other sustainable design objectives. Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

- Check the feasibility of relocating or reducing noise levels from relevant sources;
- Consider options for planning the site or building layout;
- Consider the orientation of proposed building(s);
- Select construction types and methods for meeting building performance requirements;
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc;
- Assess the viability of alternative solutions, and;
- Assess external amenity area noise.
- In the context of the proposed development, each of the considerations listed above have been addressed in the following subsections.
- Relocation or Reduction of Noise from Source

Noise sources incident upon the development site have been determined to be medium risk one location during the day and two locations during the night. The majority of the site has been determined to be negligible to low risk. With regards to road noise, this source is located outside the redline boundary of the site and therefore it is beyond the scope of this development to introduce any noise mitigation at source. Screening proposed as part of landscaping works will benefit noise levels across the site at ground level but will have no significant benefit in terms of residential units at upper levels that retain a direct line of sight to L3004.

Planning, Layout and Orientation

As part of the project design, the proposed buildings are set back from the road boundary. The orientation of the site is such that the buildings themselves screen the common external amenity areas associated with the development.

Select Construction Types for meeting Building Regulations

The design of all buildings is required to meet with all relevant parts of the Building Regulations. The specific detail of which will be completed at detailed design stage. In terms of the building sound insulation, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade. For the purposes of this assessment it is assumed that the building will be ventilated by heat recovery units therefore removing the need to open windows to ventilate living spaces.

Consideration will therefore be given to the provision of sound insulation performance for glazing, where required to achieve suitable internal noise levels within the development. Achievement of acceptable internal ambient noise levels does not form part of building regulation requirements. However, this will be incorporated into the building design in line with best practice and compliance with the guidance set out in ProPG.

Impact of noise control measures on fire, health and safety etc.

The good acoustic design measures that have been implemented on site, e.g. locating properties away from the road are considered to be cost neutral and do not have any significant impact on other issues.

Assess Viability of Alternative Solutions

The main noise source incident on the site is road traffic. This source is largely mitigated by the distance to the building, screening by the on-site building and orientation of building layouts to avoid overlooking of sensitive amenity spaces to the main noise sources. All the measures listed above aid in the control of noise intrusion to the buildings across the development site.

Assess External Amenity Area Noise

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 $L_{Aeq,16hr}$ ”

Figure 10.7 demonstrates that the noise levels in the external amenity areas to the rear of the apartment building are within this range.

Summary

Considering the constraints of the site, insofar as possible and without limiting the extent of the development area, the principles of Good Acoustic Design have been applied to the development.

Element 2 – Internal Noise Levels

A calculation was performed using the inward impact model described at the start of this section to determine the predicted noise levels at medium-risk facades. As identified above, these facades pertain to the proposed apartment building at the extreme southern end of the site and the two northern-most houses. The daytime levels are shown in Figure 10.9 and Figure 10.10 and the night-time levels are shown in Figure 10.11 and Figure 10.12.

Figure 10.9: Daytime facade noise levels at the apartment building

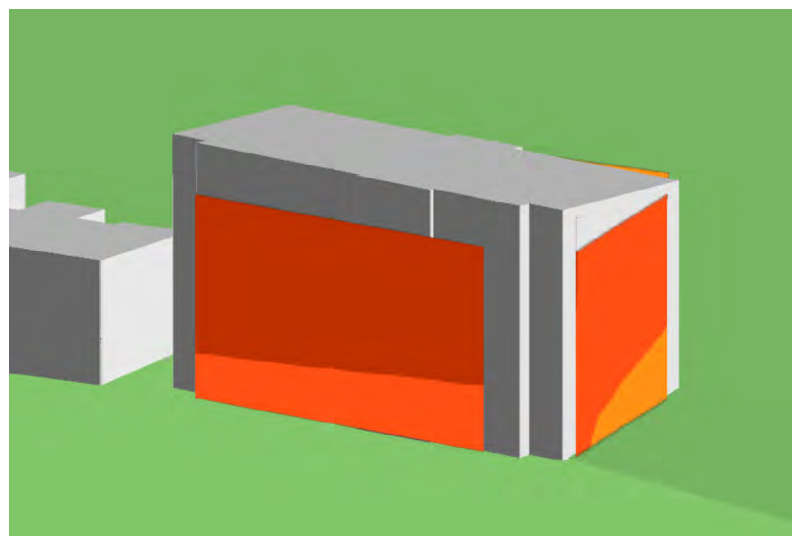


Figure 10.10: Daytime facade noise levels at the northern-most houses

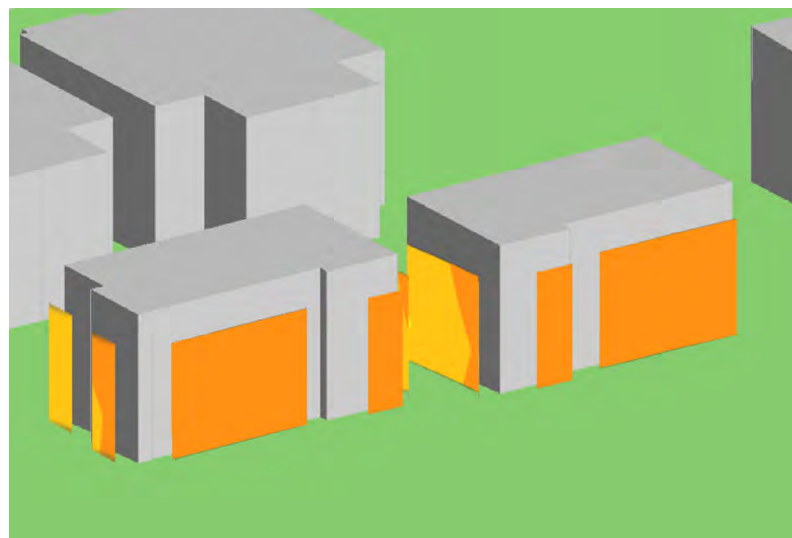


Figure 10.11: Night-time facade noise levels at the apartment building

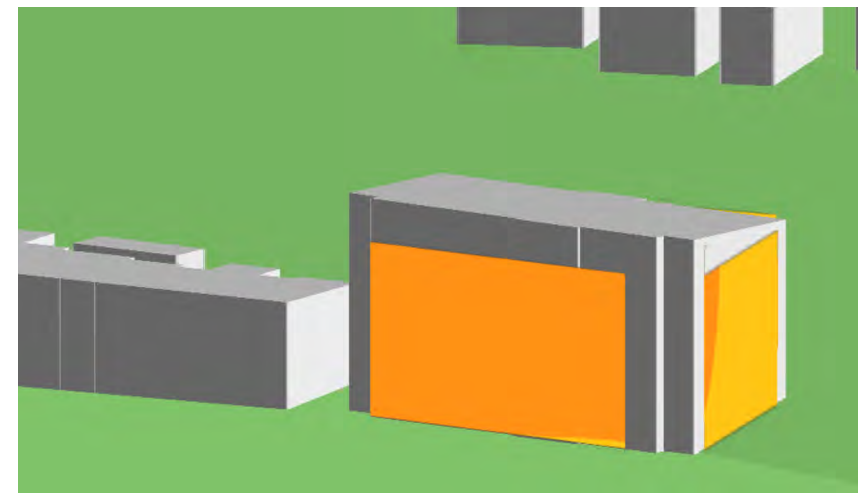
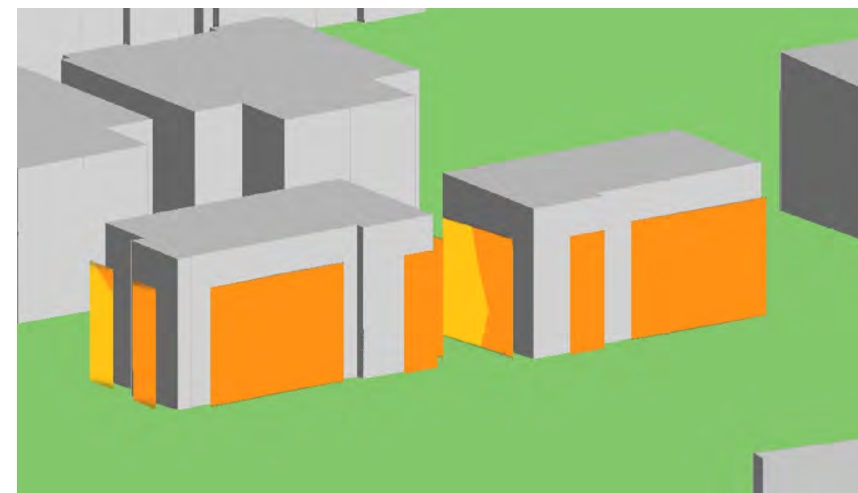


Figure 10.12: Night-time facade noise levels at the northern-most houses



Based on these facade noise levels, the facades can be categorised according to Table 10.18. The facades are highlighted according to their category in Figure 10.13 and Figure 10.14.

Category	Period	$L_{Aeq,T}$ (dB)
RED	Day	60
	Night	55
ORANGE	Day	55
	Night	50
GREEN	Day	<50
	Night	<45

Table 10.18: Façade categories based on daytime and night-time noise level

Figure 10.13: Facades of southern apartment block categorised by noise level

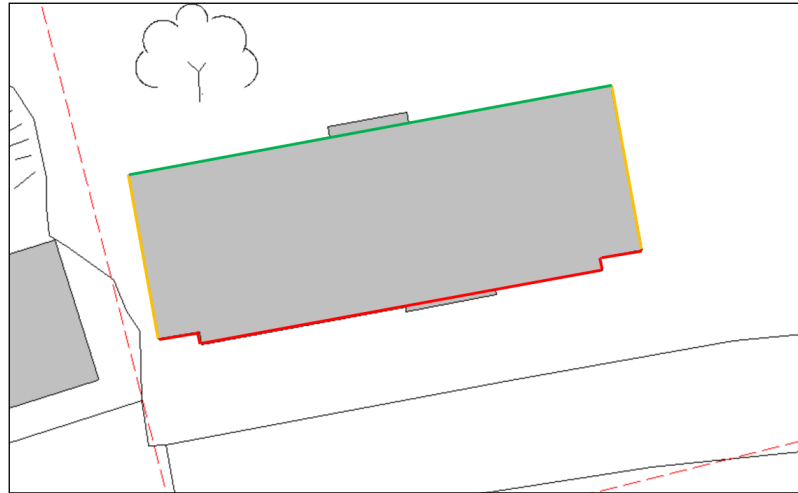
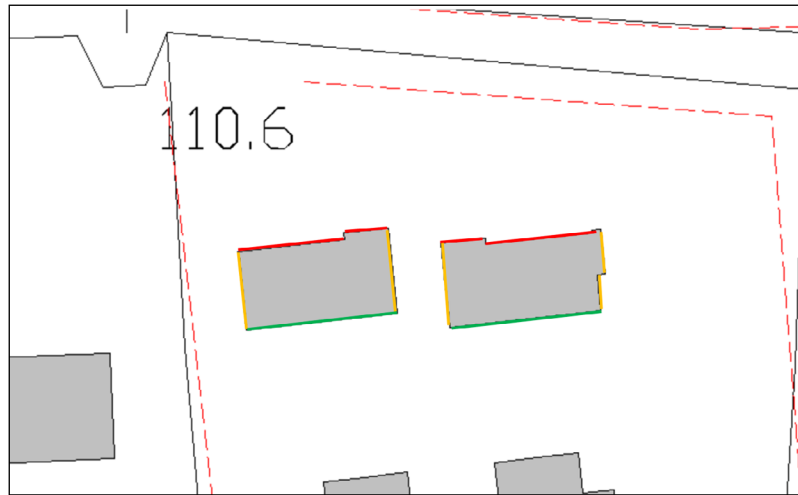


Figure 10.14: Facades of northern-most houses categorised by noise level



As is the case in most buildings, the windows or glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. BS 8233 is the relevant standard that applies to indoor ambient noise levels. The guidance provided in this standard is summarised in Table 10.5 of this report. In this instance, the facades will be provided with glazing that achieves the minimum sound insulation performance as set out in Table 10.19. These glazing specifications are chosen to meet the requirements of BS 8233.

Glazing Specification	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1k	2k	4k	
RED / ORANGE / GREEN	17	21	30	38	36	35	33

Table 10.19: Sound insulation performance requirements for glazing for each category (dB)

In-wall vents or in-frame trickle vents that achieve a sound insulation performance of 36 dB $D_{n,e,w}$ should be selected for designated facades.

Glazing Specification	Octave Band Centre Frequency (Hz)						$D_{n,e,w}$
	125	250	500	1k	2k	4k	
RED / ORANGE	37	36	35	36	34	34	36
GREEN	No specific acoustic requirement						

The assignment of glazing and ventilator performance requirements to the various facades can be confirmed by reviewing the mark-ups presented in Figure 10.13 and Figure 10.14.

The overall R_w outlined above is provided for information purposes only. The over-riding requirement is the octave band sound insulation performance values which may also be achieved using alternative glazing configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 10.19 or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

It is advised that the window supplier provides laboratory tests confirming the sound insulation performance (with reference to British Standard 2750 Part 3:1980 and British Standard 5821, or British Standard EN ISO 140 Part 3 1995 and British Standard EN ISO 717, 1997).

Element 3 – External Amenity Areas

External noise levels within the public open spaces and private gardens across the majority of the proposed development site are within the recommended range of noise levels from ProPG of between 50 and 55 dB $L_{Aeq,16hr}$ as illustrated in Figure 10.7. Noise levels at balconies on the southern side of the apartment block are predicted to exceed this recommended level, reaching 60 dB L_{Aeq} at some locations. This is ameliorated by the provision of external amenity spaces within the development. It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site.

10.11 REFERENCES

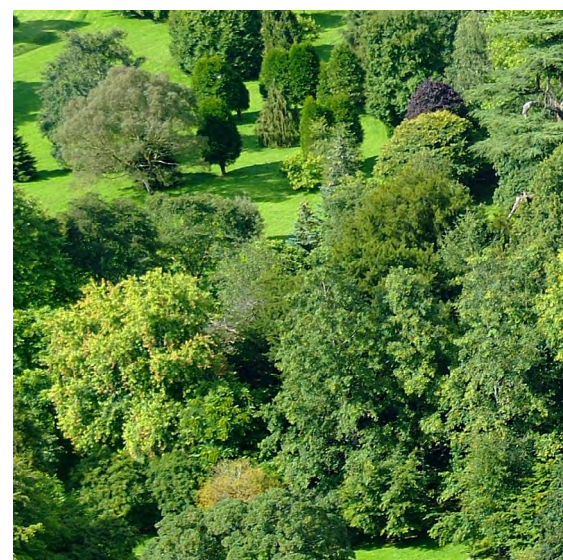
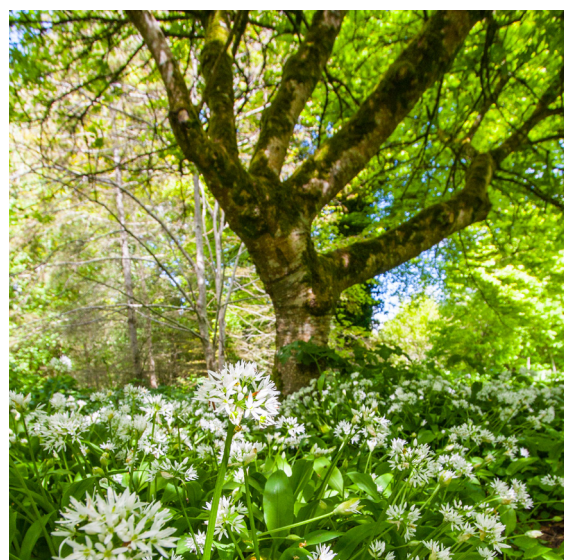
- BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes. Transport Infrastructure Ireland. 2014.
- BS 5228-2: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Vibration.
- BS 7385: 1993: Evaluation and measurement for vibration in buildings. Part 2: Guide to damage levels from ground borne vibration.
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.
- BS 8233: 2014: Guidance on Sound Insulation and Noise Reduction for Buildings.
- Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2. UK Highways Agency et al. 2020.
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Environmental Protection Agency. 2017.
- ISO 1996: 2017 Acoustics – Description, measurement and assessment of environmental noise.



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CHAPTER 11

Cultural Heritage



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CHAPTER 11

Cultural Heritage

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11 CULTURAL HERITAGE

11.1 INTRODUCTION

This chapter assesses the impacts of the project as detailed in Chapter 2 on the known and potential cultural heritage resource. The term 'Cultural Heritage' encompasses heritage assets relevant to both the tangible resource (archaeology and architectural heritage); and non-tangible resources (history, folklore, tradition, language, placenames, etc.). The recorded and potential cultural heritage resource within a study area encompassing the proposed development site and the lands extending for 1km from its boundary, was reviewed in order to compile a comprehensive cultural heritage baseline for this assessment.

The chapter was prepared by John Cronin and Tony Cummins of John Cronin and Associates. Mr Cronin holds qualifications in archaeology (B.A., University College Cork (UCC), 1991), regional and urban planning (MRUP (University College Dublin (UCD) 1993) and post-graduate qualifications in urban and building conservation (MUBC (UCD), 1999). Mr Cummins holds primary and post-graduate degrees in archaeology (B.A. 1992 and M.A. 1994, UCC). Both individuals have over 25 years' experience in the compilation of archaeological, architectural, and cultural heritage impact assessments. A separate "Historic Landscape Impact Assessment" prepared by Louise M. Harrington, an architectural heritage and historic landscape consultant has informed this assessment; Ms Harrington's assessment is contained in **Appendix 11.2**. Ms Harrington holds a MA in Historic Landscape Studies (with Distinction) from the University of York, an MPhil from University College Cork, and a BA in the History of Art with Spanish from Trinity College Dublin.

11.2 METHODOLOGY

The methodology used for this assessment is based on guidelines presented in the *Framework and Principles for the Protection of Archaeological Heritage* (Department of Arts, Heritage, Gaeltacht and the Islands 1999) and *Architectural Heritage Protection Guidelines for Local Authorities* (Department of Arts, Heritage and the Gaeltacht 2011) as well as the *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (International Council on Monuments and Sites (ICOMOS) 2011).

A study area encompassing the internal area of the proposed development and lands extending for 1 km in all directions from its boundary was reviewed as part of the assessment. The assessment commenced with a programme of desk-based research which was followed by a number of site inspections by the

authors. These studies were undertaken to identify any known or potential features of archaeological, architectural or cultural heritage significance and assesses impacts arising from the proposed development. The chapter also assesses potential cumulative impacts including those associated with relevant existing and permitted developments within the surrounding landscape.

11.2.1 Desktop Study

Documentary research on the recorded and potential cultural heritage resource within the study area and its environs was carried out in order to identify any recorded archaeological, architectural, and other cultural heritage sites and features. This information has provided an insight into the development of the study area over time and also assisted in an evaluation of the potential presence of unrecorded cultural heritage sites or features.

The principal sources reviewed for the assessment of the recorded archaeological resource were the Sites and Monuments Record (SMR) and the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage (DHLGH). Cork County Council's Record of Protected Structures (RPS) and the National Inventory of Architectural Heritage (NIAH) were consulted to assess the designated architectural heritage resource. Summaries of the legal and planning frameworks designed to protect these elements of the cultural heritage resource are also provided within the chapter.

Other sources consulted as part of the assessment included the following:

Development Plan

The current Cork County Development Plan (2014-2020) was consulted as part of this assessment. This publication identifies the buildings listed in the Record of Protected Structures and outlines the Council's policies for the protection of the archaeological and architectural heritage resource. The Draft Cork County Development Plan 2022-2028 was also consulted.

Database of Irish Excavation Reports

The Database of Irish Excavation Reports contains summary accounts of all archaeological excavations carried out in Ireland (North and South) from 1970 to present. Current data was accessed via www.excavations.ie in November 2021.

Literary Sources

Various published literary sources were consulted in order to assess the archaeological, historical, architectural heritage and folklore record of the study area and these are listed in **Section 11.8** of this chapter.

Archaeological Inventory of County Cork Vol. 2: South and East Cork

This publication presents summary descriptions of the recorded archaeological sites within this area of the county and the relevant entries are included within the chapter. In addition, the current national online database resources pertaining to same were accessed on Historical Environment Viewer at www.archaeology.ie in November 2021.

Historic Maps

The detail on historic maps sources can indicate the presence of past settlement patterns, including features of archaeological and architectural heritage significance that no longer have any surface expression. Available cartographic sources dating from the 17th century onward were reviewed.

Aerial/Satellite Imagery

A review of available online aerial images of the study area was undertaken in order to ascertain if any traces of unrecorded archaeological sites were visible and to review the extent of development within the study area during recent decades.

Irish Heritage Council: Heritage Map Viewer

This online mapping source (www.heritagemaps.ie) is a spatial data viewer which collates various cultural heritage datasets sourced from, among others, the National Monuments Service, National Museum of Ireland, local authorities, the Royal Academy of Ireland and the Office of Public Works.

National Museum of Ireland Topographical Files

These files comprise a written and digital database which records known information in relation to the discovery locations of Irish archaeological artefacts, including those held in the museum's collection. The files are archived in the museum's premises in Kildare Street, Dublin and were inspected as part of the desktop study. The archive contains no files for artefact discoveries within the study area.

Irish National Folklore Collection

Transcribed material from the National Folklore Collection archive has been digitised and published online at www.duchas.ie.

Placenames Database of Ireland

This online database (www.logainm.ie) provides a comprehensive management system for data, archival records and place names research conducted by the State.

UNESCO designated World Heritage Sites and Tentative List

There are two world heritage sites in Ireland and a number of other significant sites are included in a Tentative List (2010) that has been put forward by Ireland for inclusion.

11.2.2 Field Survey

The desktop study was supported by a site inspection to confirm the current state of the proposed development site and any relevant cultural heritage sites identified during the course of the assessment. The proposed development site was inspected by the authors in clear weather conditions on a number of occasions in 2021 and all areas were subject to a programme of field-walking surveys. No constraints were encountered during these surveys and all areas within the proposed development site were accessible. The lands within the development boundary were assessed in terms of modern land use, vegetation cover and the potential for the presence of previously unrecorded archaeological sites or structures of architectural heritage interest. The field survey results are described within the chapter (**Section 11.4.5**) and extracts from the photographic record are presented in **Appendix 11.1**.

11.2.3 Impact Assessment

The following section presents a summary of the methodology used to compile this assessment including the criteria for the determination of the nature of impacts as well as the scope of desktop studies and site inspections.

The methodology used for this assessment has been informed by the Environmental Protection Agency (EPA) *Draft Guidelines for Information to be Contained in EIAR* (2017), in accordance EIA requirements of codified EU Directive 2011/92/EU as amended by EU Directive 2014/52/EU, per current Planning Legislation, concerning EIA assessment: Planning and Development Act, 2000 (as amended) (Part X) and in Part 10 of the Planning and Development Regulations, 2001 (as amended). The following summation of the criteria used to assess impacts is provided in order to clearly and concisely outline the methodology specifically applied to the cultural heritage resource.

Duration of Effect

The duration of effects is assessed based on the following criteria:

- Momentary (seconds to minutes)
- Brief < 1 day
- Temporary <1 year
- Short-term 1-7 years
- Medium Term 7-15 years
- Long Term 15-60 years
- Permanent > 60 years
- Reversible: Effects that can be undone, for example through remediation or restoration

Quality of Effect

The quality of an effect on the cultural heritage resource can be positive, neutral or negative.

- Positive Effect: a change which improves the quality of the cultural heritage environment (e.g. increasing amenity value of a site in terms of managed access, signage, presentation etc. or high-quality conservation and re-use of an otherwise vulnerable derelict structure).
- Neutral Effect: no change or effects that are imperceptible, within the normal bounds of variation for the cultural heritage environment.
- Negative Effect: a change which reduces the quality of the cultural heritage resource (e.g. visual intrusion on the setting of an asset, physical intrusion on features/setting of a site etc.)

Type of Effect

The type of effect on the cultural heritage resource can be direct, indirect or no predicted impact.

- Direct Impact – where a cultural heritage site is physically located within the footprint of the proposed development, which will result in its complete or partial removal.
- Indirect Impact – where a cultural heritage site or its setting is located in close proximity to the footprint of the proposed development.
- No predicted impact – where the proposed development will not adversely or positively affect a cultural heritage site.

Magnitude of Effect

This is based on the degree of change, incorporating any mitigation measures, on a cultural heritage asset and can be negative or positive. The magnitude is ranked without regard to the value of the asset according to the following scale: High; Medium; Low and Negligible and has been informed by criteria published in the International Council on Monuments and Sites *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011) (**Table 11.1**).

Table 11.1: Magnitudes of Effect on Cultural Heritage Assets

Magnitude	Description
High	<p>Most or all key archaeological or architectural materials affected such that the resource is totally altered</p> <p>Comprehensive changes to setting</p> <p>Changes to most or all key historic landscape elements, parcels or components; extreme visual effects; fundamental changes to use or access; resulting in total change to historic landscape character</p> <p>Major changes to area that affect Intangible Cultural Heritage activities or associations or visual links and cultural appreciation</p>
Medium	<p>Changes to many key archaeological or historic building materials/elements such that the resource is clearly/significantly modified.</p> <p>Considerable changes to setting that affect the character of the archaeological asset.</p> <p>Changes to the setting of a historic building, such that it is significantly modified.</p> <p>Change to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, considerable changes to use or access, resulting in moderate changes to historic landscape character.</p> <p>Considerable changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.</p>
Low	<p>Changes to key archaeological materials/historic building elements, such that the resource is slightly altered/slightly different.</p> <p>Slight changes to setting of an archaeological monument.</p> <p>Change to setting of a historic building, such that it is noticeably changed.</p> <p>Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; slight changes to use or access; resulting in limited change to historic landscape character</p> <p>Changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.</p>
Negligible	<p>Very minor changes to key archaeological materials or setting.</p> <p>Slight changes to historic building elements or setting that hardly affect it.</p> <p>Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes to use or access; resulting in very small change to historic landscape character.</p> <p>Very minor changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.</p>

Value Assessment

While various national and local authority legal designations exist for elements of the Irish cultural heritage resource (see Section 14.3.2), there are currently no formal criteria for grading the values of individual elements of this resource. The National Inventory of Architectural Heritage (NIAH) does apply a ranking system (Local, Regional and National) to structures included in that inventory and, while these rankings do not confer a graduated level of protection they have been utilised as a value indicator for NIAH-listed structures for the purpose of this assessment.

Given the absence of formal criteria the evaluations used in this assessment (**Table 11.2**) have been informed by guidelines presented in the ICOMOS *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011). The evaluation of the values of cultural heritage assets is, therefore, not intended as definitive but rather as an indicator which contributes to a wider judgment based the individual circumstances of each asset. The application of values included a consideration of their legal designations (e.g., National Monuments), condition/preservation; documentary/historical significance, group value, rarity, visibility in the landscape, fragility/vulnerability and amenity value on a case-by-case basis. It is noted that archaeological monuments, whether extant or levelled, have the potential to possess sub-surface attributes, such as artefacts, human burials or other archaeological remains, that may possess values that cannot be discerned without recourse to archaeological excavation but are unlikely to be affected in the absence of direct negative impacts. The value of all known or potential assets that may be impacted by development are ranked according to the following scale as defined by ICOMOS: Very High; High; Medium; Low and Negligible. The values assigned to relevant cultural heritage assets within the area were determined following the completion of the desktop research combined with subsequent site inspections and are outlined in **Section 14.4.6**.

Table 11.2: Indicative factors for assessing the Value of Cultural Heritage Assets

Indicative Value	Example of Asset Types
Very High	<p><u>International Significance</u> which may potentially include:</p> <p>World Heritage Sites (including Tentative List properties)</p> <p>Assets of acknowledged international importance</p> <p>Assets that can contribute significantly to international research objectives</p>
High	<p><u>National Significance</u> which may potentially include:</p> <p>Assets of significant quality, rarity, preservation and importance,</p> <p>Assets that can contribute significantly to acknowledged national research objectives</p> <p>Conservation Areas containing significant buildings of importance, including group value</p> <p>Archaeological Landscapes with significant group value</p>
Medium	<p><u>Regional Significance</u> which may potentially include:</p> <p>Assets of moderate quality, preservation and importance</p> <p>Assets that can contribute significantly to acknowledged regional research objectives</p> <p>Other undesignated buildings that can be shown to have exceptional qualities in their fabric or historical associations</p> <p>Undesignated structures of potential importance (archaeological, potential 'new sites')</p> <p>Conservation Areas containing buildings that contribute significantly to its historic character</p> <p>Historic townscape or built-up areas with notable historic integrity in their buildings and settings</p>
Low	<p><u>Local Significance</u> which may potentially include:</p> <p>Assets compromised by poor preservation and/or poor survival of contextual associations</p> <p>Assets of limited value, but with potential to contribute to local research objectives</p> <p>Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)</p>
Negligible	<p>Assets with very little or no surviving archaeological interest</p> <p>Buildings of no architectural or historical note; buildings of an intrusive character</p>

Significance of Effects

This is based on a consideration of the Magnitude of the Impact (graded from High to Negligible, based on a consideration of character, duration, probability and consequences) combined with the Value (graded from High to Negligible, based on a consideration of significance/sensitivity) of the cultural heritage asset. The Significance can be described as Profound, Very Significant, Significant, Moderate, Slight, Not Significant or Imperceptible (Tables 11.3 and 11.4).

Table 11.3: Significance of Effects (per EPA Draft EIAR Guidelines 2017)

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 but 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 11.4: Significance of Effects Matrix (after EPA Draft EIAR Guidelines 2017)

Magnitude of Impact	High	Not Significant/ Slight	Moderate/ Significant	Significant/ Very Significant	Very Significant/ Profound
	Medium	Not Significant	Slight	Moderate/ Significant	Significant/ Very significant
	Low	Not Significant/ Imperceptible	Slight/ Not Significant	Slight	Moderate
	Negligible	Imperceptible	Not Significant/ Imperceptible	Not Significant/ Slight	Slight
		Negligible	Low	Medium	High
Value/Sensitivity of the Asset					

11.3 DESCRIPTION OF EXISTING ENVIRONMENT

11.3.1 General Context

The proposed development site is located within the townland of Lackenroe which is in the northern outskirts of Glounthane in an area c.7.5km to the east of Cork city. In general, the lands within the site boundary comprise a south-facing area of varying gradients which is occupied by vacant farm fields in the northern section with a wooded area in the southern end. A number of modern commercial and residential developments are located within surrounding lands.

11.3.2 Legal and Planning Context

This section presents a concise summary of the legal and planning policy frameworks relevant to this assessment in order to provide a context for the statutory protection assigned to the cultural heritage resource. The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the Valetta Treaty (1995) (formally the European Convention on the Protection of the Archaeological Heritage, 1992) ratified by Ireland in 1997; the Granada Convention (1985) (formally the European Convention on the Protection of Architectural Heritage), ratified by Ireland in 1997; and the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, ratified by Ireland in 2015. The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed and none are located within the region of the country containing the proposed development.

The National Monuments Service (NMS), which is currently based in the Department of Housing, Local Government and Heritage is responsible for the protection and promotion of Ireland’s archaeological heritage.

The national legal statutes and guidelines relevant to this assessment include:

- National Monuments Acts 1930-2014
- Heritage Act 1995, as amended
- National Cultural Institutions Act 1997
- The Architectural Heritage (National Inventory) and Historic Monuments (Misc) Provisions Act 1999
- Planning and Development Act 2000, as amended
- Department of Arts, Heritage and Gaeltacht 2011 *Architectural Heritage Protection: Guidelines for Planning Authorities*.
- Department of Arts, Heritage, Gaeltacht and the Islands 1999 *Framework and Principles for the Protection of Archaeological Heritage*

11.3.2.1 Relevant Archaeological Legislation and Planning Policies

The National Monuments Act 1930 and its Amendments, the Heritage Act 1995 and relevant provisions of the National Cultural Institutions Act 1997 are the primary means of ensuring the satisfactory protection of archaeological remains. There are a number of mechanisms under the National Monuments Acts that are applied to secure the protection of archaeological monuments. These include the designation of National Monument status for sites of national significance, the Register of Historic Monuments (RHM), the Record of Monuments and Places (RMP), the Sites and Monuments Record (SMR), and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites¹.

¹ <https://www.archaeology.ie/sites/default/files/media/publications/NMS%20-%20Managing%20and%20Protecting%20Ireland%27s%20Archaeological%20Heritage%202013.pdf>

The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO were reviewed as part of the assessment and none are located in the vicinity of the proposed development.

Section 2 of the National Monuments Act, 1930 defines a National Monument as ‘a monument or the remains of a monument, the preservation of which is a matter of national importance’. The State may acquire or assume guardianship of examples through agreement with landowners or under compulsory orders. Archaeological sites within the ownership of local authorities are also deemed to be National Monuments. The prior written consent of the Minister is required for any works at, or in proximity to, a National Monument or at sites which are subject to a Preservation Order. There are no National Monuments in State Care located within the study area.

The RMP was established under Section 12 (1) of the National Monuments (Amendment) Act, 1994 and was based on the earlier SMR and RHM. It comprises lists and maps of all known archaeological monuments and places for each county in the State and all listed archaeological sites receive statutory protection under the National Monuments Act 1994. No works can be undertaken at their locations or within their surrounding designated Zones of Notification without providing two months advance notice to the NMS. There are no recorded archaeological sites located within the proposed development site while there are four examples in the surrounding 1km study area (Table 14-5). None of these sites are National Monuments in State Care or are included in the current list of monuments that have been assigned Preservation Orders².

The County Cork Development Plan 2014 includes a number of policies and objectives in relation to the protection of the archaeological resource within the county including the protection of recorded sites (Plan ref. HE 3-1) and their environs (Plan ref. HE 3-3) and also requires that appropriate mitigation measures are enacted for newly discovered archaeological materials (Plan ref. 12.3.6).

11.3.2.2 Relevant Architectural Heritage Legislation and Planning Policies

Protection of architectural or built heritage is provided for through a range of legal instruments that include the Heritage Act 1995, the Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act 1999, and the Planning and Development Act 2000. The Planning and Development Act 2000 requires all Planning Authorities to keep a ‘Record of Protected Structures’ (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. As of the 1st January 2000, all structures listed for protection in current Development Plans, have become ‘protected structures’. Since the introduction of this legislation, planning permission is required for any works to a protected structure that would affect its character. A protected structure also includes the land and other structures within its curtilage. While the term ‘curtilage’ is not defined by legislation, the *Architectural Heritage Protection Guidelines for Local Authorities* (Department of Arts, Heritage and the Gaeltacht 2011), describes it as the parcel of land immediately associated with a structure and which is (or was) in use for the purposes of the structure. In addition, local authorities must provide for the preservation of places, groups of structures and townscapes of architectural heritage significance through designation of Architectural Conservation Areas (ACAs). The National Inventory of Architectural Heritage (NIAH) was established to record architectural heritage structures within the State and while inclusion in the NIAH does not provide statutory protection listing in the inventory is a signifier of architectural heritage value and it is intended to advise local authorities on compilation of their Record of Protected Structures. The NIAH also includes a Survey of Historic Gardens and Landscapes which comprises a non-statutory, desk-based survey of such features.

Details on the Protected Structures and NIAH-listed features within the study area are provided in Section 11.3 of this chapter.

² <https://www.archaeology.ie/sites/default/files/media/publications/po19v1-all-counties.pdf>

The County Cork Development Plan 2014 includes a number of policies and objectives in relation to the protection of the architectural heritage resource within the county including the protection of designated structures (Plan refs. HE 4-1 and HE 4-2) and non-structural features such as gardens, masonry walls, railings, follies, gates, bridges and street furniture that are of built heritage significance (Plan ref. HE 4-3). The Development Plan also includes a number of policies and objectives in relation to the protection of the cultural heritage resource within the county, including aspects such as historical associations, place names, language and the arts (Plan refs. HE 5-1 and HE 5-2).

11.3.3 Desktop Study

11.3.3.1 Archaeological and Historical Context

Relevant datasets have been interrogated and retrieved from current state and local authority sources and are considered accurate at the time of writing in November 2021. The dating framework used for each period of the archaeological record is based on the framework presented in the *Guidelines for Authors of Reports on Archaeological Excavations* as published by the National Monuments Service³. The published inventory entries of all recorded archaeological sites within the study area are presented along with references to relevant published sources that will provide general readers with further contextual information. Information acquired from other sources consulted during the desktop study is also presented, including historic maps, literary sources, and aerial/satellite imagery.

Table 11.5: Recorded archaeological sites within the study area

SMR No.	Class	Townland	ITM E	ITM N	Distance from Proposed Development
C0075-008---	Enclosure	ROWGARRANE	576354	574206	650m to west
C0075-009---	Ringfort - rath	BALLYNAROON	576351	574039	625m to west
C0075-010---	Ringfort - rath	BALLYNAROON	576281	573882	685m to west
C0075-011---	Fulacht fia	JOHNSTOWN	577999	573640	600m to east

³ <https://www.archaeology.ie/sites/default/files/media/publications/excavation-reports-guidelines-for-authors.pdf>

Figure 11.1: Recorded archaeological sites within 1km study area



Early Prehistoric Periods

Until the recent identification of Palaeolithic human butchery marks on a bear bone recovered from a cave site in County Clare, the earliest recorded evidence for human activity in Ireland dated to the Mesolithic period (7000–4000 BC) when groups of hunter-gatherers lived on the heavily wooded island. The archaeological record indicates that these mobile groups favoured coastal, lake and river shores which provided a transport and food resource. They did not construct any settlements or monuments that have left any above ground traces although their presence in an area can often be identified by scatters of worked flints in ploughed fields or during earthmoving undertaken as part of development works. The Neolithic period (4000–2400 BC) began with the arrival and establishment of agriculture as the principal form of economic subsistence, which resulted in more permanent settlement patterns in farmlands within areas of cleared forestry. As a consequence of the more settled nature of agrarian life, new site-types, such as more substantial rectangular timber houses and various types of megalithic tombs, and artefacts such as pottery begin to appear in the archaeological record during this period. While there are no recorded Mesolithic or Neolithic sites within the 1km study area, examples dating to both of these periods has been revealed elsewhere in County Cork.

Late Prehistoric Periods

The advent of the Bronze Age period (c. 2400–500 BC) in Ireland saw the introduction of a new artefactual assemblage, including metal and ceramic objects, to the island. This period was also associated with the construction of new monument types such as wedge tombs, standing stones, stone rows/circles and burnt mounds known as fulachta fia. The development of new burial practices during this period also saw the construction of funerary monuments such as cairns, barrows, boulder burials and cists. The arrival of iron-working technology in Ireland saw the advent of the Iron

Age (600 BC – 400 AD). Relatively little has been known about Iron Age settlement and ritual practices until recent decades when the corpus of evidence has been greatly increased by the discovery of sites dating to this period during bog-cutting works and road construction projects. It is noted that while the vast majority of prehistoric settlement sites leave no above ground remains their foundations and occupation deposits, which may contain artefactual and environmental remains, can often survive below modern ground surfaces.

There is one site of probable late prehistory date within the 1km study area, and this comprises a *fulacht fia* (CO075-011) which is a site type typically interpreted as the remains of Bronze Age cooking activities. While many have been levelled by ploughing or land improvement works, in their undisturbed form they comprise horseshoe-shaped mounds of heat-cracked stone and charcoal-enriched soil often built up around a central trough. They functioned by placing heated stones into a water-filled trough in order to raise the water to boiling point and are typically located near or adjacent to streams, springs or marshy areas. The example within the 1km study area has been described as follows in the *Archaeological Inventory of County Cork. Volume 2: East and South Cork* (Power 1994):

CO075-011—

Class: *Fulacht fia*

Townland: JOHNSTOWN (Barrymore By.)

Description: In tillage on S-facing slope. Roughly circular spread (20m N-S; 16m E-W) of burnt material.

The Early Medieval Period

This period began with the introduction of Christianity in Ireland and continued up to the arrival of the Anglo-Normans during the 12th-century (c. 400–1169 AD). The establishment of the Irish church was to have profound implications for political, social and economic life and is attested to in the archaeological record by the presence of church sites, associated places for burial and holy wells. The early medieval church sites were morphologically similar to settlement sites of the period but are often differentiated by the presence of features such as church buildings, graves, stone crosses and shrines. While this period saw the emergence of the first phases of urbanisation around the Hiberno-Norse ports, the dominant settlement pattern continued to be rural-based and centred around enclosed farmsteads known as ringforts. These are the most common early medieval sites within the Irish landscape and comprise circular enclosures delimited by earthen banks formed of material thrown up from a concentric external ditch. The ubiquity of these enclosures within the Irish landscape is attested to by the fact that their original Gaelic names (*rath* and *lios*) still form some of the most common place-name elements in the country. Archaeological excavations have demonstrated that the majority comprised enclosed farmsteads containing the foundations of domestic and agricultural buildings. Ringforts may form the visible element of wider farmlands (known as *airlise*) that may contain unrecorded, sub-surface archaeological features such as associated field systems, stockades, barns, mills and drying kilns. The Archaeological Survey of Ireland also designates certain archaeological sites with no diagnostic features which would allow accurate classification as ‘enclosures’. While sites assigned this classification can theoretically date from any period from prehistory onwards, the potential exists that many may form the remains of ringforts. There are two ringforts and one enclosure located within the 1km study area and these have been described as follows in the *Archaeological Inventory of County Cork. Volume 2: East and South Cork* (Power 1994):

CO075-009—

Class: *Ringfort - rath*

Townland: BALLYNAROON

Description: In tillage, atop ridge. Roughly circular area (46.5m E-W; 40.5m N-S) enclosed by earthen bank (int. H 1.3m) NE->NNW; external fosse (D 0.9m) SSE->SW. Interior level. Ringfort (CO075-010) in field to S.

CO075-010—

Class: *Ringfort - rath*

Townland: BALLYNAROON

Description: In tillage, on S-facing slope, W of Highlands Country House. Circular area, slightly raised, (34.5m E-W; 34m N-S) enclosed by earthen bank (int. H 0.3m; ext. H 1.8m) WSW->SSE; traces of fosse ENE-Se just inside road. Shown as planted with trees on 1842 OS 6-inch map. Ringfort (CO075-009) in field to N.

CO075-008

Class: Enclosure

Townland: ROWGARRANE

Description: In pasture, on SE-facing slope. Shown on 1842 OS 6-inch map as circular enclosure (diam. c. 15m). Levelled; no visible surface trace. Two ringforts (CO075-009; CO-75-010) c. 120m and c. 260m to S, respectively.

High and Late Medieval Periods

The arrival of the Anglo-Normans in the late 12th century broadly marks the advent of the Irish high medieval period which continued to c.1400 and was followed by the late medieval period which extended to c.1550. These periods saw the continuing expansion of Irish urbanisation as many of the port cities developed into international trading centres and numerous villages and towns began to develop throughout the country, often within the environs of Anglo-Norman manorial centres which were defended by masonry castles. By the 15th century the native Irish chieftains and lords began to construct tower-house castles within their own landholdings as centres of territorial control. There is little historical information on the settlement and land-use patterns within the environs of the proposed development site during these periods and there are no known archaeological sites dating to either period located within the surrounding study area which is located c.7.5km to the east of the medieval town of Cork and likely formed part of its wider agricultural hinterland during this period.

Post-Medieval and Early Modern Periods

The centuries following 1550 comprise the post-medieval period which continued into the middle of the 19th century and the period thereafter is often described as early modern. The first century of the post-medieval period was a turbulent time in Ireland history and saw a prolonged period of wars between the 1560s and 1603 with further conflicts arising during the Cromwellian Wars (1649–53). This period saw the extensive dispossession of forfeited Gaelic lands and the final disintegration of the Gaelic order in the early 17th century followed the Battle of Kinsale (1601), the conclusion of the Nine Years War (1603) and the Flight of the Earls (1607). In 1641 the forfeited lands within and surrounding the study area were in the possession of Roger Boyle, 1st Earl of Orrery who possessed a total of 28 townlands within the barony of Orrery alone. The Down Survey, which was compiled during the 17th century as part of the Cromwellian Plantation, records that Lackenroe townland comprised 185 plantation acres and was in the ownership of Daniel Duffe O’Cahell (Catholic) in 1641 while by 1671 the townland formed part of the extensive Irish landholdings of James Duke of York.

The post-medieval period saw the development of high and low status stone houses throughout the Irish countryside and rural settlement clusters at this time typically consisted of single-storey thatched cottages with associated farm buildings while two-storey farmhouses became more common as the 19th century progressed. An agricultural boom in the late 18th and early 19th centuries saw a rise in prices for both tillage and dairy produce and resulted in Irish landlords investing in extensive land improvement works within their holdings. This included widespread land drainage works, introduction of soil nutrients, grass planting and the enclosure of open lands into field systems that survive to the present-day. The popularity and success of potato farming contributed to a population boom during the 18th and early 19th centuries and its failure in the middle of the latter century was to have devastating consequences. The settlement pattern throughout much of the rural landscape was greatly affected by the Famine period and its aftermath which saw the depopulation of many areas. The following decades were marked by an increasing move away from small-scale subsistence farming towards more market-led pasture, assisted by the development of the Co-Op system, which also increased the extent of land reclamation of previously marginal lands.

There are several country houses and attendant grounds located within the wider landscape surrounding the study area including the former site of Anne Mount House in the area to the west of the proposed development site which is described as follows in the Landed Estates Database⁴

In the 1770s Falkiner Bart was resident and in 1786 Wilson refers to Annemount as the seat of Sir Riggs Falkiner. Occupied by the Reverend Mr Coghlan in 1814 and in 1837. By the time of Griffith’s Valuation Nicholas M. Cummins held this house from the Reverend Coghlan. This house was burned down and all that now remains are the steps.

The Falkiner family of Anne Mount had developed the village of Glounthaune, which was originally to be called New Glanmire, in the early 19th century. A National School was opened in the 1830s and the existing Sacred Heart Church was built in 1880, to a design by George Coppinger Ashlin, and replaced a chapel which had been in the village since 1803. The study area is located within the civil parish of Caherlag and the following extracts from *The Topographical Inventory of Ireland* (Lewis 1837) provide a summary description of the area in the first half of the 19th century:

It is situated on the road from Cork to Youghal, and comprises 3530 statute acres, as apportioned under the tithe act: nearly one-third is held by private gentlemen, and laid out in lawns, plantations, and pleasure grounds; the remaining two-thirds are almost equally divided between pasture and tillage. The dairy farms furnish Cork and its neighbourhood with a great quantity of butter, which is celebrated for its flavour. The tillage is conducted on an improved plan, the Scottish system being generally prevalent; and, from the vicinity of Cork and the sea, an abundance of various kinds of manure is easily obtained.

Ashbourne House is located to the west of the proposed development site and this property was expanded into the southern end of the proposed

development site in the early 20th century. Further details on this property are presented in Section 11.4.3.2.

The Griffith’s Valuation of 1853 lists a number of landlords and tenants within the proposed development site during the middle of the 19th century. Nicholas Cummins is listed as the owner of Anne Mount House at that time and was leasing the fields to the north of the house grounds to a number of tenants. The landlord of the fields within the section of the proposed development site to the east of the house is listed as James Kane, indicating that these fields may have not formed part of the Anne Mount holdings at this time, and the tenant was Charles McCarthy. James Kane is also listed as the landlord of the Combermere Cottage property located outside the east end of the proposed development site, with Charles McCarthy listed as tenant here. It is noted that Lewis (1837) writing 15 years earlier recorded that J. Keane was the owner of Combermere and it is likely that this refers to the same person, or perhaps a relative. The southern end of proposed development site was divided into two plots with a north-south property line shown extending through the quarry on the valuation mapping. The landlord of the west plot, which is described as ‘land and house’, is again listed as James Kane, with Daniel Looney as tenant, while the landlord of the east plot which is described as ‘land’ is listed as James Willis who was leasing the plot to Rev. J. Bury who was resident in Toureen Lodge to the west at the time.

Excavations Database

The Database does not contain any entries for licensed archaeological investigations within the proposed development site or its immediate environs but does include two entries within the surrounding 1km study area. This entailed pre-development investigation of housing developments within the environs of known archaeological sites and nothing of archaeological significance was identified at either location. The following are the Database entries for these site investigations:

Licence: 03E1929

Excavator: John Purcell

Testing was carried out as part of the planning schedule for a single house development adjacent to an enclosure (SMR CO079:009) at Ballynaron, Glanmire. A series of trenches were excavated by mechanical digger. No features or finds of archaeological significance were revealed.

Licence 05E0697

Excavator: Tony Cummins

A series of test-trenches were excavated across the area to be impacted by a proposed housing development in a large greenfield site located to the west of a levelled fulacht fiadh (SMR CO075-011). The stratigraphy recorded in all of the trenches consisted of a greyish-brown silty clay ploughsoil layer, which averaged 0.5m deep, and this overlay a dark-yellowish-brown boulder clay subsoil. There were no archaeological features or finds recorded in any of the trenches opened at this site.

⁴ <http://landedestates.nuigalway.ie/LandedEstates/jsp/property-show.jsp?id=3503>

11.3.3.2 Designated Architectural Heritage

While there are no Protected Structures located within the site boundary, the southern portion of the development site does extend into lands that once formed part of Ashbourne Garden, which was developed c.1900-1930 by R.H. Beamish in the style of a woodland garden associated with Ashbourne House (formerly Toureen Lodge) to the east of the development site. “Ashbourne House (Ashbourne House Hotel)” is a Protected Structure in the Cork County Development Plan, 2014-2020, ref.: Record of Protected Structure (RPS) Reference: 00498). The house is not included in the NIAH or the RMP. The portion of the development site that contains a former section of the Ashbourne Garden has been in separate ownership (from that of Ashbourne House) for over 50 years and, as of November 2021, the planning authority has not notified the owner and/or occupier of the development site that their landholding is within the curtilage and attendant grounds of Ashbourne House. However, for the purposes of this assessment, it is considered that the proposed development does extend into the curtilage and attendant grounds of Ashbourne House but that the development site does not contain the protected structure (i.e., Ashbourne House (Ashbourne House Hotel)).⁵ The gardens were particularly significant for its original tree and shrub collection and a Historic Landscape Impact Assessment of this portion of the proposed development site was compiled by Ms Louise Harrington as part of the assessment process. This document is presented in its entirety as **Appendix 11.2** and a summary of contextual information sourced from this report is summarised hereafter.

Toureen Lodge was built in the late-18th century and comprises a five-bay two-storey house with hipped roof and central valley; a single-bay two-storey return to the southwest; and a pair of two-storey returns to the north. The east-facing front elevation was approached by an avenue from the south which curved to a small area of trees to the front of the house. On the first edition OS Map, surveyed 1840, the presence of a mixed perimeter-belt is evident along on the boundary of the property, as well as the avenue, a planted area close to the house, an orchard to the east, and pasture which was sublet to the west. The latter two fields were let out to tenant farmers according to Griffith’s Valuation (1853), and Rev. Robert Bury was the occupant of the house which was let from the Earl of Bandon, along with ten acres and a gate lodge. The property came into the ownership of Richard Pigott Beamish, a grandson of William Beamish, one of the founders of the Beamish and Crawford Brewery, towards the end of the 1850s who renamed it as Ashbourne House. His son, Richard Henrik Beamish, took up residence in the house after his father’s death in 1899. He had studied agriculture at university in Sweden and Denmark, and upon his return to Ireland, amongst his many other business and civic activities, he became a governor of the Munster Dairy School and Agricultural Institute. As the resident of Ashbourne, he devoted his energies principally to the creation of a woodland garden which extends within the southern end of the proposed development site. He designed an informal layout of exotic trees and shrubs, and the former quarry was used to establish a rock garden. The Linnean Society Journal published his obituary in 1938 which mentioned his scientific approach to agriculture and the creation of ‘one of the most attractive gardens in Ireland, wherein he had converted an old quarry into an extremely beautiful rock garden stocked with the rarest of plants and made an artificial lake where blue nymphaeas flowered freely’. The remains of the rock garden are now overgrown but suggest that the natural hollow and pool left by the quarry were added to by some terracing and the creation of a grotto structure.

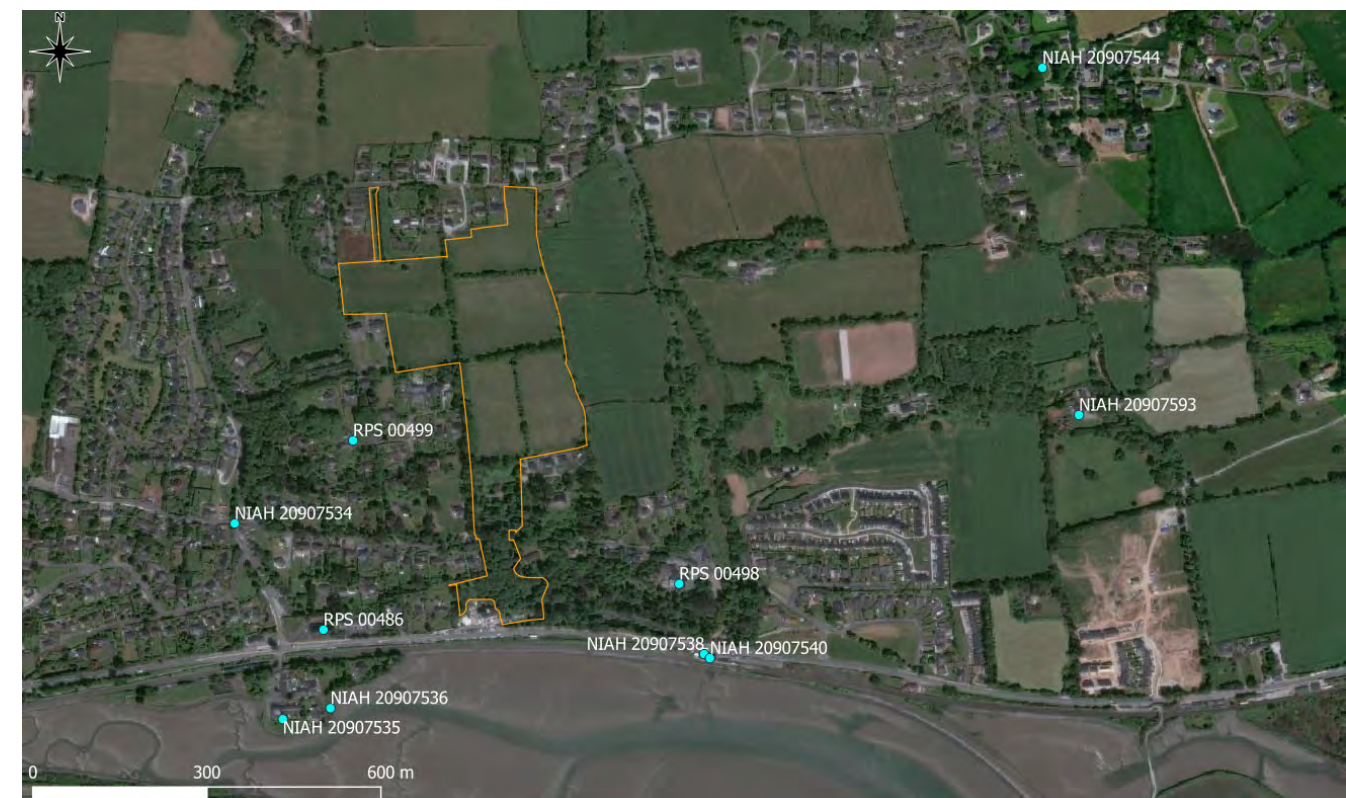
The former location of the now demolished Anne Mount House is located within a green area in the adjoining lands to the west of the proposed development site, at a distance of 140m from the nearest section of the boundary of the proposed development. While this levelled building is listed as a Protected Structure in the current County Cork Development Plan (RPS 00499) no surface traces were noted during an inspection of its location and its surrounds are now occupied by a large number of detached modern residential houses. While the demolished house has not been included in the NIAH for County Cork, its lands have been included in the NIAH Survey of Historic Gardens and Landscapes (Site ID 3067) and the online Survey record notes that much of the property is now occupied by modern housing. The surrounding study area also includes a number of 18th and 19th century buildings and features listed in either the RPS or NIAH and none of these are located within 200m of the proposed development (**Table 11.6** and **Figure 11.2**).

⁵ The definition and designation of “curtilage” and “attendant grounds” is dealt with in Chapter 13 of the *Architectural Heritage Protection: Guidelines for Planning Authorities* (Department of the Arts, Heritage and the Gaeltacht, 2011)

Table 11.6: Designated architectural heritage structures within 1km study area

RPS No.	NIAH Ref.	Name or Structure Type	ITM E	ITM N	Distance from Proposed Development
00499	-	Anne Mount House	576993	573667	140m to southwest
00498	-	Ashbourne House	577555	573420	220m to east
00486	20907537	Sacred Heart Catholic Church	576942	573341	230m to west
-	20907534	Lacken Roe Bridge	576789	573524	410m to west
-	20907535	House	576872	573187	330m to southwest
-	20907536	Water Pump	576954	573206	210m to southwest
-	20907538	Post Box	577598	573299	280m to east
-	20907540	Glounthaune Railway Station	577608	573292	280m to east
-	20907544	Windsor Cottage	578181	574309	900m to east
-	20907593	Killora Lodge	578244	573711	850m to east

Figure 11.2: Designated Architectural Heritage Structures within Study Area



11.3.3.3 Review of Cartographic Sources

The cartographic sources examined for the study area include the 17th-century Down Survey map (**Figure 11.3**), the first edition 6-inch Ordnance Survey (OS) map (surveyed c.1840) (**Figure 11.4**), the 25-inch OS map (1888-1913 series) (**Figure 11.5**) and the Cassini 6-inch edition (1930s-40s series) (**Figure 11.6**). A review of the 17th century Down Survey map revealed that Lackenroe townland is depicted and that no large residences, or any other structures or features, are indicated at its location. The reviewed editions of the historic OS maps show the character of the general Glounthaune area prior to the development of extensive 20th century housing developments within the area. The dominant settlement pattern shown within the area on the first edition 6-inch OS map comprises detached large residences and their associated grounds extending along the south-facing slopes above the river with areas of agricultural fields in their surrounds (e.g., Anne Mount, Johnstown, Rock Grove and Killahora houses). The 'New Glanmire' village is shown as a small cluster of riverside buildings to the south of the Cork to Youghal road on the 6-inch map and is shown as a slightly larger settlement renamed Glounthaune on the 25-inch map, which also shows the line of the Cork and Youghal Railway, constructed in 1868, extending along its north side. The main difference shown within the wider area on the 25-inch OS map is a dramatic shrinkage in the landscaped grounds associated within the large residences which are now shown increasingly occupied by vacant farm fields, likely the result of an attempt by landlords to increase agricultural incomes in the decades following a period of economic downturn after the Famine period.

All three editions of the historic OS maps show most of the north end of the proposed development site as vacant fields located outside the landscaped areas within the grounds of Anne Mount House to the west. The house is shown centrally placed within its grounds and is accessed from a gateway on a public road to the west. The historic OS maps also show various features within the grounds, including walkways, a fountain, outbuildings, and garden terraces. Two of the fields within the proposed development site are shown within an area of woodland extending to the east of the house on the 6-inch OS map, with no associated features such as walkways indicated in this area. The woodland is no longer present on the 25-inch OS map and its former extent in this area is shown subdivided into two vacant fields. The revised area around the house property is shown by thick lines of planted trees which are located outside the boundary of the proposed development. This mapping detail indicates that the former area of woodland within the proposed development site was felled in the second half of the 19th century and was then converted into farmland outside the revised boundary of the house grounds. The 25-inch OS map also shows an enclosed area with pumps and outbuildings, potentially an unlabelled farmyard, garden or orchard, on the north side of Anne Mount house in an area outside the southern side of the western end of the proposed development site. This enclosed area is not shown on the earlier 6-inch OS map, indicating it dates to the second half of the 19th century and, while its boundary remains, the internal area is now occupied by two modern detached houses. The southern section of the north end of the proposed development site extends through a vacant, overgrown area shown between the Anne Mount property and a detached property to the east which is named as Combermere Cottage on both maps. This cottage, including its garden and gate lodge at the road to the south, is located outside of the proposed development site and is not listed in the NIAH or RPS. This area of the proposed development site is shown as woodland on the 6-inch OS map and the detail on the 25-inch map indicates that the trees were subsequently cleared, and the area converted to a field in the later part of the 19th century. Two unlabelled, detached buildings within a small plot are shown in the northwest corner of this area on the 25-inch map are not present on the 6-inch map, also indicating that they date to the second half of the 19th century.

The detail on the 6-inch OS map shows the southern end of the proposed development site as sections of two vacant fields, subdivided by a north-south boundary which is truncated by a quarried area in the southern end which is within the site boundary. There are no structures shown within the footprint of the proposed development and while this map depicts the presence of some trees in this area, these do not appear to form woodland. The 25-inch map also shows the north ends of the two fields as vacant areas and the quarried area is still present but now has an unlabelled building and well feature to the south, both of which were therefore likely constructed in the second half of the 19th century. A range of buildings shown further to the west of the quarry are located outside the boundary of the proposed development. The detail on the Cassini 6-inch edition depicts this area following the early 20th century landscaping works undertaken by Richard Henrik Beamish and shows the planted woodlands and various pathways. Further details on the cartographic depictions of this area are presented in the Historic Landscape Impact Assessment compiled by Louise Harrington (**Appendix 11.2**).

Figure 11.3: Extract from 17th-century Down Survey map with Lackenroe townland indicated by arrow



Figure 11.4: Extract from 6-inch O.S map showing boundary of proposed development (blue line) [OSI licence ref. 0003321]



Figure 11.5: Extract from 25-inch O.S map showing boundary of proposed development (OSI licence ref. 0003321)

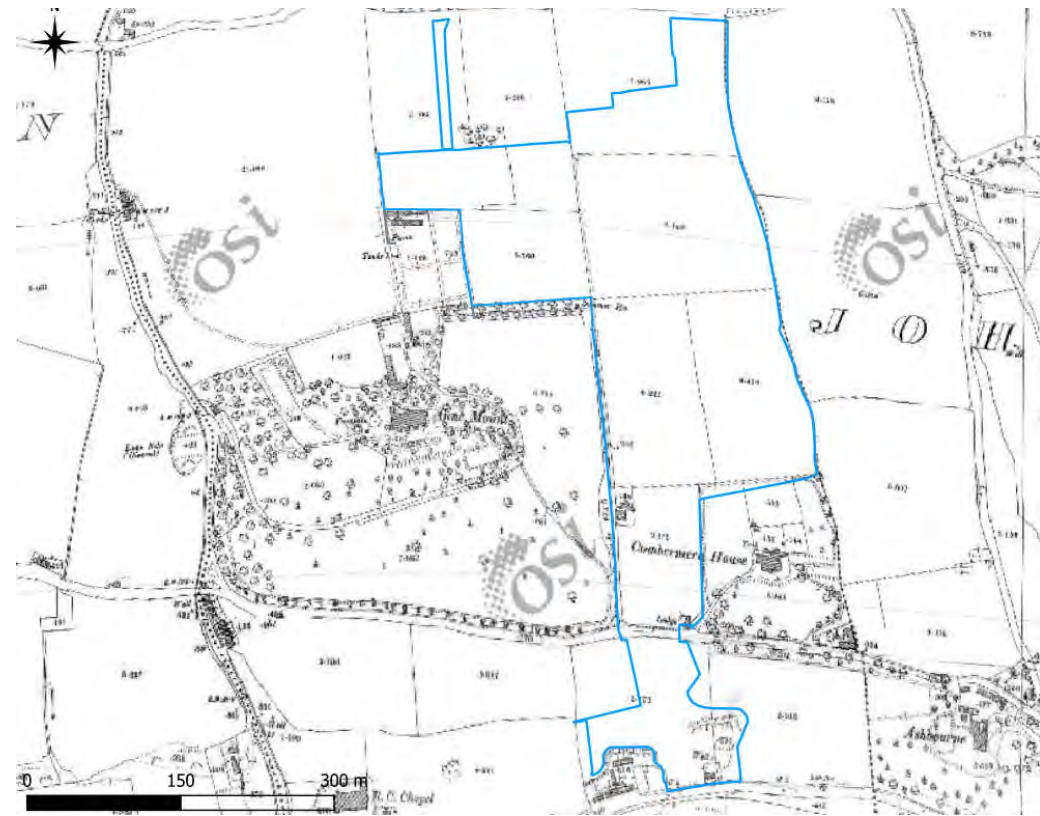
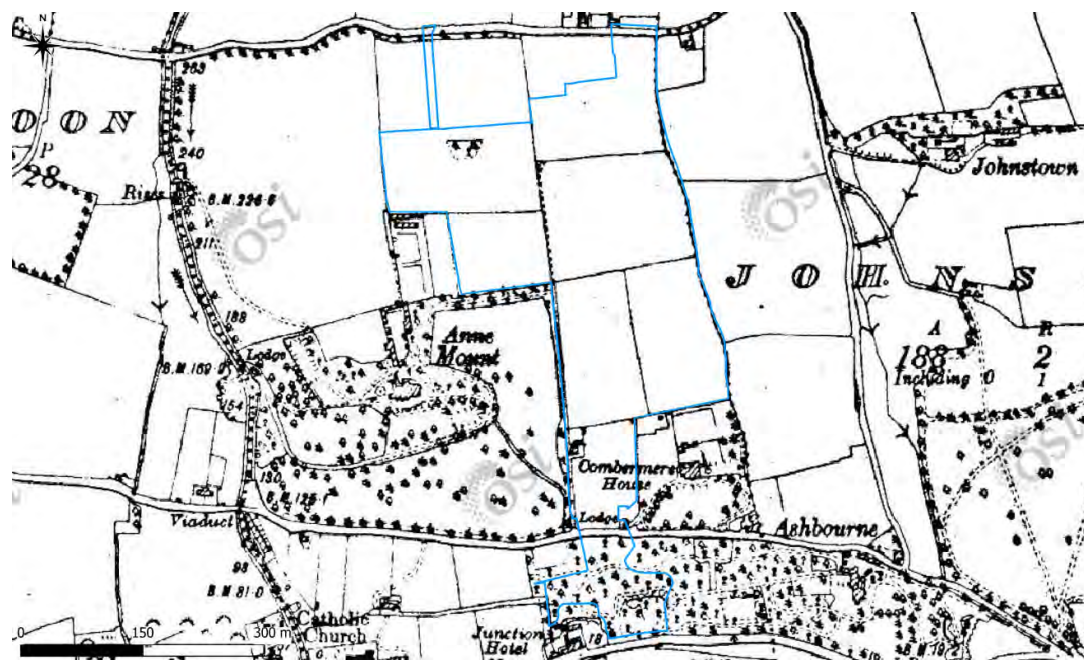


Figure 11.6: Extract from Cassini edition O.S map showing boundary of proposed development (OSI licence ref. 0003321)



11.3.3.4 Review of Aerial/Satellite Images

A review of publicly accessible aerial photographic sources from the Ordnance Survey of Ireland, Google and Bing Maps was undertaken in order to assess if any traces of potential unrecorded archaeological sites were visible within the study area. There were no potential unrecorded archaeological sites identified within the fields in the northern end of the proposed development site, which are shown following tilling on a number of examples, during the review of these sources. The detail on the reviewed images also demonstrates the extent of late 20th century housing development within the Anne Mount property to the west of the proposed development. The house itself is now longer extant and its former gardens are entirely occupied by modern detached residences, with associated internal access roads and house boundaries. The combined construction of these modern residences which also appears to have involved extensive landscaping ground works that have significantly altered the internal area of the Anne Mount property as depicted on the historic OS maps. Two detached small structures are shown within the overgrown field between the Anne Mount and Combermere properties on all reviewed images and, as noted within the below Field Survey section, these were not observed during fieldwalking. The southern end of the proposed development is shown as a wooded area on all reviewed aerial images which did not allow for an assessment of underlying ground conditions.

Figure 11.7: Aerial image of proposed development site (numbers cross-refer with Table 11.8)



11.3.3.5 Undesignated Cultural Heritage Assets

While encompassing the archaeological and designated architectural heritage resources, cultural heritage also includes various undesignated assets including vernacular structures, historical townscapes, demesne features, townland boundaries, folklore and place names. The well feature and unlabelled building shown on the 25-inch map within the quarry area in the south end of the proposed development are the only extant built structures within the site boundary and are described within the Field Survey section of this chapter (**Section 11.5**).

Townland Boundaries

There are no internal townland boundaries extending through the proposed development site although the eastern boundary of three fields in the northern area forms the boundary between Lackenroe and Johnstown townlands. This comprises an earthen field bank topped with trees and bushes, and this will form the eastern boundary of the proposed development.

Placenames

The proposed development is located entirely within the townland of Lackenroe and a further seven townlands are located within the c.1km study area (Ballycurreen, Ballyhennick, Ballynaron, Courtstown, Johnstown, Killahora and Rowgarrane). Townlands are the smallest unit of land division in the Irish landscape and many preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The layout and nomenclature of Irish townlands was recorded and standardised by the work of the Ordnance Survey in the 19th century. The Irish translations of the townlands names often refer to natural topographical features, but some name elements may also indicate the presence of past human activity within the area, e.g., dun, lios or rath indicate the presence of a ringfort while temple, saggart, termon or kill record an association with a church site. The available Irish origins and translations of the names of the townlands within the study area were sourced from www.logainm.ie.

Table 11.7: Translation of townland names within Study Area

Townland	Irish Origin	Translation	Archaeological Indicator?
Ballycurreen	Baile Uí Chuirrín	O'Curran's Homestead	No
Ballyhennick	Baile Sheinic	(J)enick's homestead	No
Ballynaron	Baile na Rún	town of the spades	No
Courtstown	Baile na Cúirte	Courtstown	No
Johnstown	-	-	No
Killahora	Coill an Hóraigh	Hore's church or woods	Potential
Lackenroe	An Leacain Rua	Red hillside	No
Rowgarrane	Ruagharrán	Red shrubbery	No

11.3.4 Field Survey

The proposed development site and its environs were inspected on by the authors on a number of occasions in August and September 2021 and were assessed in relation to existing land use, vegetation cover and the potential for the presence of unrecorded archaeological features and other features of cultural heritage interest. Extracts from the photographic record of the site survey are provided in **Appendix 11.1** and descriptions of the fields are presented in Table 11.8. The southern end of the proposed development site was also inspected by a historic landscape specialist (Louise Harrington) in September 2021 and further details on this inspection are presented in **Appendix 11.2**.

The proposed development site occupies the south-facing slopes of a ridgeline that commands expansive views over the landscape to the south, including over the River Lee. The gradients within the site are dominated by downslopes to the south which range from gentle to steep and there are no natural watercourses within the boundary. The northern

end of the proposed site is occupied by six fields which are enclosed with earthen field banks lined with trees and uniformly thick undergrowth. While the reviewed aerial images of the proposed development site during the past two decades show the fields undergoing periodic tilling, all areas were under grass growth at the time of inspection and no active agricultural use of the lands was evident. The interior of the agricultural fields in the northern end of the site were all vacant with no visible surface traces of structures, footpaths, farm lanes or other agricultural features.

Table 11.8: Description of Field Survey Results (please cross-refer to Figure 11.7)

Field	Description
1	Irregular field area measuring c.135m north to south at the west by c.165m west to east at the south (Plate 11.1). The field is shown as a portion of a larger field on both the 6-inch and Historic 25-inch OS maps whilst both show a townland and parish boundary comprising the eastern boundary. Recent aerial imagery reveals the field is bound to the south, west and east by tree-lined hedgerows whilst the field is bound to the north by a row of three modern houses. On inspection the field is slightly overgrown, gently sloping southwards and provides excellent views of the lands to the south. The field is bound to the south and west by an overgrown earthen bank with mature tree cover. The western boundary shows evidence of field clearance. A row of houses separated from the field by a low earthen bank with dense shrub growth forms the northern boundary. The eastern field boundary forms the boundary between the townlands of Lackenroe and Johnstown and comprises a hedgerow on top of a low earthen bank with no surface traces of an adjoining ditch feature (Plate 11.2). This feature also extends along the east sides of Fields 4 and 6 to the south.
2	This sub-rectangular field area measures c.95m north to south at the east by c.185m west to east at the south (Plate 11.3). It is shown as the southern end of a larger field on the 1st edition 6-inch OS map which is subdivided by a north-south field boundary on the 25-inch OS map with a small cluster of trees in the centre of the northern side. Tree-lined hedgerows form the boundaries on all four sides with modern houses in adjacent properties to the north and southwest. The field is accessed via a gap in the hedgerow in the southwest corner of Field 1 and is slightly overgrown and steeply sloping to the south. There is a cluster of trees in the centre of the northern boundary, which is separated from a row of houses by overgrown shrub-growth. The western boundary is comprised of overgrown hedgerow with tree cover and shows evidence of field clearance. The western side of the southern boundary is separated from two detached modern houses behind by a random rubble wall that encloses both properties (Plate 11.4). This boundary is visible on the historic 25-inch OS map and delimits an enclosed area to the north of Anne Mount house which is now occupied by the two modern houses. The feature forms the garden boundary of the private houses to the south and will be retained.
3	This sub-rectangular field measures c.90m north to south at the east by c.112m west to east at the north. It is shown as a portion of a larger field on the 1st edition 6-inch OS map while the 25-inch OS map shows the current layout. Tree-lined hedgerows bound all four sides of the field with modern houses within the adjoining properties to the south and west. The field is gently sloping to the south and slightly overgrown. The field is bound to the south by a modern garden wall whilst a stone-wall shown on the 25-inch OS map forms the western boundary (Plate 11.6). This now forms the garden wall of a modern house to the west and will be retained. The topsoil had been removed from a small section of the north end of these field and no potential archaeological features were noted during a visual appraisal of the exposed natural subsoil (Plate 11.5).

Field	Description
4	This sub-rectangular field measures c.127m north to south at the east by c.182m west to east at the south (Plate 11.7). The field is shown in its current form on both the 1st edition 6-inch and 25-inch OS maps with the former depicting tree-lined boundaries on the north and south sides. The eastern field boundary forms the townland boundary between Lackenroe and Johnstown and comprises a low earthen field bank with a hedgerow on top with no surface traces of an adjoining ditch feature. The ground surface within the field was under grass and weed growth at the time of inspection and the gradient slopes moderately down to south.
5	This sub-rectangular field measures c.175m north to south at the west by c.91m west to east at the north (Plate 11.9). The field, along with Field 6 to the east, is shown within woodland to the east of Anne Mount house on the 6-inch OS map, with no associated features such as walkways indicated in the area. The woodland is no longer present on the 25-inch OS map and its former extent in this area is shown subdivided into two fields. This indicates that the trees were felled, and the lands put into agricultural use during the second half of the 19 th century. Tree-lined hedgerows form the boundaries on all four sides with modern housing behind the western boundary. The field is slightly overgrown and is gently sloping to the south. Access is through a gap in the northern boundary with Field 4 which is comprised of a mature tree-lined hedgerow with an earth and stone bank running through the centre. The south and east boundaries are of the same nature as the north with evidence of field clearance material in the southern boundary.
6	Sub-rectangular field measuring c.172m north to south at the west by c.103m west to east at the south (Plate 11.10). As with Field 5 to the east, this field was shown within the woodland to the east of Anne Mount house on the 6-inc map while its current layout is shown on the 25-inch OS map. Tree-lined hedgerows comprise the boundaries on all four sides with modern housing behind the western boundary. The field gently slopes down to the south and is accessed from Field 5 via a gap in the southwest corner while it is separated from modern housing to the south by a modern fence line. The north, west and east boundaries are comprised of a mature tree-lined hedgerow with an earthen bank running through the centre.
7	Irregular field area measuring c.128m north to south at the west by c.78m west to east at the north end. The field is shown within an area of woodland on the 6-inch OS map which had been cleared by the time the 25-inch OS map was compiled. The field was overgrown at the time of inspections and was only accessible in the centre of the northern side (Plate 11.11). The northern boundary was comprised of an earth and stone bank with mature tree growth. A cluster of planted young trees was visible in the northeast corner. The area is accessed from a modern field gate on the road to the south and this section of road is flanked by on both sides by overgrown low, random rubble walling which do not form the remains of estate boundaries and are of no architectural heritage interest.

Field	Description
8	<p>This area comprises a wooded plot in the south end of the proposed development site which slopes moderately to steeply down to the south. A cleared footpath within the woodland, both of which are not shown on the 6-inch or 25-inch OS maps, extends along the east side of the area (Plate 11.13). The woodland and a number of meandering pathways are shown in this area on the 1930s-40s Cassini edition OS map and are associated with an expansion of the landscaping works associated with Ashbourne House during the early 20th century.</p> <p>The heavily overgrown quarry area, which is indicated on the historic OS maps, contains the only built features identified within this area. The quarry itself remains as a partially overgrown cut face of exposed limestone and an inspection of the area indicates that the ground levels to the south of the face have been extensively reduced by 19th century extraction works (Plate 11.14).</p> <p>A small, overgrown, circular, corbelled structure is located to the south of the quarry face (approximate ITM co-ordinates 577287 (E), 573397 (N)). This is a grotto built as part of the garden developed by R.H. Beamish. The exterior of the grotto and its surrounds are heavily overgrown and a full appraisal of the structure, including the compilation of detailed drawn and photographic records, will not be feasible prior to careful vegetation removal from its exterior and immediate surrounds. An inspection of the accessible interior of the random rubble structure demonstrated that it is constructed with poorly sorted, unhewn limestone blocks (probably quarry rubble). The inspection also revealed that sections of the stonework are bonded with a cement-rich aggregate mortar, but it was unclear if this material represented later repair works or was an original element of the structure. Overall, the walls of the structure have a “dry stone” appearance. The structure is accessed from an opening on the east side which measures 1.56m in height with widths of 1.22m at top and 1.30m at base and is topped with a 1.60m long sandstone lintel. The internal area measures 160m in diameter by a maximum of 2.2m in height measured from the existing internal ground surface to the roof. Given the presence of thick overgrowth it was not possible to accurately assess the wall thickness but based on an inspection of the visible entrance area, the thickness in this area appears to be in the range of 0.5m to 0.7m. There were no visible traces of internal wall features present, e.g., seat ledges, storage niches, shelves, door features or a roof opening. The existing floor is formed by loose soil with no surface trace of a constructed surface feature and the only visible surface inclusions comprised modern debris, primarily discarded drink cans and various plastic wrappers and bottles. While the presence of thick overgrowth precluded a full inspection of the structure, it is well-preserved, and no sections of collapsed stonework were noted within the internal space (Plates 11.17 and 11.18).</p> <p>A much-altered single storey flat-roofed building to the south of the grotto structure appears to form the surviving western end of a larger unlabelled structure shown in this area on the 25-inch OS map. No surface traces of the demolished section of the building on the east side were observed. The surviving structure comprises a single room with a long axis north to south and the internal area, which has a soil floor, measures 2.3m wide by 4.6m long and 2.05m in height. It is accessed from doorway on the north side and a small window opening in the east wall likely opened to the interior of the demolished section of the building in that direction (Plate 11.16). The walls are of random limestone rubble construction while the roof is of concrete slab construction. The exterior of the structure is partially overgrown, and it has also been obscured by spoil material deposited within its surrounds (Plate 11.15). Based on the reviewed cartographic sources and an appraisal of its extant remains, the structure forms a remnant part of an otherwise demolished late 19th century building within the quarry.</p> <p>No traces of other structures, footpaths, work yards or features associated with the early 20th century rock garden were noted in the area, but it is noted that the presence of thick overgrowth may obscure surface remains of such features. The grotto is to be retained as part of the proposed development and the single-storey flat-roofed building (to the south of the grotto) is to be removed.</p>

11.3.5 Summary

There are no recorded archaeological sites located within the proposed development site or within 600m of its boundary. There are no National Monuments in State Care located within the study area and the recorded elements of the archaeological resource (ringforts, enclosure and fulacht fiadh) within the area are types common to the wider region and are of likely medium value albeit with the potential to contain elements of higher value although this cannot be ascertained without recourse to archaeological excavation. While no evidence for potential unrecorded archaeological sites within the site boundary was identified during the desktop study and field surveys undertaken as part of this assessment, the potential does exist for the presence of unrecorded, sub-surface archaeological sites within greenfield areas.

There are no extant designated architectural heritage structures located within the proposed development site or within 200m of its boundary and the examples within the wider study area are deemed to be of regional significance by the NIAH and are, therefore, of likely medium value. While two fields within the site were formerly within an area of woodland associated with Anne Mount House (Protected Structure 00499) to the west, the woodland in this area was removed in the second half of the 19th century and the cleared area was converted into agricultural fields outside of the house grounds. Anne Mount House, while listed as a Protected Structure RPS 00499, is no longer extant and its historic grounds in the property to the west and south of the proposed development site have been extensively altered by 20th century housing developments. The remnant remains of boundary features around the former house's grounds bound, but do not extend into, the proposed development site and will be retained. Given the demolition of the house combined with the widespread construction of modern housing developments within and surrounding its former grounds, the Anne Mount property is deemed to be of low cultural heritage value.

The southern portion of the proposed development (Field 8) contains the relict remains of a former rock garden (and associated grotto structure) situated within a former quarry. The former garden was associated with Ashbourne House, a protected structure. The relict rock garden is located within the curtilage and attendant grounds of the protected structure and considered to be of medium cultural heritage value. Within and adjoining the disused quarry are the only extant structures located within the proposed development site. Of these two structures, the first is a grotto that is of medium cultural heritage value given its association with the early 20th century expansion of the gardens of Ashbourne House. Though an undesignated structure that is heavily overgrown, the grotto possesses strong historical associations. The second structure is a much-altered 19th-century single-storey flat-roofed structure that is deemed to be of negligible cultural heritage value.

11.4 IMPACT ASSESSMENT

11.4.1 Do Nothing Scenario

A 'Do Nothing Scenario' will result in no predicted impacts on recorded and potential cultural heritage assets within the study area.

11.4.2 Construction Phase

Archaeology

There are no recorded archaeological sites within the proposed development site, or within 600m of its boundary, and the construction phase of the proposed development will, therefore, have no likely adverse direct or indirect impacts on the known archaeological resource during the construction phase. While no evidence for unrecorded archaeological sites or features was identified within the proposed development site during the desktop research and field surveys carried out as part of this assessment, the potential exists for the presence of unrecorded, sub-surface archaeological features in undisturbed green field areas. As the existence, nature and extent of any unrecorded archaeological features within the study area are unknown; the nature and significance of potential impacts is indeterminable. However, ground works required for housing construction will have the likely potential to result in negative, direct, permanent, irreversible impacts of unknown significance on any sub-surface or in-channel archaeological features that may exist within the footprint of the proposed development.

Architectural Heritage

As noted in Section 11.4.6, the only remnant features associated with the former Anne Mount House (Protected Structure 00499) to the south and west of the proposed development are boundary features shown on historic OS maps and the construction phase will have no predicted direct impact on these boundaries. The character of the area within the former grounds of this protected structure has been significantly altered by the presence of modern housing developments. The construction phase of the proposed development will, therefore, result in an indirect, negative, not significant, temporary impact on the former site of Anne Mount House during the construction phase.

The proposed development will have no predicted significant impact on the architectural heritage significance and setting of Ashbourne House during the construction phase of the proposed development. The portion of the development site that contains a former section of Ashbourne Garden has been in separate ownership (from that of Ashbourne House) for over 50 years and, as of November 2021, the planning authority has not notified the owner and/or occupier of the development site that the land is within the curtilage and attendant grounds of Ashbourne House (and indeed the Record of Protected Structure specifically references "Ashbourne House Hotel" in the description in the naming of the protected structure). However, for the purposes of this

assessment, it is considered that the development does extend into the curtilage and attendant grounds of Ashbourne House. The impact of the development on the former garden and associated features within the subject site is dealt with below and in the Historic Landscape Impact Assessment prepared by Ms Louise Harrington as part of the assessment process (see **Appendix 11.2**).

Cultural Heritage Assets

The townland boundary between Lackenroe and Johnstown comprises an overgrown field bank that extends along the eastern edge of the proposed development. This feature will be retained as part of the proposed development and no construction phase impacts are predicted.

The southern end of the proposed development extends into an area that was formerly part of the extended gardens of Ashbourne House (Protected Structure 00498) but which are now in separate ownership and have become alienated from the protected structure (Ashbourne Hotel (Ashbourne House Hotel)). Though abandoned and in a poor state of preservation, the former gardens, for the purposes of this assessment, are considered to form part of the curtilage and attendant grounds of the protected structure. This area was developed as a landscaped rock garden area in the early 20th century but fell into disuse and was abandoned in the latter half of the same century. The area is now heavily overgrown and no longer forms part of the curtilage of the protected structure (having ceased to be in the same ownership as Ashbourne House since 1970). The construction phase of the proposed development will result in a direct, negative, moderate permanent impact on the former garden.

The potential also exists for the presence of overgrown features associated the early 20th century rock garden within this area. As the existence, nature and extent of any unrecorded rock garden features within this area are unknown; the nature and significance of potential impacts is indeterminable. However, ground works during the construction phase will have the potential to result in negative, direct, permanent, irreversible impacts of unknown significance on any such features that may exist within the footprint of the proposed development.

Given its cultural heritage significance, the grotto structure within the rock garden will be retained and conserved as part of the proposed development. The footprint of a proposed apartment building has been modified to avoid a direct impact on the structure. The construction phase of the proposed development will result in an indirect, negative, moderate permanent impact on the setting of this structure.

The construction phase of the proposed development will involve the demolition of the much-altered 19th-century single-storey structure located to the south of the grotto; given its negligible cultural heritage value, the demolition will result in a direct, negative but not significant permanent impact.

11.4.3 Operational Phase

Archaeology

There are no recorded archaeological sites within 600m of the boundary of the proposed development. Of the four recorded examples located within the surrounding 1km study area (Table 11.5) only two remain above ground remains these comprise two ringforts (CO075-009— and CO075-010—) located in private lands at distances of 625m and 685m to the west of the proposed development. A number of modern residential developments have been constructed between these ringforts and the proposed development and there is no inter-visibility between their locations. No potential visual impacts on the recorded archaeological sites within the surrounding study area are predicted. The proposed development will, therefore, result in no predicted direct or indirect impacts on the known archaeological resource during the operational phase. The implementation of the mitigation measures outlined in **Section 11.6** will provide for either the avoidance of such features or the recording of any currently unrecorded archaeological features within the proposed development boundary by systematic archaeological excavation. As a result, the operational phase of the proposed development will have no predicted impact on this element of the cultural heritage resource during the operational phase.

Architectural Heritage

The character of the former grounds of Anne Mount House (Protected Structure 00499) to the south and west of the proposed development has been significantly altered by the removal of the house and the presence of modern detached housing developments within its grounds. The remnant boundary of this property will be retained in situ during the operational phase of the proposed development. The operational phase of the proposed development will, therefore, result in a likely negative, not significant, indirect, permanent impact on the former site of Anne Mount House.

Cultural Heritage Assets

The recorded location of a landscaped rock garden within the southern end of the proposed development site has become almost entirely obscured by heavy overgrowth and the neglect of the area has resulted in a negative impact on its setting. The planned removal of overgrowth from the former rock garden area and the facilitation of access to the location will also have the potential to result in a direct, positive, moderate, permanent impact on this area of cultural heritage interest during the operational phase of the proposed development. The extant grotto feature within this former rock garden will be retained in situ at a distance of 2.7m from the retaining wall of a proposed apartment building and this will result in an indirect, negative, moderate permanent impact on the setting of this structure. The removal of vegetation from the structure and the planned programme of repairs to the structure (in line with an outline conservation method statement (see **Appendix 11.3**) and the Outline Construction & Environmental Management Plan prepared by AECOM Ireland Ltd) will result in a direct, positive, moderate permanent impact on this structure.

11.4.4 Cumulative Impacts

A review of a number of completed and proposed developments within the study area was carried out in order to assess potential cumulative impacts on the cultural heritage resource and this included reviews of online planning files published on the Cork County Council (CCC) planning enquiry system and the Excavations Database.

The Excavations Database does not include any entries for archaeological investigations associated with the modern housing developments within the Anne Mount grounds to the west and south of the proposed development. A review of planning files published for two of these housing developments (CCC refs 164790 and 1204156) revealed that no archaeological conditions were included in the grant of planning.

Cork County Council commenced a Part 8 process in 2020 for the proposed development of a Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune and this scheme is currently under construction. It entails the creation of a 3m wide shared pathway along the north side of the L3004 (former N25) roadway with a 1m wide landscaped separation between the path and the road carriage. The section of the route adjacent to the existing roadway extending through the general Glounthaune area will not impact on any recorded archaeological sites or architectural heritage structures.

An application for the construction of 94 residential houses within a property adjoining the eastern side of the south end of the proposed development is currently pending a decision from Cork County Council (CCC ref. 21/5072). This property contains a Protected Structure (Ashbourne House RPS 00498) and the online planning file for this proposed development contains an Architectural and Historic Landscape Appraisal prepared by Louise Harrington in April 2021 which presents an impact assessment and proposes mitigation measures. There are no recorded archaeological sites within the property and application documents for this proposed development do not include an Archaeological Impact Assessment. It is noted that a further information request issued by Cork County Council in June 2021 does not include any requirement for an archaeological assessment.

An application for the construction of 12 residential houses within a property 170m to the east of the proposed development site is currently pending a decision from Cork County Council (21/4622). A review of its location revealed that there are no recorded archaeological sites or designated architectural structures located within the application boundary and the application documents in the relevant online planning file do not include any cultural heritage assessment reports.

An application for the demolition of the Great O'Neill Public House, formerly outside the southeast end of the proposed development site, and the construction of an apartment building was lodged with Cork County Council (CCC ref.18/6250) and was subsequently referred to An Bord Pleanála

(APB 304427-19). The Public House was not a designated architectural heritage structure and none of the conditions attached to the Board's grant of permission relate to cultural heritage.

A SHD application for the construction of 174 residential houses in a green field site to the east of the village was granted permission by An Bord Pleanála (ABP ref. 301197-18). There are no recorded archaeological sites or designated architectural heritage structures located within the application boundary. The Inspector's Report notes that the Department of Arts, Heritage and the Gaeltacht made a submission which recommended that archaeological testing be required before construction by a condition on any grant of permission. The Board included a Condition (No. 13) requiring the developer to employ a suitably qualified archaeologist to monitor all site investigation and other excavation works. This development is under construction with the initial phases occupied, and a review of the Excavation Database did not reveal any entries detailing the discovery of previously unrecorded archaeological features during archaeological monitoring of ground works in this property.

An application for the construction of 38 residential houses within a green field location immediately to the west of the northern end of the proposed development was lodged with Cork County Council (CCC ref. 17/5699) and was subsequently referred to An Bord Pleanála (APB 300128-17). The property contains no recorded archaeological sites or designated architectural structures and the grant of permission issued by the Board contained no conditions in relation to any aspect of the cultural heritage resource. An application for the demolition of 2 agricultural buildings and the construction of 21 no. units to the south of this location has also been submitted to Cork County Council (Planning Reference 21/6851) and this application is currently pending a decision. There are no recorded archaeological sites or designated architectural structures located within the boundary of this area.

Based on the results of the assessment of the proposed development in combination with the above developments, it is concluded that it will not result in any significant adverse cumulative impacts on the archaeological, architectural and cultural heritage of the wider area.

11.4.5 'Worst Case Scenario'

If the proposed development were to proceed without the implementation of the archaeological mitigation measures outlined in **Section 11.6** then construction works could result in permanent, direct, significant, negative impacts on any unrecorded, sub-surface archaeological features that exist within the site.

11.5 MITIGATION AND MONITORING OF PROCESS

Archaeology

Given the scale and extent of the proposed development works within undeveloped greenfield areas, a programme of archaeological investigations, to comprise a geophysical survey of such areas followed by targeted archaeological test trenching, will be undertaken prior to the commencement of the construction phase. The presence of woodland and thick overgrowth within the southern end of the proposed development will act as a constraint for carrying out pre-development geophysical and test trenching investigations in this area. All vegetation clearance and ground works within this area will be, therefore, subject to constant archaeological monitoring during the construction phase. These works will be carried out by a suitably qualified archaeological specialists under licences issued by the National Monuments Service. In the event that any previously unrecorded archaeological or cultural heritage features are identified during these site investigations, they will be recorded and left to remain *in situ* within cordoned off areas while the National Monuments Service and the Cork County Council Archaeologist are consulted to determine further mitigation measures which may entail preservation by avoidance or preservation by record through systematic archaeological excavation.

There are a number of obligatory processes to be undertaken as part of archaeological licence applications and these will allow for monitoring of the successful implementation of the archaeological mitigation measures. Method statements detailing the proposed strategy for site investigations will be submitted for approval to the National Monuments Service as part of the licence applications. These will clearly outline the proposed extent of works and outline the consultation process to be enacted in the event that any unrecorded archaeological sites or other features of cultural heritage significance are identified, including remains of the rock garden features within the southern end of the proposed development. A report will be compiled on all site investigations which will clearly present the results in written, drawn and photographic formats. Copies of these reports will be submitted to the National Monuments Service, Cork County Council and the National Museum of Ireland. In the event that any sub-surface archaeological deposits, features or artefacts are identified during site investigations the Planning Authority and the National Monuments Service will be consulted to determine further appropriate mitigation measures.

Architectural Heritage

The locations of the remnant boundary features associated with the former Anne Mount House property, which now form garden boundaries of modern detached houses adjoining the north end of the proposed development will be cordoned off for the duration of the construction phase.

Undesignated Cultural Heritage Assets

The following mitigation measures (derived from an outline conservation method statement contained in **Appendix 11.3**) will be adopted during the construction phase to ensure the protection of the extant grotto feature within the southern end of the proposed development (the Outline Construction & Environmental Management Plan prepared by AECOM Ireland Limited that accompanies the SHD application reflects these mitigation measures).

Preliminary works

- The principal requirement will be the demarcation and protection of the structure prior to commencement of any site development works. Given the overgrown nature of the structure, it is easily overlooked and consequently vulnerable to inadvertent damage through tree-felling and machine/plant movements.
- A masonry conservation specialist shall be appointed to oversee the demarcation and vegetation clearance for the creation of a buffer/protection zone. A tree surgeon will undertake targeted tree-felling within the environs under the supervision of the conservation specialist, if required. At later stages of the works, the protection/buffer zone will provide protection from construction activity/traffic associated with the wider site. The fencing will also control access mortar mixing area and storage of materials.
- The structure will be demarcated by buffer zone consisting of a temporary demountable fence (i.e. "Heras" fence or similar) that provides a minimum of 2.7 metres clearance around the structure. To achieve the clearance to erect the fence line, trees and shrubbery within the buffer zone will be cut back, taking due care to prevent damage to structure. No removal of embedded roots (or grubbing up of the ground surface) will be undertaken without the express consent/approval from the masonry conservation specialist.
- On the removal of the vegetation to expose the structure, a full appraisal of the structure, including the compilation of detailed drawn and photographic records, will be undertaken by the masonry conservation specialist. If necessary, scaffolding will be erected to provide safe access to the upper portions of the structure. Following such an appraisal the masonry specialist will specify any required additional and/supplementary conservation measures.

Guidance for conservation works

- A suitably experienced masonry contractor shall be appointed to undertake the conservation of the grotto structure. The contractor shall have demonstrable experience of the repair of dry-stone walling and the use of traditional lime mortars; the contractor will be directed and supervised by the client's masonry conservation specialist.
- Mortar has been used within the core of the walls to provide a key for walling material; however, the walling has a drystone appearance that is imperative to retain. To provide a sound base for the replacement any mortar, it will be necessary to remove any decayed or defective mortar. The raking-out will be

done with care to avoid damaging the edges of the underlying stones. The aim is to reach the position where sound mortar remains within the body of the walls. In the raking out process, power tools will not be used as they can be difficult to control and can badly damage or mark the remaining stonework.

- In some localised areas, it may be necessary to dismantle and repair a particular loose section of the masonry. Dismantling will occur so that the stones area carefully laid out beside each other in the manner by which they were taken apart from the wall.
- In preparation of mortar, it will be important to "batch" the volume of the lime, sand, and aggregates accurately to that the successive mixes can follow the same proportions.
- As works progresses care will be exercised to finish off the appearance of the structure in such a way as to match the original. The dry-wall appearance will be retained/maintained.
- Works will not be carried out in extreme weather conditions, and particular care needs to be exercised if work is being carried out when there is a risk of frost. In such cases, some form of insulation should be provided to protect the wall face that has been worked on. Usually this is provided by hessian sheets. Equally, care needs to be exercised during repointing works when heavy rain is expected. In extremely hot weather intermittent gentle spraying with clean, or covering the work with dampened hessian, will help prevent too rapid drying.

11.6 RESIDUAL IMPACTS

There are no recorded archaeological sites located within the proposed development area or within 600m of its boundary. Any potential impacts on any sub-surface archaeological features that may exist within site will be addressed by mitigation during the pre-construction and construction phase of the proposed development which will provide for the recording and/or avoidance of any potential sub-surface archaeological features that may exist within the proposed development site. As a result, no residual impacts on the archaeological resource are predicted to arise from the proposed development.

The locations of the remnant boundary features associated with the former Anne Mount House property, which now form garden boundaries of modern detached houses adjoining the north end of the proposed development will be cordoned off for the duration of the construction phase to prevent negative impacts. Furthermore, the proposed development will not impact the architectural heritage significance of Ashbourne House. As a result, no residual impacts on this element of the architectural heritage resource are predicted to arise from the proposed development.

With respect to the cultural heritage significance of the former rock garden and associated grotto structure, the implementation of the mitigation measures outlined in this chapter and the outline CEMP will ensure that the residual effect on the receiving environment is both managed and minimised.

11.7 PROJECT REFERENCES

Cork County Council (2014) *Cork County Development Plan 2014*

Cummins, T. (2005) 'Johnstown, Co. Cork: Licence 05E0697'. www.excavations.ie

Department of Arts, Heritage and the Gaeltacht (2011) *Architectural Heritage Protection Guidelines for Local Authorities*. Dublin: The Stationery Office.

Department of Arts, Heritage, Gaeltacht and the Islands (1999) *Framework and Principles for the Protection of Archaeological Heritage*. Dublin: The Stationery Office.

EPA (2017) *Draft Guidelines on the Information to be contained in EIARs*

Harrington, L. (2021) "Historic Landscape Impact Assessment, Lackenroe, Glounthaune, Co. Cork". Unpublished report prepared by Louise Harrington, Architectural Heritage & Historic Landscape Consultant, Cork

ICOMOS (2011) *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*

Lewis, S. (1837) *Topographical Dictionary of Ireland*. 2 Volumes, Lewis & Company, London

National Monuments Service (2006) *Guidelines for Authors of Reports on Archaeological Excavations*

Power, D. (1994) *Archaeological Inventory of Cork: Vol. 2 East and South Cork*. Dublin: The Stationery Office.

Purcell, J. (2003) 'Ballynaron, Co. Cork: Licence 03E1929'. www.excavations.ie

Ronan, S, Egan, U. and Byrne, E. (2009) *Archaeological Inventory of Cork: Vol. 5*. Dublin: The Stationery Office.

Consulted online sources:

<http://gis.teagasc.ie/soils/map.php> (Soils)

<http://map.geohive.ie/mapviewer.html> (Geology)

<http://maps.osi.ie/publicviewer/#V2,591271,743300,1,10> (Historic maps)

<http://downsurvey.tcd.ie/down-survey-maps.php> (Down Survey)

http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple (Bedrock)

www.archaeology.ie (SMR and NIAH)

www.duchas.ie (Folklore)

www.excavations.ie (Archaeological investigations)

www.logainm.ie (Placenames)

www.heritagemaps.ie/WebApps/HeritageMaps/index.html (Partial NMI finds database)

<http://www.askaboutireland.ie/griffith-valuation/> (Griffiths Valuation)

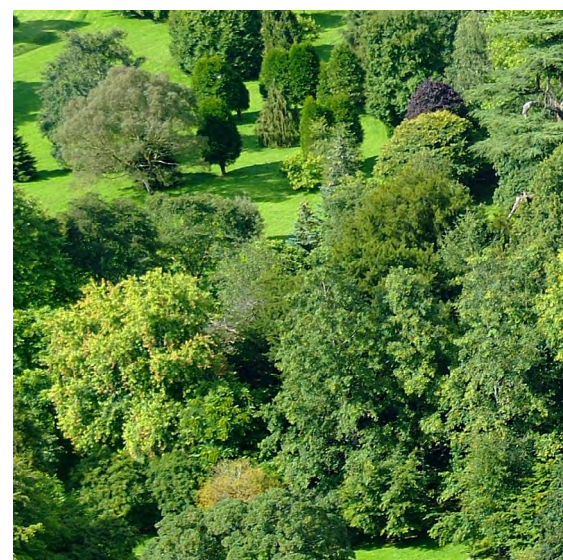
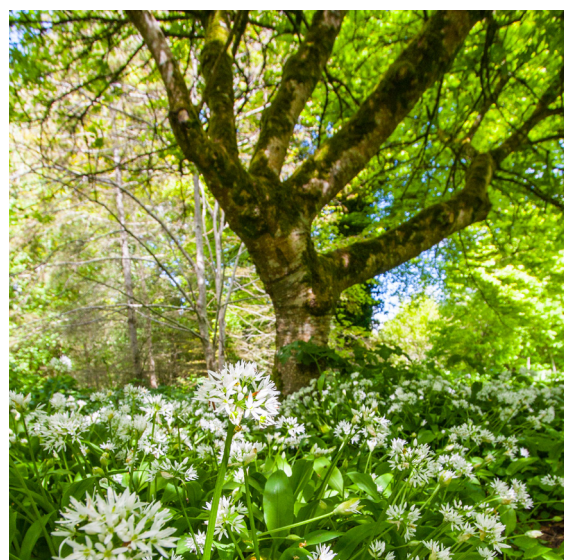
<http://landedestates.nuigalway.ie/LandedEstates/jsp/property-show.jsp?id=2025> (Landed Estates Database, National University of Galway)



LACKENROE SHD

CHAPTER 12

Air Quality & Climate



VOLUME II | EIAR

LACKENROE SHD

CHAPTER 12

Air Quality & Climate

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12 Air Quality and Climate

12.1 INTRODUCTION AND METHODOLOGIES

This chapter assesses the likely air quality and climate impacts associated with the proposed SHD at Glounthaune, Co. Cork.

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12.1.1 Methodology

This chapter has been prepared having regard to the following guidelines;

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017)
- Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 (Institute of Air Quality Management (IAQM), 2014)
- UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality (UK Highways Agency, 2019a)
- UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate (UK Highways Agency, 2019b).

12.1.2 Relevant Legislation & Guidance

12.1.2.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. 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 (see Appendix 12.1 (Volume III)).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011 (S.I. No. 180/2011), which incorporate EU Directive 2008/50/EC, which has set limit values for a number of pollutants. The limit values for NO₂, PM₁₀ and PM_{2.5} are of relevance to this assessment see “Table 12.1 Ambient Air Quality Standards”. Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directive are used which are triggers for particular actions (see Appendix 12.1, Volume III).

Pollutant	Regulation ^{Note 1}	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
Particulate Matter (as PM ₁₀)	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
Particulate Matter (as PM _{2.5})	2008/50/EC	Annual limit for protection of human health	25 µg/m ³

^{Note 1} EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

Table 12.1 Ambient Air Quality Standards

12.1.2.2 Dust Deposition Guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM₁₀) and less than 2.5 microns (PM_{2.5}) and the EU ambient air quality standards outlined in “Table 12.1 Ambient Air Quality Standards” have set ambient air quality limit values for PM₁₀ and PM_{2.5}.

With regards to larger dust particles that can give rise to nuisance dust, 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 nuisance dust 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/(m²*day) averaged over a one-year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the Bergerhoff limit value of 350 mg/(m²*day) to the site boundary of quarries. This limit value can also be implemented with regard to potential dust impacts from construction of the proposed development.

12.1.2.3 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2 °C above pre-industrial levels with efforts to limit this rise to 1.5 °C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas 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* (the Regulation). 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. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the 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 Act as the 'national transition objective'. The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act 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 *Climate Action Plan* (CAP) (Government of Ireland, 2019), published in June 2019, outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details 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 CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

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) Bill 2021 (hereafter referred to as the 2021 Climate Bill) in March 2021. The 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, 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 will also "provide 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".

The 2021 Climate Act removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request that each Local Authority produce a climate action plan lasting five years, specifying the mitigation measures and the adaptation measures to be adopted by the Local Authority.

The Cork County Council Draft Climate Adaptation Strategy published in 2019 (Cork County Council Climate Action Regional Office, 2019) outlines a number of goals and plans to prepare for and adapt to climate change in the key sectors of infrastructure and built environment, land use and development, drainage and flood management, natural resources and cultural infrastructure and community, health and wellbeing. Some of the measures promoted within the Adaptation Strategy relevant to infrastructure and built environment include integrating climate considerations into the design, planning, tendering process and construction of new developments and ensuring climate change is considered in locating future developments, the promotion of climate resilient and sustainable design and construction, the promotion of green infrastructure such as living roofs and walls, adequate assessment of the potential flooding related risks and appropriate mitigation measures required for new developments.

Under amendments to Part L of the Building Regulations from November 2019 all new buildings were required to comply with the Near Zero Energy Building (NZEB) regulations. This aims to make new residential buildings 70% more energy efficient than the 2005 levels. The amendments to Part L give effect to the European Union (Energy Performance of Buildings) Regulations 2019, published on 3 May 2019 (S.I. 183 of 2019). The regulations transpose Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings (recast), as amended by Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018. The Directive sets requirements for Member States to improve the energy performance of buildings and make an important contribution to the reduction of greenhouse gas emissions. The improved efficiency of buildings will help in reducing Ireland's GHG emissions and thus help to mitigate climate change. The regulations require that at least 20% of the total energy use of buildings is sourced from renewables. There is also a requirement to reduce the heat loss from buildings and avail of heat gain through the fabric of the building in addition to providing energy efficient space and water heating systems. The NZEB requirements will result in a typical Building Energy Rating (BER) of A2 which represents a 70% improvement in carbon emissions levels on the emissions levels of buildings from 2005.

12.1.3 Construction Phase Methodology

12.1.3.1 Air Quality

During the construction phase the main focus in relation to air quality impacts

will be from potential fugitive dust emissions from site activities. The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2014) outlines an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage 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 in order 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 considered best practice in the absence of applicable Irish guidance.

As per the IAQM guidance (2014) high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time or areas where users would expect a high level of amenity. Commercial properties, parks 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. Ecological sites can also be dust sensitive, according to the IAQM guidance high sensitivity ecological areas are defined as "locations with an international or national designation and the designated features may be affected by dust soiling".

Traffic emissions associated with construction vehicles accessing the site also have the potential to impact air quality during the construction phase. The air quality assessment has been carried out following procedures described in the publications by the EPA (2015; 2017) and using the methodology outlined in the guidance documents published by the UK Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). TII reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

In 2019 the UK Highways Agency DMRB air quality guidance was revised with LA 105 Air Quality replacing a number of key pieces of guidance (HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15). This revised document outlines a number of changes for air quality assessments in relation to road schemes but can be applied to any development that causes a change in traffic. Previously the DMRB air quality spreadsheet was used for the majority of assessments in Ireland with detailed modelling only required if this screening tool indicated compliance issues with the EU air quality standards. Guidance from TII (TII, 2011) recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this is a somewhat outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still

be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a “dirtier” fleet, vehicle emissions would be considered to be higher than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

Construction phase traffic has the potential to impact air quality and climate. The UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a), 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.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

Traffic data for the proposed development was provided by MHL & Associates Ltd to inform this assessment. None of the impacted road links meet the above scoping criteria for the construction phase and therefore, a detailed assessment is not required as there is no potential for significant impacts to air quality.

12.1.3.2 Climate

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency 2019b). This guidance is specific to road projects but can be used for any project that causes a change in traffic. The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

Traffic data for the proposed development was provided by MHL & Associates Ltd. to inform this assessment. None of the impacted road links meet the above scoping criteria for the construction phase climate impacts and therefore, a detailed further assessment is not required as there is no potential for significant impacts to climate.

12.1.4 Operational Phase Methodology

12.1.4.1 Air Quality

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The UK Highways Agency scoping criteria detailed in Section 12.1.3.1 was used to determine if any road links are affected by the proposed development and require inclusion in an air dispersion modelling assessment. Transport Infrastructure Ireland (TII) reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic. As there are road links present that exceed the scoping threshold, the assessment will proceed to a qualitative model.

The guidance states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling (UK Highways Agency, 2019a). The TII guidance (2011) defines sensitive receptor locations as: 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. Therefore, according to the scoping criteria in section 12.1.3.1 the local road links with sensitive receptors within 200 m which can be classed as ‘affected’ should proceed to an air dispersion modelling of operational phase traffic emissions due to the potential for impacts to air quality. Guidance from Transport Infrastructure Ireland (TII, 2011) recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this is a somewhat outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a “dirtier” fleet, vehicle emissions would be considered to be higher than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

The TII guidance (TII 2011) states that the assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or
- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

In addition, guidance from LA 105 - Air Quality states that a detailed assessment must be conducted where the sensitivity of the environment is medium or above when combined with a high-risk project, due to a risk of exceeding air quality thresholds.

Considering the scale of the proposed Project, its receiving environment sensitivity should be considered low due to the background NO₂ being less than 36 µg/m³. In addition the potential project risk is considered low due to its localised impacts

In accordance with both the TII and LA 105 Guidance there is no requirement to proceed to detailed modelling.

NO_x (NO + NO₂) is emitted by vehicles exhausts. The majority of emissions are in the form of NO, however, with greater diesel vehicles and some regenerative particle traps on HGVs the proportion of NO_x emitted as NO₂, rather than NO is increasing. With the correct conditions (presence of sunlight and O₃) emissions in the form of NO, have the potential to be converted to NO₂.

Transport Infrastructure Ireland states the recommended method for the conversion of NO_x to NO₂ in “*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*” (2011). The TII guidelines recommend the use of DEFRA’s NO_x to NO₂ calculator (2020) which was originally published in 2009 and is currently on version 8.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability of O₃ and proportion of NO_x emitted as NO for each local authority across the UK. O₃ is a regional pollutant and therefore concentrations do not vary in the same way as concentrations of NO₂ or PM₁₀.

The calculator includes Local Authorities in Northern Ireland and the TII guidance recommends the use of ‘Armagh, Banbridge and Craigavon’ as the choice for local authority when using the calculator. The choice of Craigavon provides the most suitable relationship between NO₂ and NO_x for Ireland. The “All Other Urban UK Traffic” traffic mix option was used.

In 2011 the UK DEFRA published research (Highways England, 2013) on the long term trends in NO₂ and NO_x for roadside monitoring sites in the UK. This study marked a decrease in NO₂ concentrations between 1996 and 2002, after which the concentrations stabilised with little reduction between 2004 and 2010. The result of this is that there now exists a gap between projected NO₂ concentrations which UK DEFRA previously published and monitored concentrations. The impact of this ‘gap’ is that the DMRB screening model can under-predict NO₂ concentrations for predicted future years. Subsequently, the UK Highways Agency published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years. This methodology has been used in the current assessment to predict future concentrations of NO₂ as a result of the proposed development.

The 2019 UK Highways Agency DMRB air quality revised guidance *LA 105 Air Quality* states that modelling should be conducted for NO₂ for the base, opening and design years for both the do minimum (do nothing) and do something scenarios. Modelling of PM₁₀ is only required for the base year to demonstrate that the air quality limit values in relation to PM₁₀ are not breached. Where the air quality modelling indicates exceedances of the PM₁₀ air quality limits in the base year then PM₁₀ should be included in the air quality model in the do minimum and do something scenarios. Modelling of PM_{2.5} is not required as there are currently no issues with compliance with regard to this pollutant. The modelling of PM₁₀ can be used to show that the project does not impact on the PM_{2.5} limit value as if compliance with the PM₁₀ limit is achieved then compliance with the PM_{2.5} limit will also be achieved. Historically modelling of

carbon monoxide (CO) and benzene was required however, this is no longer needed as concentrations of these pollutants have been monitored to be significantly below their air quality limit values in recent years, even in urban centres (EPA, 2020a). The key pollutant reviewed in this assessment is NO₂. Concentrations of PM₁₀ have been modelled for the base year and indicate that there are no potential compliance issues.

Data for the Do Nothing (DN) and Do Something (DS) scenarios for the base year 2022, opening year 2026 and design year 2031 were provided (see Chapter 5 for further details). The traffic data is detailed in "Table 12.2 Traffic Data Used in Local Air Quality Modelling Assessment" Background concentrations have been included as per Section 12.2.2 of this chapter based on available EPA background monitoring data (EPA, 2020a). The locations of the sensitive receptors modelled is shown in Table 12.3 and Figure 12-1.

Link Number	Road Name	Speed (kph)	Base Year	Do-Nothing			Do-Something	
			2022	2026	2031	2026	2031	
1	L2969/L2968 Junction	50	3450 (2.5%)	3690 (2.5%)	3990 (2.5%)	4050 (2.5%)	4690 (2.5%)	
2	L2968	50	3600 (2.4%)	3860 (2.4%)	4170 (2.4%)	4930 (2.4%)	5700 (2.4%)	
3	The Terrace	50	1950 (1.6%)	2090 (1.6%)	2260 (1.6%)	2190 (1.6%)	2530 (1.6%)	
4	Glouthaune Road	50	3690 (4.7%)	3950 (4.7%)	4270 (4.7%)	4500 (4.7%)	5210 (4.7%)	
5	The Terrace (south)	50	2020 (3.8%)	2160 (3.8%)	2340 (3.8%)	2260 (3.8%)	2610 (3.8%)	
6	Johnstown Close East	50	6030 (4.7%)	6460 (4.7%)	6980 (4.7%)	6620 (4.7%)	7660 (4.7%)	
7	Johnstown Close West <small>Note 1</small>	50	7250 (4.7%)	7760 (4.7%)	8390 (4.7%)	8140 (4.7%)	9420 (4.7%)	

Note 1 Road link included in the air quality ecological assessment due to proximity and change in traffic

Note 2 Traffic data was received 27/07/2021 from MHL & Associates Ltd.

Table 12.2 Traffic Data Used in Local Air Quality Modelling Assessment

Name	Receptor Type	X (ITM)	Y (ITM)
1	Residential	576796	573679
2	Residential	576835	573436
3	Residential	576831	573366
4	Residential	576715	573938
5	Residential	576977	573326

Table 12.3 Sensitive Air Quality Receptors

Figure 12.1 Sensitive Receptors for Operational Traffic Assessment



12.1.4.2 Climate

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under Regulation (EU) 2018/842 on binding annual greenhouse gas 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. Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

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 by reference to EPA data on annual GHG emissions (see Section 13.2.3). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO₂) which will impact climate.

The UK Highways Agency scoping criteria detailed in Section 12.1.3.2 was used to determine if any road links are affected by the proposed development and require inclusion in a climate modelling assessment.

The proposed development will increase traffic by more than 10% AADT on some nearby road links, therefore, the scoping criteria are met and a detailed climate assessment is required as there is a potential for significant impacts to climate as a result of traffic emissions.

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. The Energy and Sustainability Report prepared in relation to the proposed development outlines a number of measures in relation to energy usage from the proposed development primarily in relation to heat and electricity. A number of measures have been incorporated into the overall design of the development to reduce the impact to climate where possible.

12.1.4.3 Ecology

For routes that pass within 2 km of a designated area of conservation (either Irish or European designation) the TII requires consultation with an ecologist (2011). However, in practice the potential for impact to an ecological site is highest within 200m of the proposed scheme or development and when significant changes in AADT (>5%) occur. Only sites that are sensitive to nitrogen deposition should be included in the assessment. In addition, the UK Highways Agency (2019a) states that a detailed assessment does not need to be conducted for areas that have been designated for geological features or watercourses.

Transport Infrastructure Ireland's Guidelines for Assessment of Ecological Impacts of National Road Schemes (2009) and Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DEHLG, 2010) provide details regarding the legal protection of designated conservation areas.

If both of the following assessment criteria are met, an assessment of the potential for impact due to nitrogen deposition should be conducted:

- A designated area of conservation is located within 200 m of the proposed development; and
- A significant change in AADT flows (>5%) will occur.

The Great Island Channel pNHA (Site Code: 001058), Cork Harbour SPA (Site Code: 004030) and Great Island Channel SAC (Site Code: 001058) are within 200m of road links directly impacted by the proposed development and have been assessed in Section 12.4.2.4.. As such an assessment of the impact with regards to nitrogen deposition was conducted. Dispersion modelling and prediction was carried out at typical traffic speeds at these locations. Ambient NO_x concentrations were predicted for the opening year (2026) and design year (2031) along a transect of up to 200m within the SAC, SPA and pNHA in line with the UK Highways Agency (2019a) and TII (2011) guidance. The road contribution to dry deposition along the transect was also calculated using the methodology outlined in Appendix 9 of the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011).

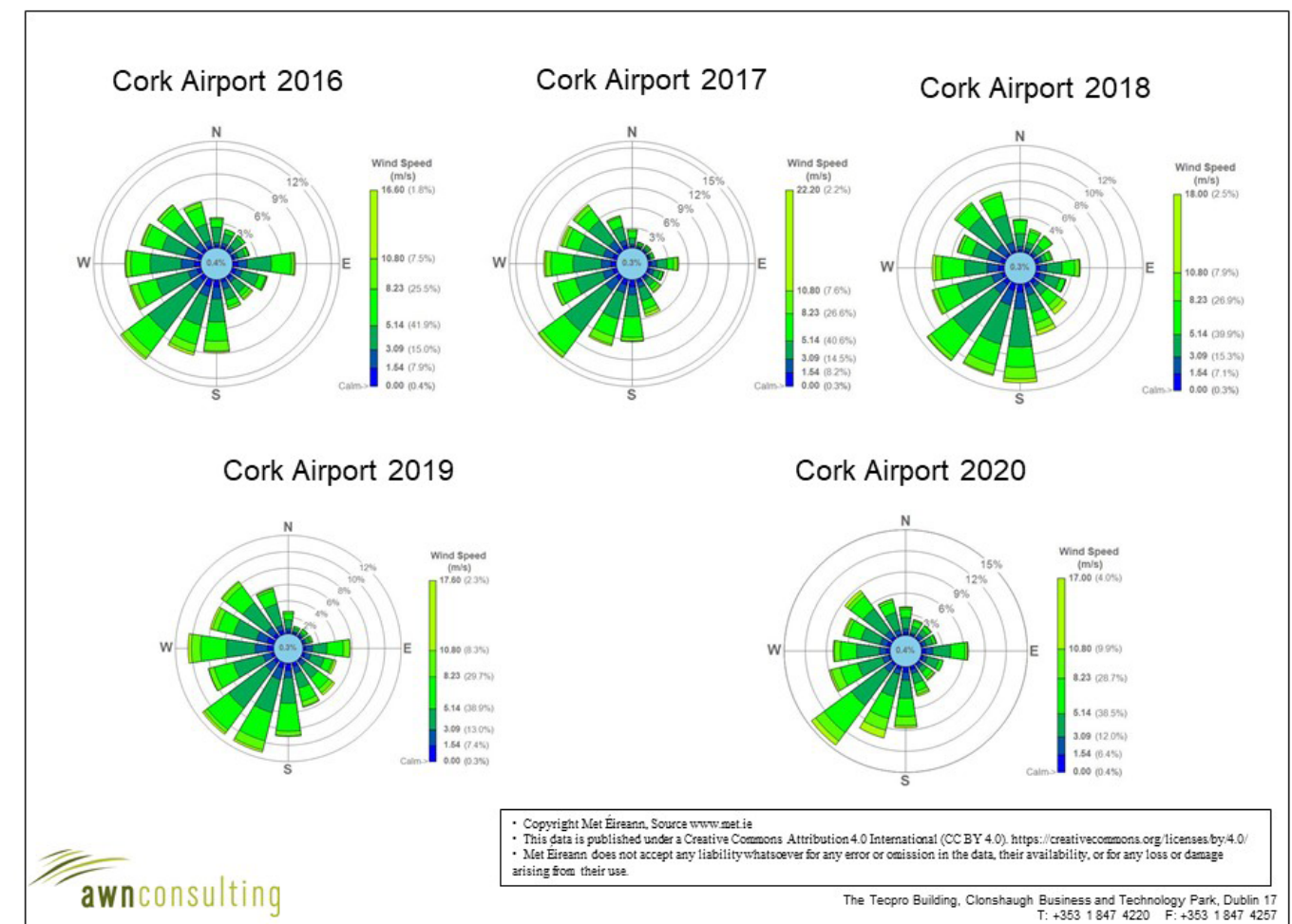
12.2 DESCRIPTION OF EXISTING ENVIRONMENT

12.2.1 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). 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 PM₁₀, 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} - PM₁₀) will actually increase at higher wind speeds. Thus, measured levels of PM₁₀ will be a non-linear function of wind speed.

Cork Airport is the nearest representative weather station collating detailed weather records, it is located approximately 12 km southwest of the proposed development at the closest point, collects meteorological data in the correct format for the purposes of this assessment and has a data collection of greater than 90%. Long-term hourly observations at Cork Airport meteorological station provide an indication of the prevailing wind conditions for the region. For data collated during five representative years (2016 – 2020), the predominant wind direction is south-westerly, with generally moderate wind speeds (see Figure 12.2 Cork Airport Windrose 2016 – 2020 (Met Eireann, 2021)) (Met Eireann, 2021).

Figure 12.2 Cork Airport Windrose 2016 – 2020 (Met Eireann, 2021)



12.2.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "Air Quality In Ireland 2019" (EPA, 2020). 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 (EPA, 2021a). The EPA data provides a long-term data set for background air quality at a variety of locations throughout Ireland. The use of existing long-term data is considered best practice in air quality assessments (TII, 2011).

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2021a). 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 but also includes 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 is on the boundary between Zone B and Zone C (EPA, 2020a). Zone B data has been used to inform background concentrations as a worst-case scenario. The long-term EPA 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.).

Long-term NO₂ monitoring was carried out at two Zone B locations – South Link Road and UCC Distillery Fields (EPA, 2020). The NO₂ annual average from 2018 to 2019 at the UCC Distillery Fields and 2015-2019 annual average at the South Link Road locations were 10.5 µg/m³ and 23.5 µg/m³ respectively. Long-term average concentrations measured at both these locations were significantly lower than the annual average limit value of 40µg/m³. The South Link Road location is located in proximity to a major road and therefore less representative of the proposed development than the UCC Distillery Fields monitoring location. Based on the above information, a conservative estimate of the background NO₂ concentration for the region of the proposed development is 10.5 µg/m³.

Long-term PM₁₀ monitoring is carried out at three suburban Zone B locations in 2019 South Link Road, Heatherton Park and Bishopstown CIT. Bishopstown CIT was a new station in 2019 with an annual mean concentration of 15 µg/m³. The average PM₁₀ concentration measured at South Link Road and Heatherton Park sites in 2015-2019 was 19 µg/m³ and 11.3 µg/m³ respectively. Based on the above information a conservative estimate of the background PM₁₀ concentration for the Zone B region of the proposed development is 15 µg/m³.

Continuous PM_{2.5} monitoring carried out Heatherton Park and Bishopstown CIT which showed annual average levels ranging from 5.7 µg/m³ to 9 µg/m³ over 2015 to 2019. The annual average level measured at these locations between 2015 and 2019 was 7.9 µg/m³ with a ratio at the Heatherton Park station between PM₁₀:PM_{2.5} of 0.7.

12.2.3 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details final emissions up to 2019 (EPA, 2021b). The data published in 2021 states that Ireland has exceeded its 2019 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.85 Mt. For 2019, total national greenhouse gas emissions are 59.78 million tonnes carbon dioxide equivalent (Mt CO₂eq) with 45.58 MtCO₂eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO₂.

GHG emissions for 2019 are 4.4% lower than those recorded in 2018. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for four years in a row. Emissions from 2016 – 2019 exceeded the annual EU targets by 0.29 MtCO₂eq, 2.94 MtCO₂eq, 5.57 MtCO₂eq and 6.85 MtCO₂eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2020 GHG Emissions Projections Report for 2020 – 2040 (EPA, 2021b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the Climate Action Plan published in 2019. Implementation of these are classed as a “With Additional Measures scenario” for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 to 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No.

406/2009/EC) 2020 targets by approximately 12.2 MtCO₂eq under the “With Existing Measures” scenario and under the “With Additional Measures” scenario (EPA, 2021b). The projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the 2019 Climate Action Plan and the use of the flexibilities available.

There are currently no sector specific emissions targets outlined for the reduction of GHG emissions.

12.2.4 Construction Dust Sensitivity

In line with the IAQM guidance document (2014) prior to assessing the impact of dust from a proposed development, the sensitivity of the area must first 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.

In terms of receptor sensitivity to dust soiling, there are more than 10 no. high sensitivity residential receptors within 20 m of the site boundary. Based on the IAQM criteria outlined in “Table 12.4 Sensitivity of the Area to Dust Soiling Effects on People and Property”, the worst-case sensitivity of the area to dust soiling is considered to be high.

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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

Table 12.4 Sensitivity of the Area to Dust Soiling Effects on People and Property

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 PM₁₀ concentration, receptor sensitivity based on type and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM₁₀ concentration in the vicinity of the proposed development is 15 µg/m³ and there are more than 10 but less than 100 no. high sensitivity receptor within 20 m of the site boundary. Based on the IAQM criteria outlined in Table “Table 12.5 Sensitivity of the Area to Human Health Impacts”, the worst-case sensitivity of the area to human health impacts is considered low.

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number Of Receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	< 24 µg/m ³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m ³	>1	Low	Low	Low	Low	Low

Table 12.5 Sensitivity of the Area to Human Health Impacts

The IAQM guidance (2014) also outlines the criteria for determining the sensitivity of an ecological receptor to dust impacts. The sensitivity 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.

Only ecological sites within 50 m of the proposed development site need to be considered in relation to dust impacts (IAQM, 2014). Great Island Channel pNHA, Cork Harbour SPA, Great Island Channel SAC are approximately 50m to the southern boundary of the site. These can be considered high sensitivity receptors according to the IAQM guidance due to the presence of nationally important species (IAQM, 2014). According to the IAQM criteria in Table 12.6 the sensitivity of the area to dust related ecological impacts is medium.

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table 12.6 Sensitivity of the Area to Dust Related Ecological Impacts

12.3 DO NOTHING SCENARIO

The Do-Nothing scenario includes retention of the current site without the proposed development in place. In this 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).

As the site is zoned for development, 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 proposed development.

12.4 LIKELY SIGNIFICANT EFFECTS

12.4.1 Construction Phase

12.4.1.1 Air Quality

The greatest potential impact on air quality during construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first

50m. 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 (see Section 12.2.1) indicates that the prevailing wind direction is south-westerly and wind speeds are generally moderate in nature. In addition, dust generation is considered negligible on days where rainfall is greater than 0.2 mm. A review of historical 30-year average data for Cork Airport meteorological station indicates that on average 204 days per year have rainfall over 0.2 mm (Met Eireann, 2021) and therefore it can be determined that over 55% of the time dust generation will be reduced. It is important to note that the potential impacts associated with the construction phase of the proposed development are short-term in nature.

In order 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 (see Section 12.2.4). The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

Demolition will primarily involve the removal of buildings or structures currently on the site in a potentially dusty manner. This may also involve dust generation at heights. Dust emission magnitude from demolition can be classified as small, medium and large and are described below.

- **Large:** Total building volume >50,000 m³, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
- **Medium:** Total building volume 20,000 m³ – 50,000 m³, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- **Small:** Total building volume less than 20,000 m³.

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 12.7 Risk of Dust Impacts - Demolition

As part of the proposed development there is the requirement for demolition of 1 no. existing derelict dwelling house and associated outbuildings. Under the IAQM guidance (2014) the proposed demolition can be classified as small. This results in an overall medium risk of dust soiling impacts, a negligible risk of human health impacts and a low risk of ecological impacts as a result of demolition activities prior to mitigation (see "Table 12.7 Risk of Dust Impacts - Demolition").

Earthworks

Earthworks typically involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. Following the IAQM guidance (2014), dust emission magnitude from earthworks can be classified as small, medium and large and are described below.

- **Large:** Total site area > 10,000 m², 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 > 8 m in height, total material moved >100,000 tonnes;
- **Medium:** Total site area 2,500 m² – 10,000 m², moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes; and
- **Small:** Total site area < 2,500 m², soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

Under the IAQM guidance (2014) the proposed earthworks can be classified as large. This results in an overall high risk of dust soiling impacts, a low risk of human health impacts and a medium risk of ecological impacts as a result of earthworks activities prior to mitigation (see "Table 12.8 Risk of Dust Impacts - Earthworks").

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 12.8 Risk of Dust Impacts - Earthworks

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** Total building volume > 100,000 m³, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 25,000 m³ – 100,000 m³, potentially dusty construction material (e.g. concrete), on-site concrete batching;
- **Small:** Total building volume < 25,000 m³, construction material with low potential for dust release (e.g. metal cladding or timber).

The dust emission magnitude from construction associated with the proposed development works can be classified as large due to the total building volume involved exceeding 100,000 m³. Therefore, there is an overall high risk of dust soiling impacts, a low risk of human health impacts and a medium risk of ecological impacts as a result of the proposed construction activities prior to mitigation (*"Table 12.9 Risk of Dust Impacts – Construction" on page 8*).

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 12.9 Risk of Dust Impacts – Construction

Trackout

Factors which determine the dust emission magnitude associated with trackout are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- **Large:** > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;
- **Medium:** 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;
- **Small:** < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

Dust emission magnitude from trackout can be classified as large under IAQM guidance as there is likely to be more than 100m of unpaved site road. This

results in an overall high risk of dust soiling impacts, a low risk of human health impacts and a medium risk of ecological impacts as a result of the proposed trackout activities prior to mitigation (*see "Table 12.10 Risk of Dust Impacts – Trackout" on page 8*).

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Table 12.10 Risk of Dust Impacts – Trackout

Summary of Dust Emission Risk

The risk of dust impacts as a result of the proposed development are summarised in *"Table 12.11 Summary of Dust Impact Risk used to Define Site-Specific Mitigation"* for each activity. The magnitude of risk determined is used to prescribe the level of site specific mitigation required for each activity in order to prevent significant impacts occurring.

Overall, in order to ensure that no dust nuisance occurs during the earthworks, construction and trackout activities, a range of dust mitigation measures associated with a high risk of dust impacts must be implemented. In the absence of mitigation dust impacts from construction works are predicted to be short-term, localised, negative and slight.

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	High Risk	High Risk	High Risk
Human Health	Negligible Risk	Low Risk	Low Risk	Low Risk
Ecology	Low Risk	Medium Risk	Medium Risk	Medium Risk

Table 12.11 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

There is also 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 provided 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 UK HA LA 105 assessment criteria in Section 12.1.3.1. It can therefore be determined that the construction stage traffic will have a neutral, imperceptible, localised and short-term impact on air quality due to the minor increase in site related traffic as a result of the proposed development.

12.4.1.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., will give rise to CO₂ and N₂O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is assessed to be neutral, localised, imperceptible and short term.

12.4.1.3 Human Health

Dust emissions from construction activities have the potential to impact human health through PM₁₀ and PM_{2.5} emissions. The overall sensitivity of the area to human health impacts from dust emissions is considered low as per Section 12.4.4. It has been established that there is a low risk of human health impacts from construction dust emissions. Therefore, in the absence of mitigation human health impacts are considered short-term, localised, negative and slight.

12.4.2 Operational Phase

12.4.2.1 Air Quality

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of NO₂ emissions for the opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

Transport Infrastructure Ireland’s document *‘Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes’* (2011) detail a methodology for determining air quality impact significance criteria for road schemes and this 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, in order to determine the degree of impact. Impacts were assessed at 5 no. worst-case sensitive receptors, residential properties (R1 to R5) within 200m of the road links impacted by the proposed development (see Table 12.3 Sensitive Air Quality Receptors and Figure 12.1 Sensitive Receptors for Operational Traffic Assessment). These five properties are a representative sample of sensitive receptors on the impacted roads.

The results of the assessment of the impact of the proposed development on NO₂ in the opening year 2026 are shown in *"Table 12.12 Predicted Annual Mean NO2 Concentrations – Opening Year 2026 (µg/m3)."* and for design year 2031 are shown in *"Table 12.13 Predicted Annual Mean NO2 Concentrations – Design Year 2031 (µg/m3)."* The annual average concentration is in compliance with

the limit value at all worst-case receptors in 2026 and 2031. Concentrations of NO₂ are at most 31% of the annual limit value in 2023 and 30% of the annual limit in 2031. There are some increases in traffic levels between the opening and design years, therefore any reduction in concentrations is due to reduced background concentrations. In addition, the hourly limit value for NO₂ is 200 µg/m³ and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO₂ concentration is not predicted to be exceeded in any modelled year (Table "Table 12.14 Predicted 99.8th percentile of Daily Maximum 1-hour NO₂ Concentrations (µg/m³).").

The impact of the proposed development on annual mean NO₂ concentrations can be assessed relative to "Do Nothing (DN)" levels. Relative to baseline levels, there are predicted to be some imperceptible to small increases in NO₂ concentrations at the worst-case receptors assessed. Concentrations will increase by at most 0.7% of the annual NO₂ limit value at receptor R1 in 2026. Changes in concentrations are similarly low for the design year 2031, concentrations at receptor R1 will increase by 1%. Using the assessment criteria outlined in Appendix 12.2 Table A12.3.1 and Table A12.3.2 the impact of the proposed development in terms of NO₂ is considered negligible. Therefore, the overall impact of NO₂ concentrations as a result of the proposed development is long-term, negative and imperceptible.

Concentrations of PM₁₀ were modelled for the baseline year of 2022. The modelling showed that concentrations were in compliance with the annual limit value of 40 µg/m³ at all receptors assessed, therefore, further modelling for the opening and design years was not required. Concentrations due to modelled traffic reached at most 0.4 µg/m³. When a background concentration of 15 µg/m³ is included the overall impact is 39% of the annual limit value at the worst case receptor.

The impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, negative and imperceptible.

Receptor	Impact Opening Year 2026				
	DN	DS	DS - DN	Magnitude	Description
R1	11.6	11.9	0.31	Imperceptible	Negligible Increase
R2	12.0	12.2	0.20	Imperceptible	Negligible Increase
R3	11.9	12.1	0.13	Imperceptible	Negligible Increase
R4	11.6	11.7	0.11	Imperceptible	Negligible Increase
R5	12.9	13.0	0.07	Imperceptible	Negligible Increase

Table 12.12 Predicted Annual Mean NO₂ Concentrations – Opening Year 2026 (µg/m³).

Receptor	Impact Design Year 2031				
	DN	DS	DS - DN	Magnitude	Description
R1	11.7	12.1	0.44	Small	Negligible Increase
R2	12.1	12.5	0.34	Imperceptible	Negligible Increase
R3	12.0	12.3	0.26	Imperceptible	Negligible Increase
R4	11.7	11.9	0.21	Imperceptible	Negligible Increase
R5	13.1	13.4	0.26	Imperceptible	Negligible Increase

Table 12.13 Predicted Annual Mean NO₂ Concentrations – Design Year 2031 (µg/m³).

Receptor	Opening Year 2026		Design Year 2031	
	DN	DS	DN	DS
R1	39.0	40.0	38.0	39.4
R2	40.3	41.0	39.4	40.6
R3	39.9	40.4	39.1	39.9
R4	39.0	39.3	38.1	38.8
R5	43.4	43.6	42.7	43.5

Table 12.14 Predicted 99.8th percentile of Daily Maximum 1-hour NO₂ Concentrations (µg/m³).

12.4.2.2 Climate

There is also the potential for increased traffic volumes to impact climate. The impact of the proposed development on emissions of CO₂ impacting climate was assessed using the Design Manual for Roads and Bridges screening model see "Table 12.5 Sensitivity of the Area to Human Health Impacts". The results show that the impact of the proposed development in the opening year 2026 will be to increase CO₂ emissions by 0.000346% of Ireland's EU 2026 Target. The impact in the design year of 2031 is equally low with CO₂ emissions increasing by 0.000398% of the EU 2030 Target. Thus, the impact of the proposed development on national greenhouse gas emissions will be insignificant in terms of Ireland's obligations under the EU 2030 Target.

Therefore, the likely overall magnitude of the changes on climate in the operational stage of the proposed development is imperceptible, negative and long-term.

Year	Scenario	CO ₂
		(tonnes/annum)
2026	Do Nothing	834
	Do Something	892
2031	Do Nothing	901
	Do Something	1032
Increment in 2026		58.5 Tonnes
Increment in 2031		131 Tonnes
Emission Ceiling (kilo Tonnes) 2026		32,869 ^{Note 1}
Emission Ceiling (kilo Tonnes) 2030		32,860 ^{Note 2}
Impact in 2026 (%)		0.000346%
Impact in 2031 (%)		0.000398%

^{Note 1} Target under Regulation (EU) 2020/2126. Annual emission allocations for each Member State for each year of the period from 2021 to 2030 pursuant to Article 4(3) of Regulation (EU) 2018/842, adjusted in accordance with Article 10 of that Regulation

^{Note 2} Target under Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas 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

Table 12.15 Predicted Climate Impact Assessment

12.4.2.3 Human Health

Traffic related air emissions have the potential to impact human health if they do not comply with the ambient Air Quality Standards detailed in Table 12-1. There are no exceedances of these limit values predicted. Therefore, in the absence of mitigation human health impacts are considered long-term, localised, negative and imperceptible.

12.4.2.4 Air Quality Impact on Designated Sites

The impact of NO_x (i.e. NO and NO₂) emissions resulting from the traffic associated with the proposed SHD at the Great Island Channel pNHA, Cork Harbour SPA and Great Island Channel SAC was assessed. Ambient NO_x concentrations were predicted for the assessment years of 2026 and 2031 along a transect of up to 200m, starting from 20 m which is the distance from the road to the designated areas boundaries and are given in "Table 12.16 Predicted Air Quality Impact on Designated Sites 2026" for 2026 and "Table 12.7 Risk of Dust Impacts - Demolition" for 2031 for the SAC, SPA and pNHA. The road contribution to dry deposition along the transect is also given and was calculated using the methodology of TII (2011).

The predicted annual average NO_x levels in Great Island Channel pNHA, Cork Harbour SPA and Great Island Channel SAC are below the limit value of 30 µg/m³ for the “Do Nothing” and the “Do Something” (i.e. the proposed development) scenarios, with NO_x concentrations reaching 66% of the limit value, including background levels.

The impact of the proposed development can be assessed relative to “Do Nothing” levels, the impact of the proposed SHD leads to an increase in NO_x concentrations of at most 0.44 µg/m³ within the SAC, SPA and pNHA. Appendix 9 of the TII guidelines (2011) states that where the scheme or development is expected to cause an increase of more than 2 µg/m³ and the predicted concentrations (including background) are close to, or exceed the standard, then the sensitivity of the habitat to NO_x should be assessed by the project ecologist. Concentrations within the SAC, SPA and pNHA are not predicted to increase by 2 µg/m³ or more and the predicted concentrations are also below the standard, as such it was not necessary for the sensitivity of the habitat to NO_x to be assessed by an ecologist as there is no potential for significant impacts to ecology from NO_x emissions.

The contribution to the NO₂ dry deposition rate along the 200m transect within the SAC, SPA and pNHA is also detailed in “Table 12.16 Predicted Air Quality Impact on Designated Sites 2026” for 2026 and “Table 12.17 Predicted Air Quality Impact on Designated Sites 2031” for 2031. The maximum increase in the NO₂ dry deposition rate is 0.023 Kg(N)/ha/yr. This is well below the critical load for inland and surface water habitats of 5 - 10Kg(N)/ha/yr (TII, 2011).

It can be determined that the impact from air quality on the designated sites is negative, long-term and imperceptible.

Distance to Road (m)	NO _x Concentration (µg/m ³)			NO ₂ Dry Deposition Rate Impact (Kg N ha ⁻¹ yr ⁻¹)
	Do Nothing	Do Something	Change in NOx Concentration	
20	19.62	19.78	0.16	0.0090
30	18.86	18.98	0.13	0.0070
40	18.30	18.39	0.10	0.0050
50	17.87	17.95	0.08	0.0040
60	17.54	17.60	0.06	0.0030
70	17.27	17.32	0.05	0.0030
80	17.07	17.10	0.04	0.0020
90	16.90	16.93	0.03	0.0010
100	16.77	16.79	0.02	0.0010
110	16.66	16.68	0.02	0.0010
120	16.59	16.60	0.01	0.0000
130	16.53	16.54	0.01	0.0010
140	16.48	16.49	0.01	0.0010
150	16.46	16.47	0.01	0.0000
160	16.44	16.45	0.01	0.0000
170	16.43	16.44	0.01	0.0010
180	16.41	16.42	0.01	0.0000
190	16.39	16.39	0.00	0.0000
200	16.30	16.30	0.00	0.0000

Table 12.16 Predicted Air Quality Impact on Designated Sites 2026

Distance to Road (m)	NO _x Concentration (µg/m ³)			NO ₂ Dry Deposition Rate Impact (Kg N ha ⁻¹ yr ⁻¹)
	Do Nothing	Do Something	Change in NOx Concentration	
20	19.89	20.33	0.44	0.023
30	19.06	19.40	0.34	0.018
40	18.46	18.72	0.26	0.014
50	18.00	18.20	0.21	0.012
60	17.64	17.80	0.16	0.009
70	17.35	17.48	0.13	0.007
80	17.13	17.23	0.10	0.005
90	16.95	17.03	0.08	0.004
100	16.81	16.87	0.06	0.004
110	16.69	16.74	0.05	0.003
120	16.61	16.65	0.04	0.002
130	16.54	16.57	0.03	0.002
140	16.50	16.52	0.02	0.001
150	16.47	16.49	0.02	0.001
160	16.46	16.48	0.02	0.002
170	16.44	16.46	0.02	0.001
180	16.42	16.44	0.01	0.000
190	16.40	16.41	0.01	0.001
200	16.30	16.30	0.00	0.000

Table 12.17 Predicted Air Quality Impact on Designated Sites 2031

12.4.3 Cumulative

A review of potentially cumulative developments opposite the proposed development (see “Table 12.18 Cumulative Projects” on page 11) was conducted to determine the potential to have overlapping construction periods and a cumulation impact during construction. Should the construction phase of the proposed development coincide with the construction of any other permitted developments within 350m of the site then there is the potential for cumulative dust impacts to the nearby sensitive receptors according to the IAQM guidance (IAQM, 2014).

However appropriate dust mitigation measures, as outlined in Appendix 12.3, will be applied throughout the construction phase of the proposed development which will avoid significant cumulative impacts on air quality from coinciding construction phases. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development are deemed short-term and not significant.

Application Reference	Applicant(s)	Description	Outcome/Current Status	Potential for Cumulative Impact in Construction Stage
Part 8	Cork County Council	Pedestrian and Cycle Route from Bury's Bridge, Kilcoolishal to Carrigtwohill via Glounthaune	Under Construction	No – Construction Periods unlikely to overlap.
21/6851	Citidwell Developments Limited	Demolition of 2 no. farm buildings and a derelict dwelling and the construction of 21 no. units.	Application currently pending a decision from Cork County Council.	Yes – pending application and construction periods overlapping
21/5072	Barlow Properties Ltd	Construction of 94no. residential units	Site Immediately east of our sites southern land parcel. Application currently pending a decision from Cork County Council.	Yes – pending application and construction periods overlapping.
21/4622	Glounthaune Homes Trust	Construction of 12 no. residential units	Application currently pending a decision from Cork County Council.	Yes – pending application and construction periods overlapping.
18/6250	Keta Products Ltd.	Demolition of The Great O'Neill Public House and construction of a two-storey extension of the existing Fitzpatricks shop to the east to replace the demolished public house, for use as an extended retail.	Under Construction – Nearing Completion	No – Construction Periods unlikely to overlap.
ABP-301197-18	O'Mahony Developments Limited	Strategic Housing Development Construction of 174 number residential units	Under Construction with initial phases occupied	Yes – pending application and construction periods overlapping.
17/ 5699 (ABP Reference 300128-17) Amended by 18/6312 & 20/5864	Bluescape Ltd	Phase 1 of Proposed Development. Construction of 38 no. residential units & upgrade of local road network	Construction recently commenced	Yes – pending application and construction periods overlapping.

Table 12.18 Cumulative Projects

Cumulative impacts have been incorporated into the traffic data supplied for the operational stage air and climate modelling assessments where such information was available. The results of the modelling assessment (section 12.8.2) show that there is a long-term, negative and imperceptible impact to air quality and climate during the operational stage.

12.4.4 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 dust impacts (see Section 12.8.1.1).

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.

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.

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. A Flood Risk Assessment (FRA) has been conducted as part of the EIAR, which states that the site is located in Flood Zone C. The FRA notes that surface water drainage network will be designed to cater for storm water from the roof of the housing units and the surrounding hardscaped areas in accordance with the Greater Dublin Strategic Drainage Study (GSDSDS) and will contain the 1 in 100-year event plus 20% climate change allowance.

As the development is in close proximity to Cork Harbour, the risk of coastal flooding has been considered as part of the design and FRA. A review of The Catchment Flood Risk Assessment and Management (CFRAM) study indicates that the development is not at risk from a 1 in 1000-year coastal event. This confirms the site in Flood Zone C with reference to coastal flood risk. It is also noted in the FRA that the proposed development will not increase the flood risk elsewhere. The FRA recommend that any residual flood risk be managed through appropriate maintenance of the proposed drainage network and structures (attenuation tanks, manholes, gullies, channel drains, etc.) and the use of emergency plans and evacuation procedures, which the Client will be preparing upon development occupation in order to suit specific needs. With these in place, the impact will be imperceptible in the long term.

12.5 MITIGATION MEASURES AND MONITORING

12.5.1 Incorporated Design Mitigation

The proposed development has been designed so as to reduce the impact on climate as much as possible during operation. The Energy and Sustainability Report prepared as part of the proposed project and submitted under separate cover with this planning application details a number of design measures that have been considered in order to reduce the impact on climate wherever possible. Such measures include:

- The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards;
- A renewable energy rating (RER) of 20% will be achieved to comply with Part L (2019) of the NZEB regulations;
- Minimising heat loss where possible;

- Provision of electric car charging points;
- Rainwater harvesting system;
- Design of glazing to maximise solar heat gain.

The following heating and renewable strategies are also being considered for use:

- A Mono-Bloc heat pump (MBHP);
- Split-Bloc heat pump (SBHP);
- Air to Air Heat Pump (AAHP);
- Ground Source Heat Pumps;
- Photovoltaic (PV) systems.

These measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Cork County Council Draft Climate Adaptation Strategy.

In addition, adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. This includes for drainage system and attenuation storage design allow for a 20% increase in rainfall intensities, as recommended by the GDSDS.

12.5.2 Construction Phase Mitigation

12.5.2.1 Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. A dust management plan will be implemented onsite. The main contractor will be responsible for the coordination and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 12.3 (Volume III). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) for the site.

In summary the measures which will be implemented will include:

- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays will be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- When conditions are such that there is a risk of trackout of dust (i.e. very dry or muddy), vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.

- Vehicles using site roads will have their speed restricted through speed limit implementation, and this speed restriction will be enforced rigidly. On any site roads, this will be 20 kmph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust and other dust generating activities will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

12.5.2.2 Climate

Impacts to climate during the construction stage are predicted to be imperceptible however, good practice measures can be incorporated to ensure potential impacts are lessened. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- 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.

12.5.3 Operational Phase Mitigation

The impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no additional site specific mitigation measures are required beyond the site specific incorporated design mitigation as described in Section 12.5.1.

12.5.4 Monitoring

Monitoring of construction dust deposition at locations along the site boundary close to the 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 2m above ground level. The TA Luft limit value is 350 mg/(m²*day) during the monitoring period between 28 - 32 days.

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

12.6 RESIDUAL IMPACT ASSESSMENT

12.6.1 Construction Phase

With the implementation of the dust mitigation measures, associated with a high risk of dust impacts, outlined in Section 12.5.2 and Appendix 12.3 dust impacts from construction will be localised, imperceptible, negative and short-term but will not pose a nuisance at nearby receptors.

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 (*see "Table 12.1 Ambient Air Quality Standards" on page 1*) which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short-term and imperceptible with respect to human health.

12.6.2 Operational Phase

The proposed development has been designed to reduce the impact on climate where possible. The proposed development will comply with the NZEB standards. Electric vehicle car charging points have been incorporated into the development and increased bicycle parking has been provided to promote a modal shift and thus reduce GHG emissions.

The results of the climate assessment show that the impact of the proposed development due to traffic emissions in the opening year 2026 will be to increase CO₂ emissions by 0.000346% of Ireland's EU 2030 Target. The impact in the design year of 2031 is equally low with CO₂ emissions increasing by 0.000398% of the EU 2030 Target. The likely overall magnitude of the residual changes on traffic related climate impacts in the operational stage of the proposed development is imperceptible, negative and long-term.

12.6.3 Cumulative

Cumulative construction phase impacts will result from dust emissions impacting people and property within 350m of the proposed development site and neighbouring sites. Impacts are predicted to be negative, short-term and imperceptible at nearby receptors once the dust mitigation measures outlined in Appendix 12.3 (see Volume III) are implemented.

According to the IAQM guidance (2014) site traffic, plant and machinery are unlikely to have a significant impact on climate. Therefore, cumulative impacts are not predicted.

Operational phase impacts involve an increase in traffic related pollutants in the local area. The traffic data for the proposed development in conjunction with other nearby permitted and proposed developments was found to have an imperceptible, negative and long-term impact on local air quality and climate.

12.7 INTERACTIONS

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between human beings 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 nuisance 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 and therefore the predicted impact is long term and imperceptible with respect to human beings.

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 considered to be imperceptible due to the low level changes in traffic associated with the proposed development.

With the appropriate mitigation measures to prevent fugitive dust emissions (see Section 12.5.2.1 and Appendix 12.3), it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality have been identified.

12.8 DIFFICULTIES ENCOUNTERED

There were no difficulties encountered when completing this assessment.

12.9 CONSULTATION

Having regard to the nature of the proposed development together with the available guidelines for completing air quality and climate assessments, sufficient information existed to scope the content of this chapter and consultation was not deemed necessary.

12.10 REFERENCES AND SOURCES

- Cork County Council Climate Action Regional Office (2019) Draft Climate Adaptation Strategy 2019 - 2024
- Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021).
- Department of the Environment Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities
- Department of Housing, Planning & Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
- Environmental Protection Agency (2015) Advice Notes for Preparing Environmental Impact Statements – Draft
- Environmental Protection Agency (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft
- Environmental Protection Agency (2020) Air Quality Monitoring Report 2019 (& previous annual reports)
- Environmental Protection Agency (2021a) EPA website Available at: <http://www.epa.ie/whatwedo/monitoring/air/>
- EPA (2021b) GHG Emissions Projections Report - Ireland's Greenhouse Gas Emissions Projections 2020 – 2040
- European Commission (2013) *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*
- European Commission (2017) Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report
- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- Government of Ireland (2015) Climate Action and Low Carbon Development Act
- Government of Ireland (2019) Climate Action Plan 2019
- Government of Ireland (2020) Draft General Scheme of the Climate Action (Amendment) Bill 2019
- Government of Ireland (2021) Draft Climate Action (Amendment) Bill 2021
- Institute of Air Quality Management (IAQM) (2016) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1
- Met Éireann (2021) Met Éireann website: <https://www.met.ie/>
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- Transport Infrastructure Ireland (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes

UK Highways Agency (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07 (Document & Calculation Spreadsheet)

UK Highways Agency (2019a) UK Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 LA 105 Air quality

UK Highways Agency (2019b) UK Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 Climate

UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures

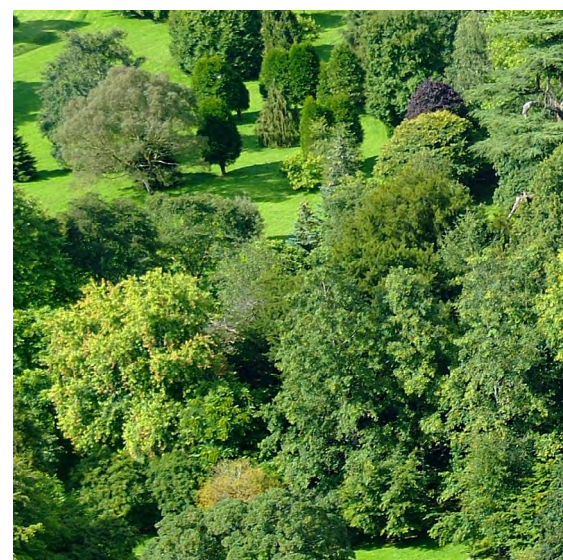
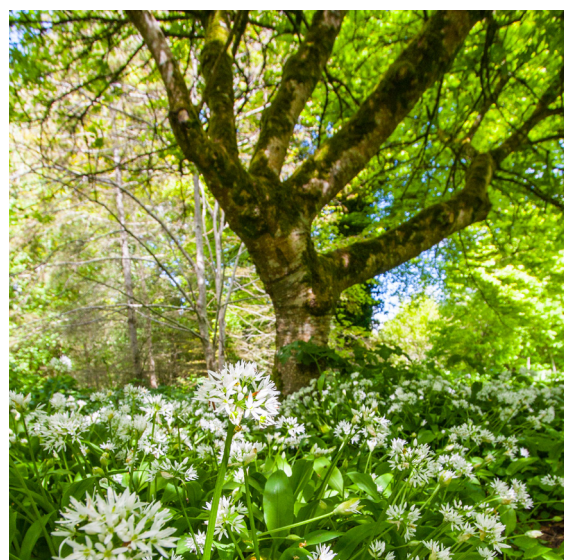
World Health Organisation (2006) Air Quality Guidelines - Global Update 2005 (and previous Air Quality Guideline Reports 1999 & 2000)



LACKENROE SHD

CHAPTER 13

Population and Human Health



VOLUME II | EIAR

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CHAPTER 13

Population and Human
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13 Population and 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. Harry has 22 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 the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

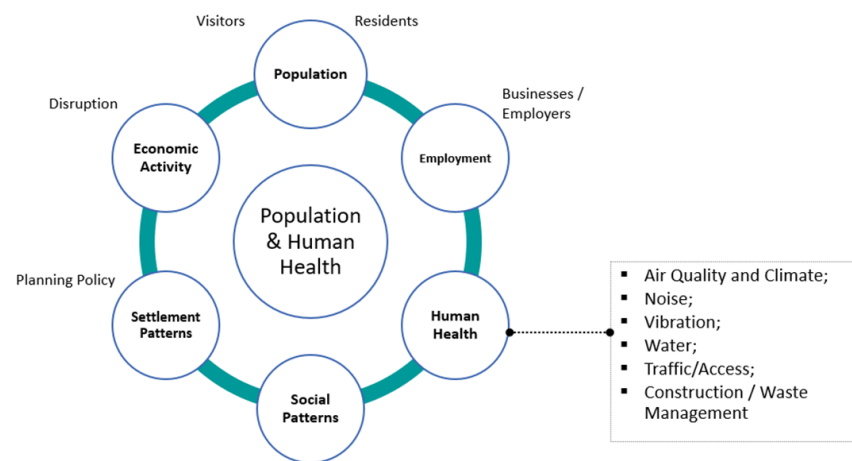
13.1.2 Chapter Context

The '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, there are several inter-related environmental topics such as the potential impacts of the proposed development on air quality & climate, noise & vibration, water, traffic & access, construction & waste management, which are of intrinsic direct and indirect consequence to human health. This chapter addresses human health in the context of other factors addressed elsewhere in further detail within the EIAR where relevant. For detailed reference to particular environmental topics please refer to the corresponding chapter of the EIAR. 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 Methodology

This chapter of the EIAR document has been prepared with reference to the Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 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 data;
- Cork County Development Plan 2014;
- Draft Cork County Development Plan 2021.

The Strategic Environmental Assessments (SEA) for the Cork County Development Plan has also been reviewed, to provide a consideration of Population and Human Health. 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.

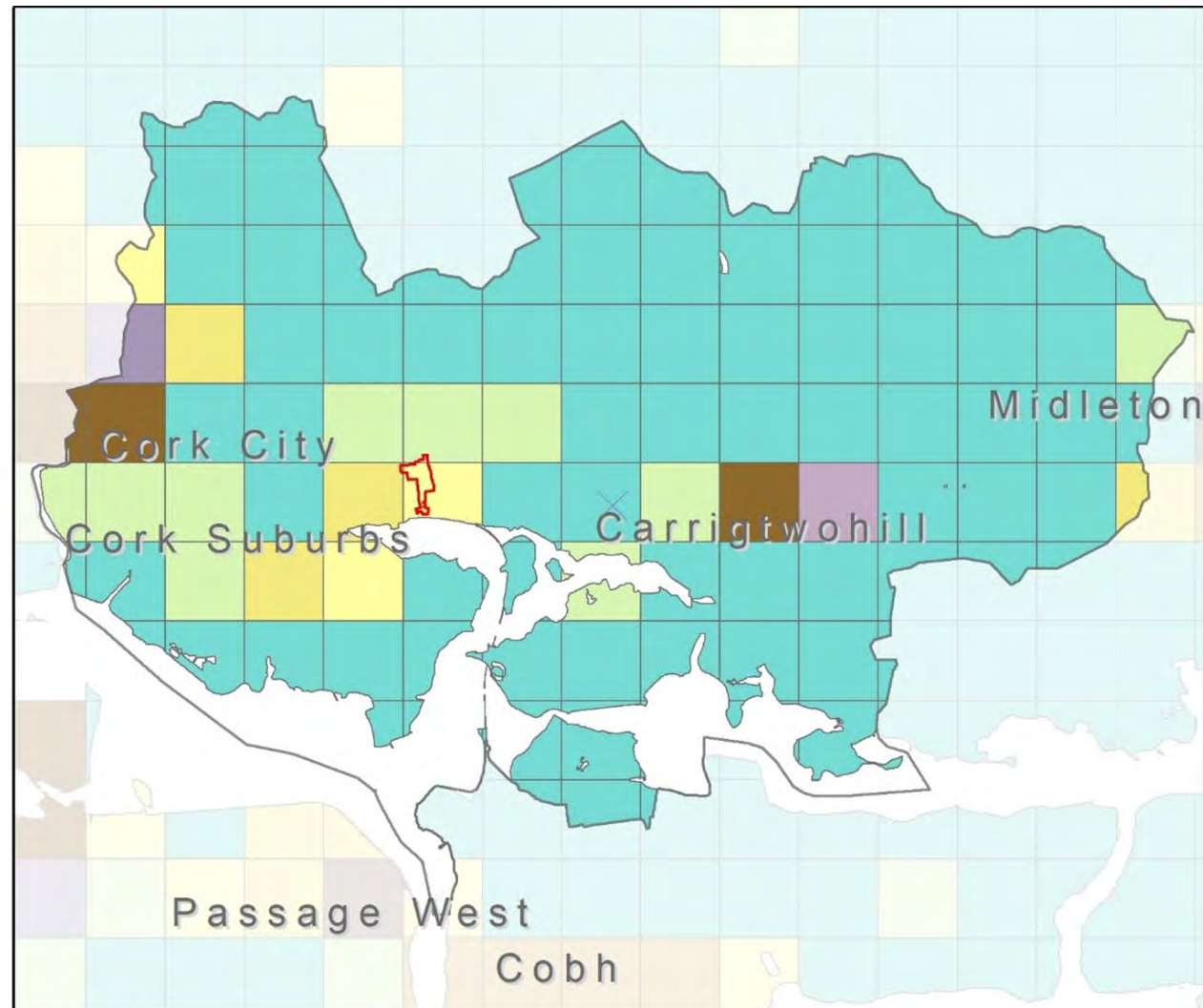
13.2 DESCRIPTION OF EXISTING BASELINE ENVIRONMENT

13.2.1 Definition of Chapter Study Area











The study area for this section was initially defined based on an assessment of the location of the subject site in relation to Electoral Divisions (EDs), the smallest legally defined administrative areas in the State. The subject site falls along the eastern boundary of the Caherlag ED (ref 47064), which includes Little Island to the south and the eastern suburbs of Glanmire to the west. In recognition of the enhanced wider connectivity of the site due to its proximity to the commuter rail line and Burys Bridge to Carrigtwohill Greenway, it is considered appropriate to include the adjoining ED of Carrigtwohill (ref 47077), which lies immediately to the east of the site and includes the settlement of Carrigtwohill and its environs. The delineation of the boundaries of these two ED's excluded Fota Island which falls within the larger Cobh Rural ED to the south.

It is considered that while it would not be appropriate to include the entire ED within the study area, Fota Island and the small northern portion of Great Island which are both readily accessed via the Cobh branch of the suburban rail line, should naturally be included within the study area to represent a more realistic catchment for the subject site. Therefore, two Census Small Areas (SA) which generally comprise either complete or part of townlands or neighbourhoods, were included to the south. These SAs were 047106013 comprising Fota Island and 047106014, representing the small northern portion of Great Island.

Figure 13.2 Study Area



Legend

	WES001-02_SiteBoundary_SHD		151 - 300		1001 - 1500		2501 - 3000
	2016 Population by 1km Grid Square		301 - 500		1501 - 2000		3001 - 3500
	0 - 150		501 - 1000		2001 - 2500		

13.2.2 Demographics

13.2.2.1 Population

The most recent nationwide Census took place in 2016. Between 2011 and 2016 the overall population in the study area increased by 10%, significantly in excess of the county and state population increases of 5% and 4% in the same period. Within the study area there was strong growth experienced in most areas, in particular in Fota Island (small area 04710613) where the population doubled in that intercensal period. By contrast the Belvelly area to the south experienced a 10% population decline.

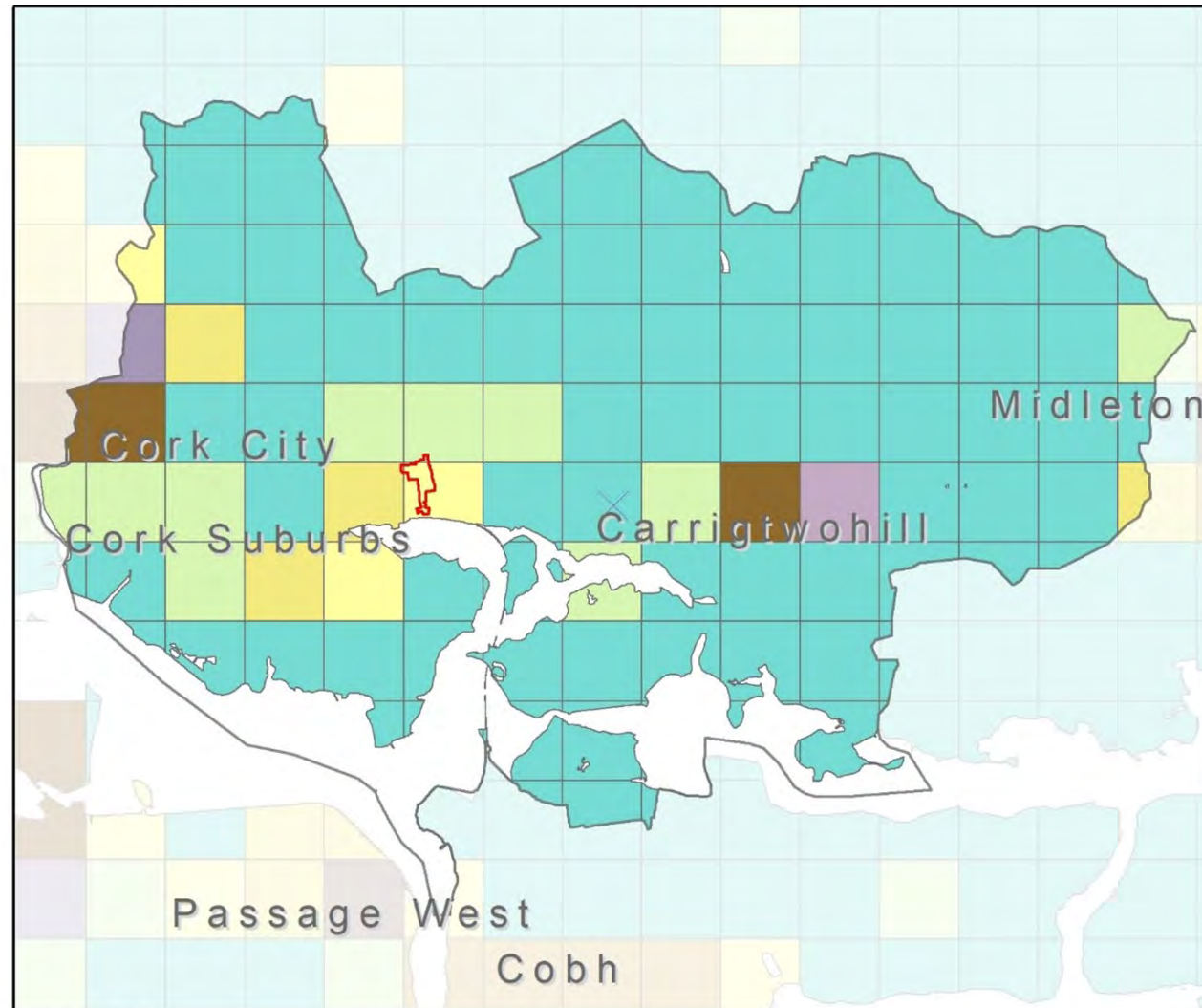
Small Area Statistics have only been captured by the CSO since 2011 so it is not possible to determine a long-term trend in the Study Area population. However, the trend for the two ED areas indicates that Caherlag experienced 31% growth between 2002 and 2016. This is in line with the county and national growth rates which were 29% and 31% respectively over that period. Carrigtwohill, however, experienced exceptional growth of 109% in that period.

Area	2002	2006	2011	2016	% Change 1991 - 2016	% Change 1991 - 2016
Caherlag ED 47064	5720	6555	6958	7481	31%	8%
Carrigtwohill ED 47077	3,507	4,875	6665	7334	109%	10%
47106013 SA			153	323		111%
47106014 SA			197	177		-10%
Study Area Total			13973	15315		10%
Cork County	447,829	481,295	519032	542868	29%	5%
State	3,917,203	4,239,848	4588252	4761865	31%	4%











Table 13.1 Population Trends in the Study Area

Figure 13.3 indicates that the population density of the majority of the ED of the study area is relatively low with fewer than 150 persons/km², this reflects the predominantly agricultural nature of the area. Exceptions to this are the relatively high population densities at Brooklodge/Riverstown and Glanmire to the west and Carrigtwohill and the environs of Midleton to the east. The settlement cores of Glounthaune and nearby Little Island have medium population densities of c. 600 persons/km², which have experienced limited population growth (1.4% and 5.1% respectively) in the 2011 - 2016 intercensal period. The population density in the 1km² that contains the subject site is 431 persons/km². It has experienced population growth of 11% between 2011 and 2016, higher than the county and state growth rates and in line with the 10% growth experienced in the study area as a whole. It can be seen from Figure 13.3 that the growth rates along the commuter rail line are in general high reflecting housing policy focus on these areas. This is notable in the case of South Glanmire (18%), south and east of Little Island (25% and 40%), east of Glounthaune (17%), west of Carrigtwohill (21%), western environs of Midleton (80%, 33% and 21%). Again the north of Fota Islands figure of 73% is attributable to the presence of a hotel in this area.

Figure 13.3 2016 Population per 1km Grid Square



Legend

	WES001-02_SiteBoundary_SHD		151 - 300		1001 - 1500		2501 - 3000
2016 Population by 1km Grid Square			301 - 500		1501 - 2000		3001 - 3500
	0 - 150		501 - 1000		2001 - 2500		

13.2.2.2 Households

The average household size in the study area at 3.03 is higher than the state, city and county averages, with the average household size of the suburban EDs of Caherlag and Carrigtohill primarily accounting for this increase with the Small Areas to the south of the study area having average household sizes of 2.63 and 2.80, in line with the regional and state averages.

Area	Number of Households	Persons in Households	Average Household Size
Caherlag ED 47064	2423	7462	3.08
Carrigtohill ED 47077	2444	7329	3.00
47106013 SA	41	108	2.63
47106014 SA	64	179	2.80
Study Area Total	4972	15078	3.03
Cork City	49,411	120,980	2.45
Cork County	146,442	414,062	2.83
State	1,702,289	4,676,648	2.75

Table 13.2 Average Household Size in the Study Area

This is accounted for by the relatively high percentage of families in the area comprising with children between pre-school and adolescent family cycle stages. The state average for family members which are in this cohort is 54% whereas in the study area overall it is 63%, with this elevated level reflected in all the sub-areas with the exception of the 47106014 census Small Area, where fewer younger children and more adolescents live. An exceptionally high level of families with young children is recorded in the 47106013 census Small Area, (80%), with the children predominantly being in the pre-school and early school stage. While this can be partly attributed to the present of the hotel and associated holiday homes in this area, a similar trend is evident in Carrigtohill ED (66%), and to a lesser extent Caherlag ED (61%) where the subject site is located.

Family Cycle	Pre-school	Early school	Pre-adolescent	Adolescent	Retired
Caherlag ED 47064	11%	17%	16%	17%	5%
Carrigtohill ED 47077	15%	23%	16%	12%	3%
47106013 SA	26%	36%	19%	0%	2%
47106014 SA	5%	8%	13%	20%	5%
Study Area Total	13%	20%	16%	15%	4%
Cork City	9%	11%	11%	13%	8%
Cork County	10%	15%	15%	16%	6%
State	10%	14%	15%	16%	6%

Table 13.3 - % of Family Member Population by Family Cycle Stage the Study Area

13.2.2.3 Travel Patterns

Table 13.4 outlines the travel mode statistics for commuting trips to school, college and work. It is evident that there is a significantly higher number of commuters using private motor vehicles in the area than the state average, with a correspondingly low number of pedestrian, cyclist and public transport commuters.

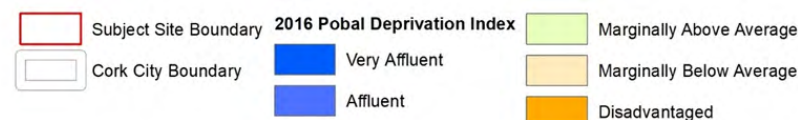
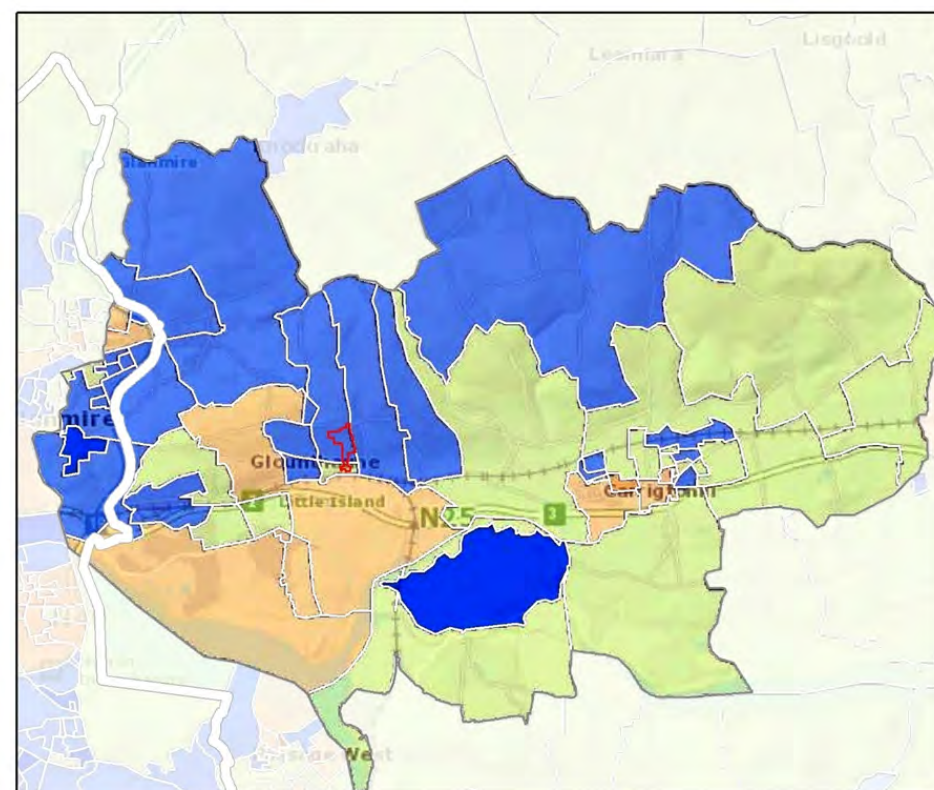
Commute Mode	On-foot or Bicycle	Public Transport	Car, Motorbike or Van	work from Home
Caherlag ED 47064	8%	8%	79%	2%
Carrigtohill ED 47077	10%	8%	76%	2%
47106013 SA	7%	4%	70%	3%
47106014 SA	1%	6%	89%	3%
Study Area Total	9%	8%	77%	2%
Cork County	9%	8%	75%	4%
Rural Areas	4.40%	2%	85.50%	-
State	17%	13%	63%	3%

Table 13.4 Commuting Modes for persons aged 5 and over in the Study Area

These figures are, however, in line with the commuting figures for Cork County. As significant areas of the study area are rural in character, it is interesting to compare the commuting pattern with the rural state averages indicated in Table 13.4. In this context, the suburban nature of much of the study area is evident in the figures, and the proximity to the commuter rail line results in an 8% use of public transport figure, compares with 2% in rural areas.

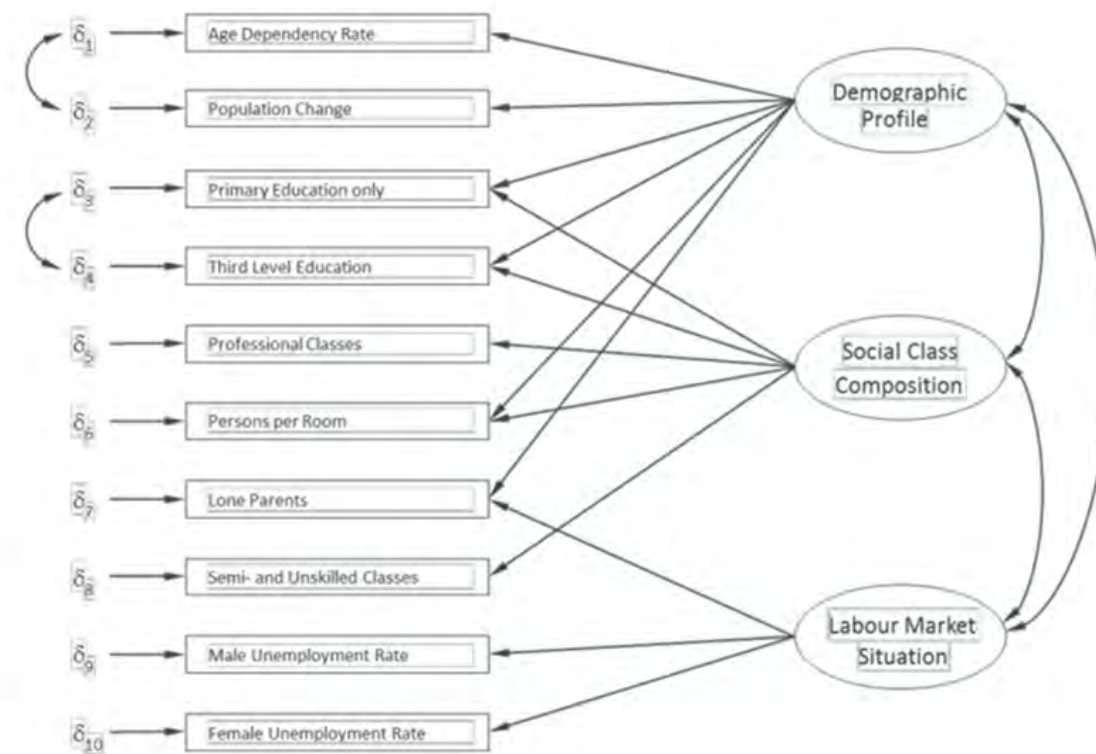
13.2.2.4 Affluence and Deprivation

Figure 13.4 2016 Pobal Deprivation Index per Small Area



The Pobal Deprivation Index shows the level of overall affluence and deprivation at the level of CSO Small Areas in 2016 based on a number of census indicators, as set out in Figure 13.5. As highlighted in Figure 13.4 the subject site falls largely within an 'Affluent' CSO Small Area, with significant areas in the northern vicinity similarly classified and the Fota Island area to the south categorised as 'Very Affluent'. However, it should be noted that there is considerable variation in affluence within the study area. While the southern portion of the subject site falls within the 'Marginally Above Average' category, the area immediately to the south is considered to be 'Marginally Below Average'.

Figure 13.5 Pobal Deprivation Index Indicators



Similarly, significant areas to the west of Glounthaune settlement and much of Little Island and the settlement of Carrigtohill are considered to be 'Marginally Below Average', while an area in the centre of Carrigtohill settlement considered 'Disadvantaged'. The latter corresponds to an area with a high percentage of local authority rented housing.

13.2.2.5 Employment

In the 2016 census, the CSO introduced Workplace Zones, which are an aggregate of CSO Small Areas and which aim to indicate the spatial distribution of employment. Table 13.5 indicates the Workplace Zone that includes the subject site. Within this area there were 270 jobs recorded in the 2016 Census and 327 resident workers, giving a job to worker ratio of 0.825, representing an overall outflow of workers. The jobs ratio is however higher than that of Carrigtohill (0.397) and significantly lower than the Cork City average as would be expected of a suburban area.

	Workplace Zone	Carrigtwohill	Cork City and Suburbs
Labour Force (A)	327	2,345	87,354
Number of Jobs (B)	270	931	102,139
Jobs Ratio (B/A)	0.825	0.397	1.169

Table 13.5 Jobs Ratio in the Study Area

13.2.3 Land Use

The subject lands are situated within the ‘development boundary’ of Glounthaune as defined in the current 2017 Cobh Municipal District Local Area Plan. The northern land parcel comprises undeveloped agricultural lands, bound to the north by the L-2969 local road and a number of individual residential properties. To the east are further undeveloped agricultural lands with the southern and western areas of the site bound by lower density housing. The southern parcel consists of an unmaintained wooded area with some attractive and notable trees, particularly to the north of the parcel. The southern areas of the site bound the existing village at Glounthaune with an existing residential apartment block, Fitzpatrick’s shop and local public house to the southwest of the site and the recently constructed greenway bounding the southern boundary of the site. Glounthaune Train Station is approximately 350 metres (which amounts to a 3–5-minute walk or 2 minute cycle) to the southeast of the southern parcel.

13.2.4 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 13.6 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

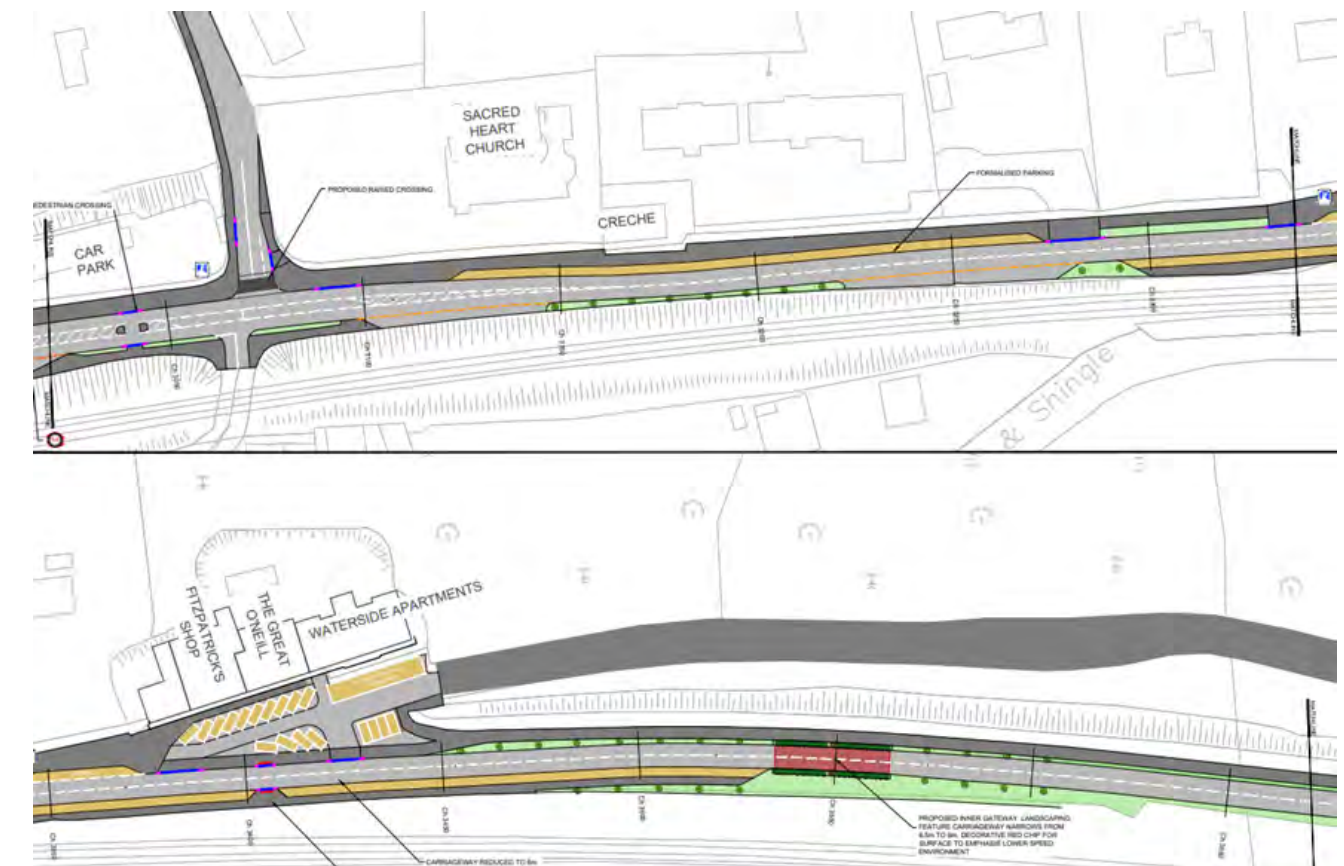
Table 13.6 Community and Social Infrastructure Categories

13.2.4.1 Amenity, Open Space and Sports

Glounthaune and its surrounding areas are well served by a variety of recreational, amenity and sporting facilities. Within the site’s immediate local context of Glounthaune, Erins Own GAA club at Caherlag to the northwest of the settlement is the local GAA club with Glounthaune United AFC grounds approximately 2km north of the village. The Hyde Equine Centre which provides a variety of equine related activities including show jumping, dressage and horse training is situated to the west of Erins Own GAA grounds. Within the village itself, Glounthaune playground is situated to the west of the local Community Centre.

Glounthaune has benefited from significant recent investment in walking and cycle infrastructure in the area which will serve as a valuable recreational and amenity asset for the local population. Specifically, the settlement is situated along the greenway from Burys Bridge to Carrigtwohill which received Part 8 planning approval by Cork County Council in March 2020 and is currently being constructed. In addition to providing an important amenity for residents and providing dedicated pedestrian/cycle access to the train station, the permitted greenway will also enhance sustainable connectivity between Glounthaune and Carrigtwohill.

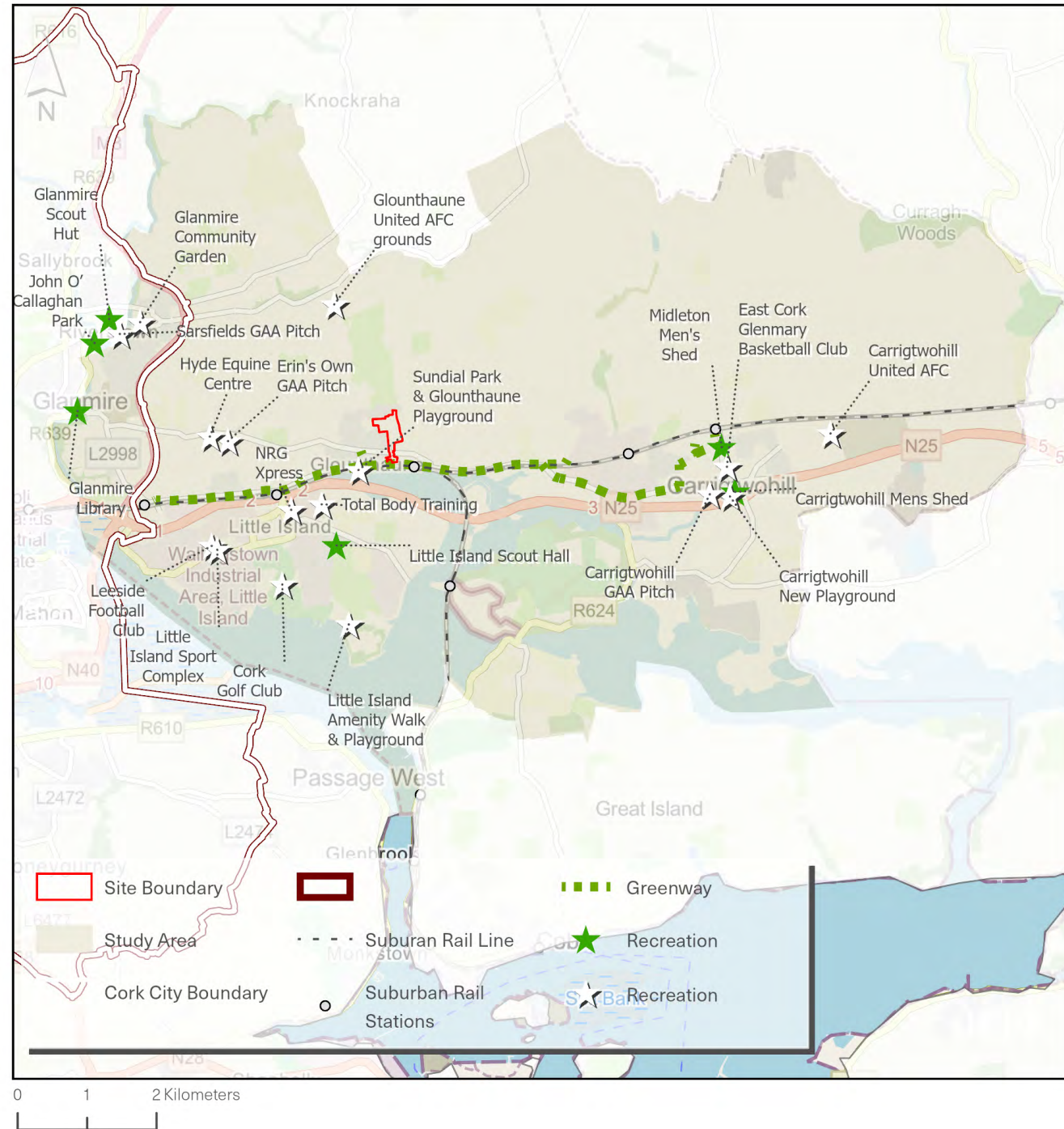
Figure 13.6 Extract of Permitted Greenway Route in Glounthaune



Little Island provides for a further diversification of such outlets including Leaside Football Club, Little Island Sport Complex and Cork Golf Club. A separate amenity walk and playground exists to the south east of the aforementioned golf course in addition to a number of gyms and fitness studios in the form of Total Body Training and NRG Xpress.

Due to its strategic function as a ‘Metropolitan Town’ in the settlement hierarchy of the 2014 Cork County Development Plan, Carrigtwohill provides for a wide range of existing community and social infrastructure assets which will serve existing and future residents of Glounthaune. This includes amenity, open space and sports facilities including Carrigtwohill GAA and Carrigtwohill United clubs, East Cork Glenmarry Basketball Club, local playgrounds, all weather facilities and additional gyms, Pilates/yoga centre. Glounthaune is also situated a 3 minute train journey from Fota Island Wildlife Park, hotel and golf course which provides a unique amenity for residents in the area.

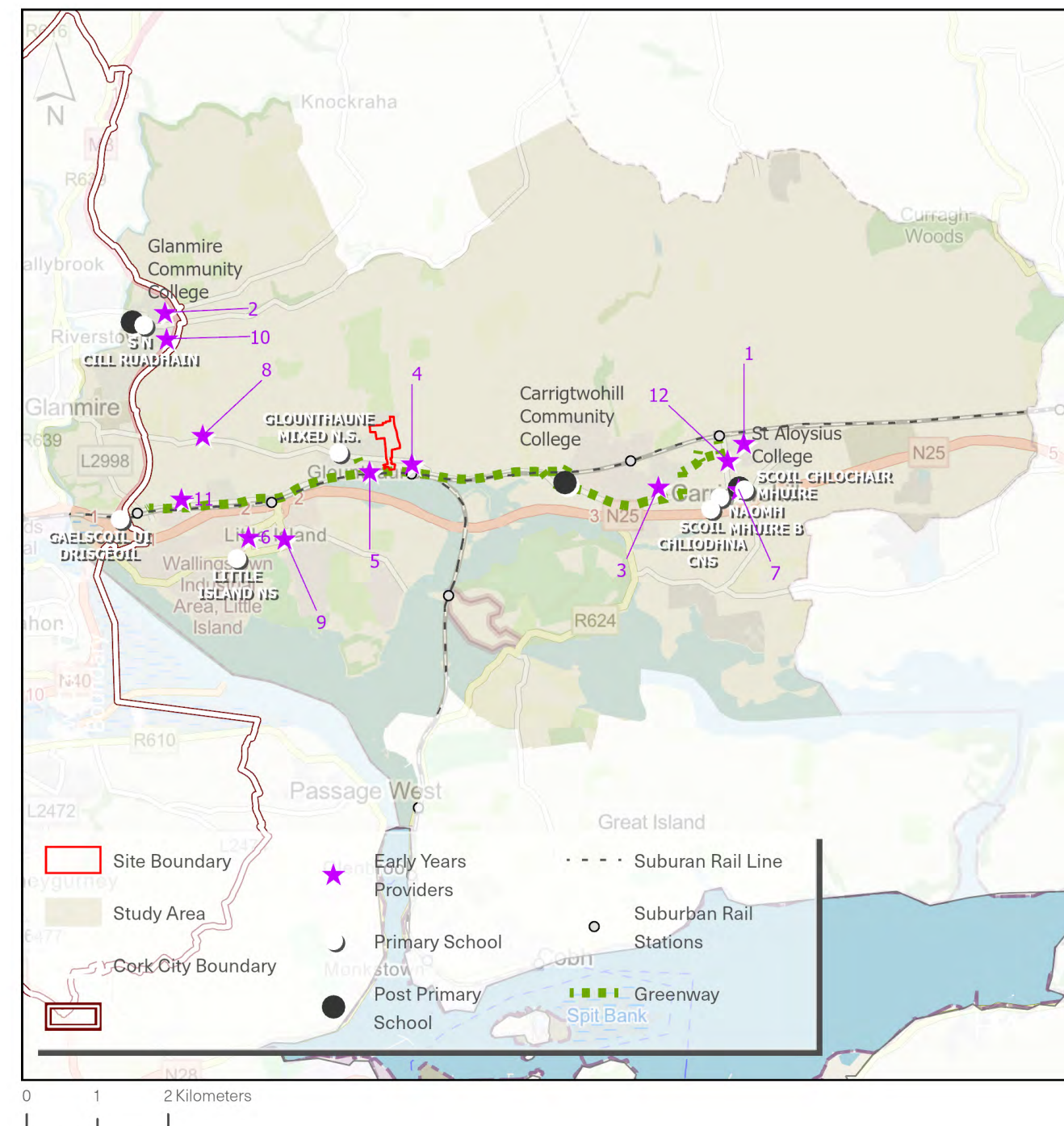
Figure 13.7 Details of Existing Amenity, Open Space and Sports outlets in study area



13.2.4.2 Childcare

The study area, which includes the settlements of Glounthaune, Little Island, areas of Glanmire and Carrigtwohill contains 12 no. existing creches/childcare facilities, 7 no. primary schools and 3 no. secondary schools.

Figure 13.8 Details of Existing Childcare and education outlets in study area



13.2.4.3 Schools and Education

The population of Glounthaune is served by 2 no. primary schools, namely Scoil Náisiúnta an Chroí Naofa (Glounthaune National School) to the northwest of the settlement and Gaelscoil Uí Drisceoil, Dunkettle to the west of Glounthaune. An overview of the primary schools within the study area is provided in table 13.7 as shown. The information in table 13.7 was obtained from a review of the 'Data on Individual Schools' 2020/2021 database of the Department of Education ¹.

¹ <https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/>

Settlement	Primary School	Type	Capacity
Glounthaune	Glounthaune National School, Ballynaron, T45 AX78	Mixed	436
Glounthaune	Gaelscoil Ui Drisceoil, Dunkettle, T45 YY19	Mixed	435
Little Island	Little Island National School, Castleview, T45 VA49	Mixed	170
Carrigtwohill	Scoil Mhuire Naofa, Tara Court, T45 AK65	Mixed	486
Carrigtwohill	Scoil Chlochair Mhuire National School, Main Street, T45 VX82	Mixed	442
Carrigtwohill	Scoil Chliodhna Community National School, Carrigtwohill GAA Grounds, T45 P282	Mixed	257
Glanmire	Scoil Chill Ruadháin Brooklodge NS, Hazelwood Rd, Brooklodge, Co. Cork. T45CA19	Mixed	354

Table 13.7 Summary of Existing Primary Schools in Study Area

In total there are 871 no. primary school places in the 2 no. primary schools in Glounthaune and a further 1,709 no. spaces across the remainder of the study area.

Existing Post-Primary/Secondary Schools

Post-primary schools by their nature are generally of a larger scale and catchment area. Due to Glounthaunes location within Metropolitan Cork and regular public transport links to urban centres such as Cork City, Glanmire, Carrigtwohill, Cobh and Midleton, Glounthaune is served by a large 'post-primary school' catchment. This results that existing and future residents of Glounthaune have a greater selection of post-primary schools than other comparably sized settlements, particularly as students at this age are more capable of availing of public transport and sustainable modes of transport, without adult supervision. However, for consistency and the purposes of this assessment, only the post-primary schools within the defined study area have been assessed.

There are currently no post-primary schools in Glounthaune or Little Island. There are 3 no. post-primary schools in the study area with a combined capacity of 1,680 no. places. An overview of the post-primary schools within the study area is provided in Table 13.8 as shown. The information in Table 13.8 was obtained from a review of the 'Data on Individual Schools' 2020/2021 database of the Department of Education ².

Settlement	Primary School	Type	Capacity
Carrigtwohill	St Aloysius College, Main Street, T45 CF61	Female	792
Carrigtwohill	Carrigtwohill Community College, Fota Business wPark, T45 XN23	Mixed	383
Glanmire	Glanmire Community College, Brooklodge, Glanmire, T45W965	Mixed	505

Table 13.8 Summary of Existing Secondary Schools in Study Area

² <https://www.education.ie/en/Publications/Statistics/Data-on-Individual-Schools/>

New Carrigtwohill Schools Campus

We note that construction works are due to commence on a new 'multi-school' campus at Station Road, Carrigtwohill. Permission was granted by Cork County Council (Planning Reference 19/5707) for the.

- Construction of three no. new school buildings and the construction of a main link road with a roundabout from Castlelake Housing estate to Station Road and additional link from the roundabout to Station Road, with cycle infrastructure.
- School A comprises 1 no. three-storey primary school building with 24 no. classrooms and 2 no. class SNU with physical education hall, support teaching spaces and ancillary accommodation.
- School B comprises 1 no. two-storey primary school building with 24 no. classrooms and 2 no. class SNU with physical education hall, support teaching spaces and ancillary accommodation.
- School C comprises 1 no. three-storey, 1,000 pupil, post primary school building with physical education hall, 2 no. classroom SNU support teaching spaces,
- Works to the remainder of the school grounds consist of the provision of car parking spaces, disabled access car parking spaces, drop-off and pick-up facilities.

Final permission for the development was received on 02/07/2020. The development will be the permanent location for three existing schools currently in temporary accommodation in Carrigtwohill, namely, Carrigtwohill Community College, Scoil Chliodhna Community National School and Scoil Mhuire Naofa, significantly increasing primary and secondary school places for the surrounding areas.

The future school's campus will link to the aforementioned Burys Bridge to Carrigtwohill (via Glounthaune) pedestrian and cycle route resulting that the future residents of the proposed development will be served by a pedestrian and cycle links to the campus.

Third Level Institutions

There are no third level institutions such as colleges or universities with the study area. Glounthaunes location on the Cork Metropolitan Rail Network and regular bus routes from the settlement results that third level institutions in Cork City and further afield will be readily accessible via existing public transport opportunities.

Special Schools

According to the Data on Individual Schools' 2020/2021 database the closest special school to Glounthaune is Scoil Triest, Lota Glanmire approximately 4km west of Glounthaune. There are also a number of special schools in Cork City that are served by public transport links with Glounthaune.

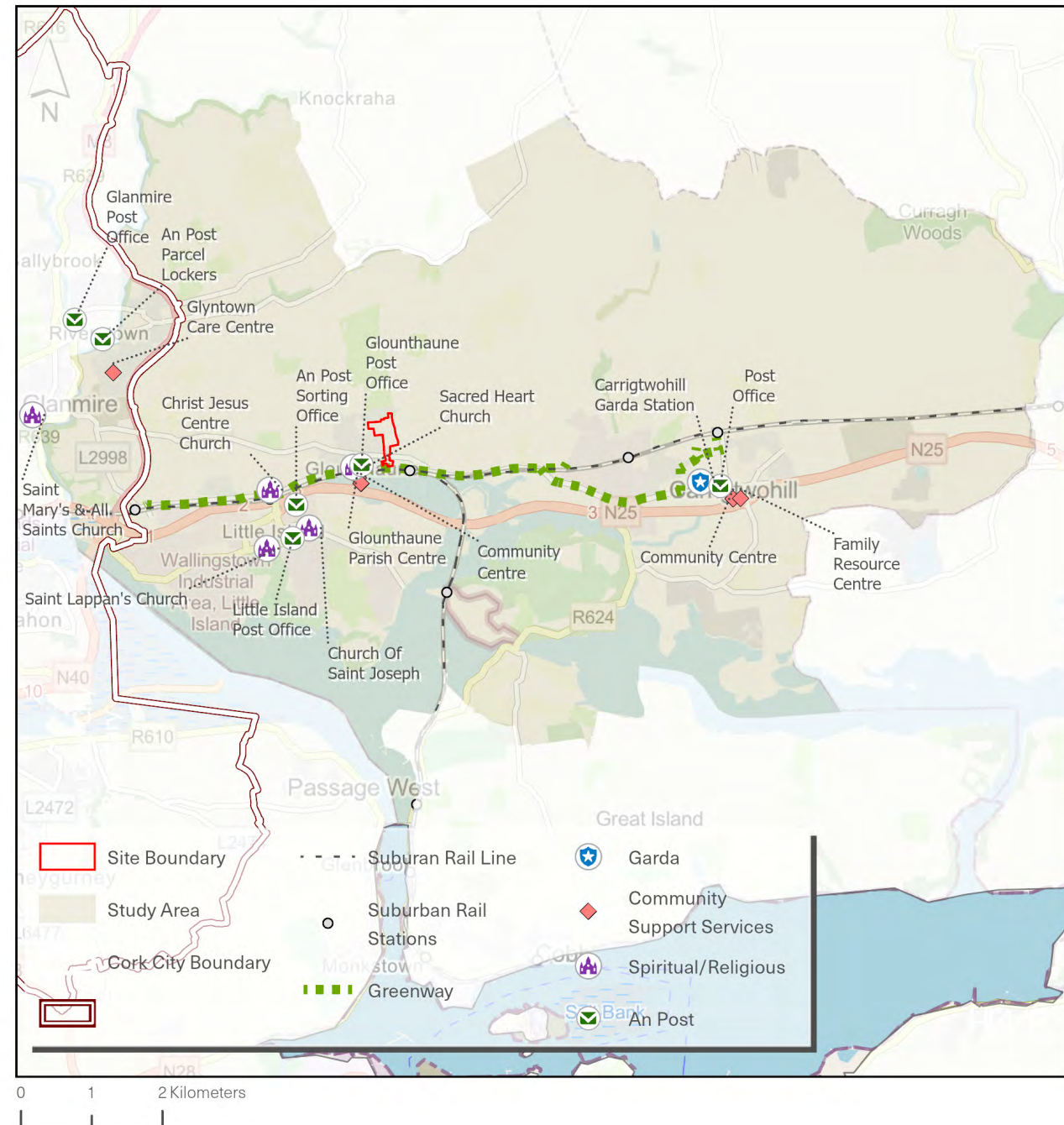
13.2.4.4 Community Facilities & Emergency Services

Due to its traditional village function, Glounthaune contains a number of community-oriented facilities. These include a cluster of community facilities near the junction of Johnstown Close and the L-2968 local road including Glounthaune post office, local Catholic Church and Glounthaune Community Centre.

Due to the settlement's relationship and proximity to the larger settlements of Little Island and Carrigtwohill, many local community services are contained in these settlements as illustrated in Figure 13.9 as shown. These include a greater selection of community spaces and buildings (Carrigtwohill Community Centre, local churches) and public open spaces. The previously referenced local sports clubs and schools form focal points of the local community and serve as key community assets.

Carrigtwohill and Glanmire Garda Stations serves as the most local Garda stations to Glounthaune while there are fire stations in both Midleton and Cobh.

Figure 13.9 Details of Existing Community facilities in study area



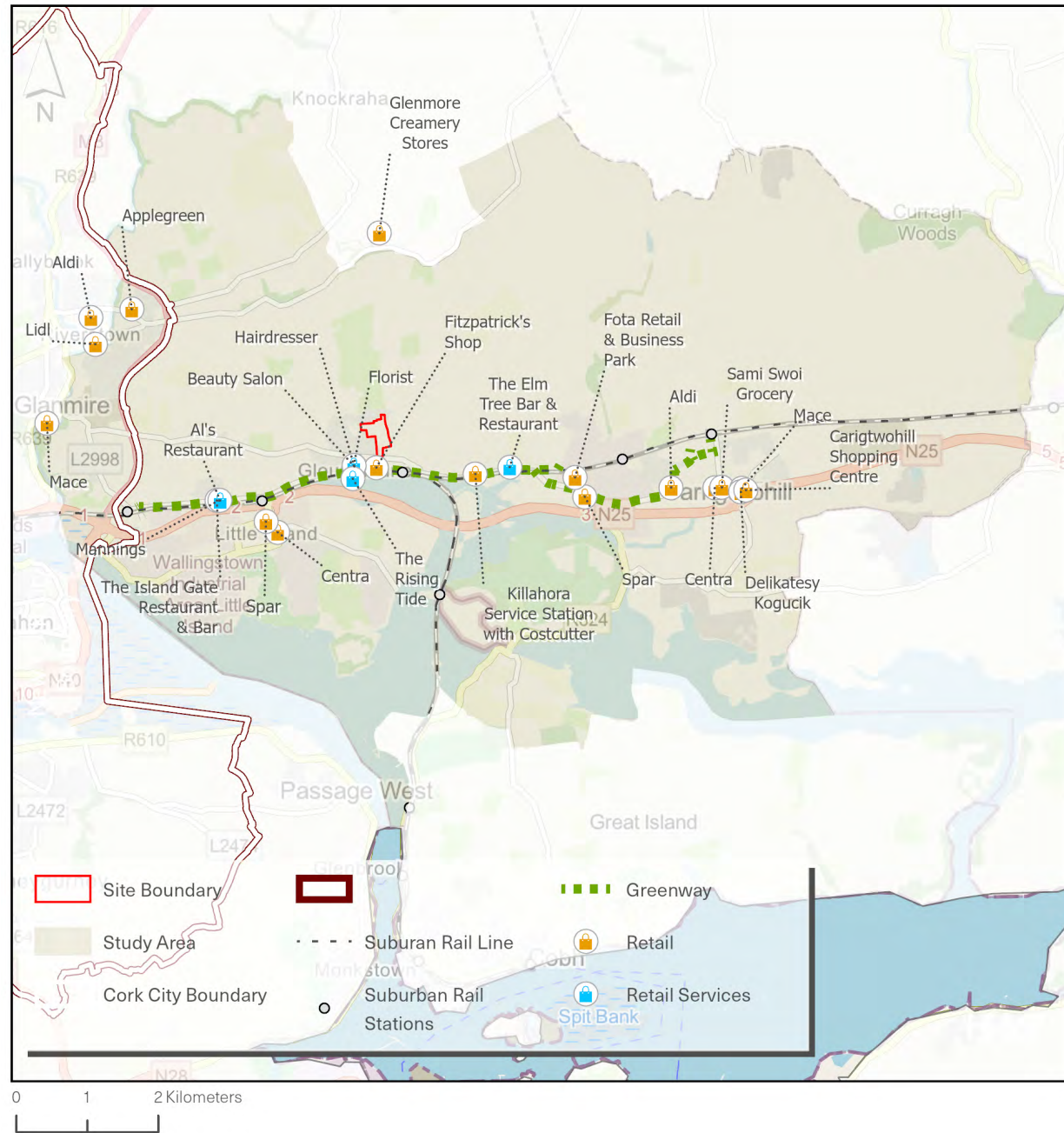
13.2.4.5 Retail

Locally, Glounthaune is served by a number of smaller shops and commercial outlets. Adjacent to the previously mentioned post office is a local florist, hairdresser and beauty salon. Fitzpatrick’s shop on Johnstown Close is a well-known local retail outlet and is undergoing redevelopment as permitted by Cork County Council planning reference 18/6250 (An Bord Pleanála reference 304427-19). Killahoura Service Station to the east of the settlement and an additional service station to the west of the settlement also serves the local population in terms of fuel supplies and convenience retail. There are also a number of pubs/restaurants in Glounthaune including the Island Gate Restaurant & Bar, Al’s Restaurant, the Rising Tide Bar and Restaurant and the Elm Tree Bar and Restaurant.

Due to its position as a Strategic Employment Location in the settlement hierarchy of the CDP, Little Island is home to wide variety of retail services. Specifically, at the Eastgate Retail Park there exists a Harvey Norman Superstore, EZ Living Interiors, ‘The Range’ home goods store, Tubs & Tiles, and number of cafes and restaurants. Branches of AIB and Bank of Ireland banks are also present at Little Island in addition to pharmacies, dentist, convenience retail, and hair and beauty outlets.

Due to its function as service town for its hinterland, Carrigtwohill provides for a further diversification of the retail and commercial offering for Glounthaunes residents. The Fota Retail & Business Park, Carrigtwohill Shopping & Business Centre provide a variety of retail and commercial outlets in addition to the town centre which contains an Aldi, Centra supermarkets and various pharmacies, service stations, restaurants, takeaways, butchers and specialty services typical of a town centre.

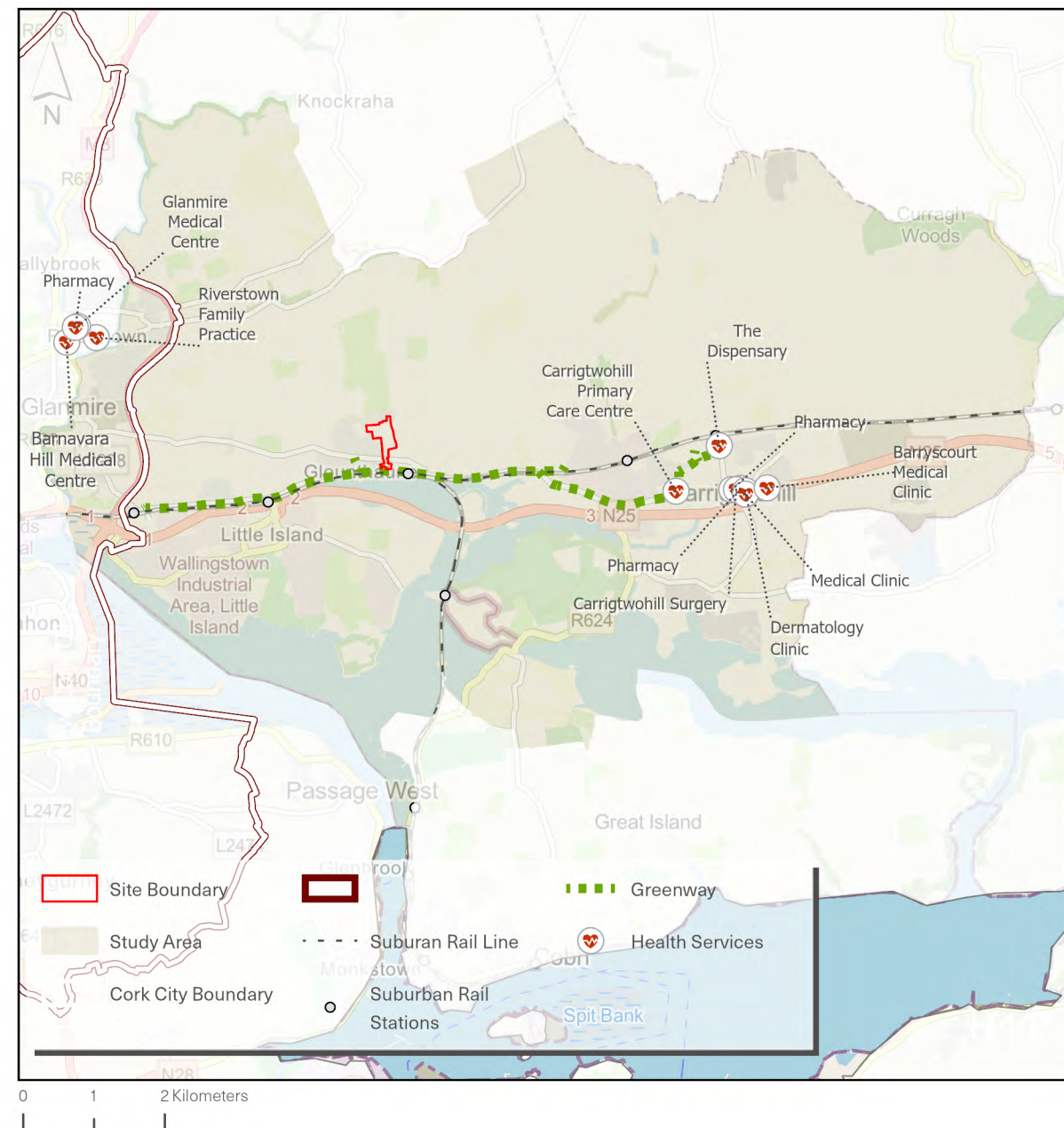
Figure 13.10 Details of Existing Retail facilities in study area



13.2.4.6 Healthcare

Although there are not currently any healthcare outlets in Glounthaune itself, there is a broad range of health and medical care facilities in Carrigtwohill and Little Island to serve the settlements existing and future population. The Carrigtwohill Primary Care Centre to the west of the town provides several healthcare outlets with dentists, pharmacies, dermatology clinic, Carrig Opticians & Hearing and Barryscourt Medical Centre all within the town centre. The Special Kids Medical Clinic at Castlelake, Carrigtwohill also provides children with medical conditions with specialised treatments providing a valuable service for the Carrigtwohill’s wider catchment. 2 no. additional pharmacies and 4 no. dentists also exist in Little Island. Glounthaunes location in the wider Metropolitan Cork area results that existing and future residents are conveniently located and accessible to larger urban settlements such as Cork City, Glanmire and Midleton for additional healthcare/medical services.

Figure 13.11 Details of Existing Health facilities in study area



13.2.4.7 Public Transport

Due to its location on the Cork Metropolitan Rail Network and the presence of several existing bus routes, Glounthaune is one of the most sustainable settlements in the Cork Metropolitan Area in terms of public transport provision. Glounthaune Train Station provides one of the most regular and high frequency rail services in the country, being situated on both the Cork – Midleton -and Cork – Cobh lines, resulting in rail services every 15 minutes (Monday-Saturday) at peak times to the city centre (Kent Station) and a service every 30 minutes to other urban centres including Little Island, Midleton, Cobh and Carrigtwohill³. Glounthaune is one of only 2 no. settlements (the other being Little Island) that benefits from being on both rail lines and a service every 15 minutes to the City Centre. Glounthaune benefits from high frequency rail services at both a local/regional level and is linked via rail travel to at an intercity level to Dublin and other larger urban centres.

Figure 13.12 Strategic Rail Network (Source: Iarnród Éireann)

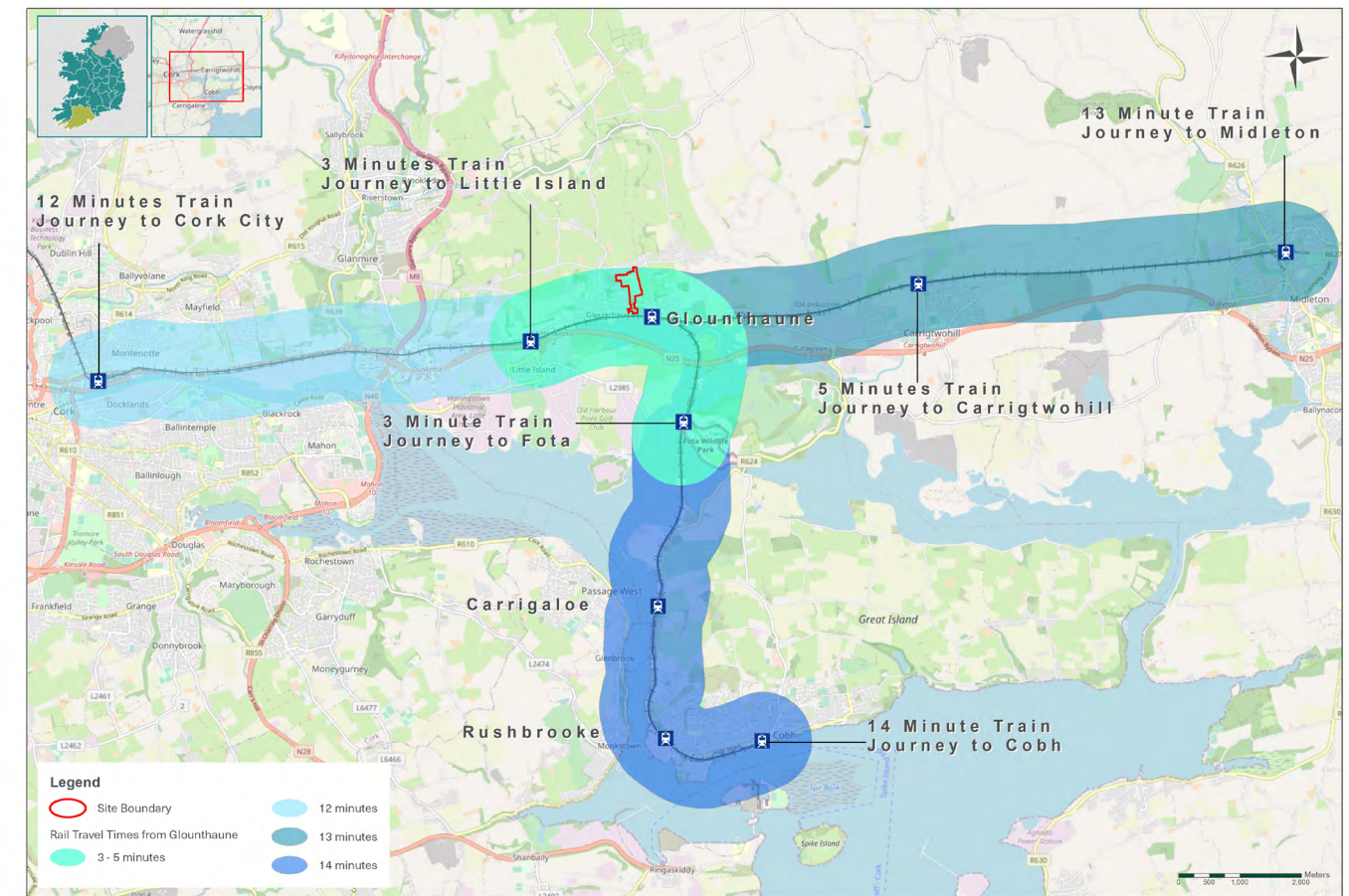


The frequency of rail services serving Glounthaune Station and the proximity of the settlement to major urban/employment centres reflects that Glounthaune is.

- 12 minute train time to Cork City Centre (Kent Station) – with a service every 15 minutes at peak times.
- 3 minute train time to Little Island – with a service every 15 minutes at peak times.
- 3 minute train time to Fota – with a service every 30 minutes at peak times.
- 5 minute train time to Carrigtwohill - with a service every 30 minutes at peak times.
- 13 minute train time to Midleton – with a service every 30 minutes at peak times
- 14 minute train time to Cobh – with a service every 30 minutes at peak time

³ Appendix 13-1 Cork Suburban Rail Network Timetable (Source: www.irishrail.ie)

Figure 13.13 Travel Times via rail to nearby urban centres from Glounthaune

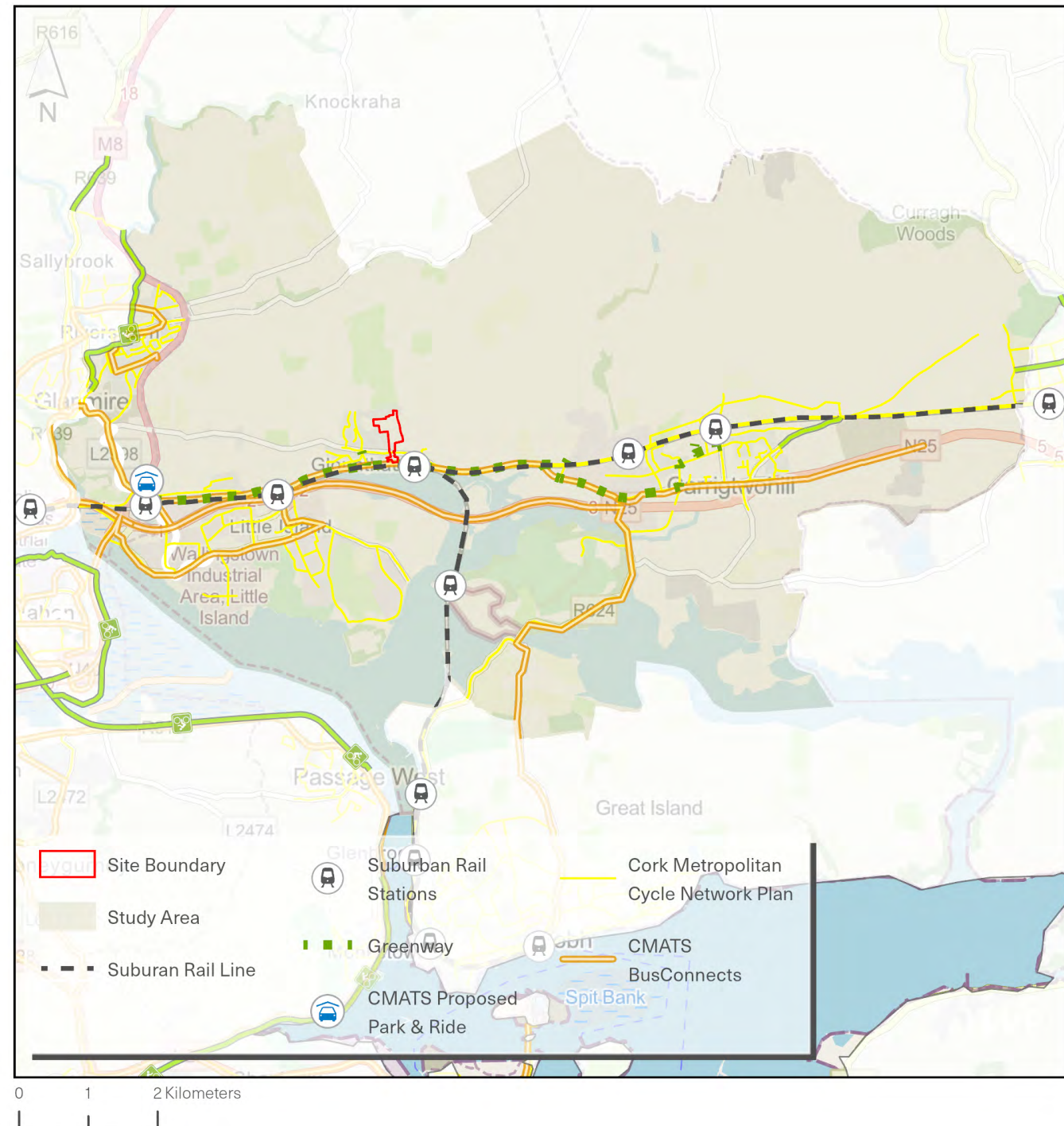


The Cork Metropolitan Area Transport Strategy (CMATS) indicates that Glounthaune will benefit from rail service improvements resulting in improved services on the Cork-Midleton line, with future works including a double track to Midleton and signaling improvements.

Glounthaune which are served by the following public bus routes with existing bus stops at Glounthaune station and Johnstown Close.

- No. 240 bus route; Cork – Ballycotton via Glanmire, Little Island, Carrigtwohill, Midleton and Cloyne. – c. 3 services daily
- No. 241 bus route; Cork – Trabolgan via, Midleton and Whitegate. – c. 3 services daily
- No. 260 bus route; Cork – Ardmore via Glanmire, Carrigtwohill, Midleton and Youghal – c. 5 services daily.
- No. 261 bus route – Cork – Ballinacurra via Midleton – c. 1 services daily.

Figure 13.14 Public Transport provision in Glounthaune



13.3 IMPACT ASSESSMENT

13.3.1 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.

13.3.2 Impacts on Existing Population and Human Health

13.3.2.1 Construction Phase

Construction works are likely to take place over a c. 48 no. month period (c. 4 no. years). During this time, there will be no loss of rights of way as a result of the proposed project. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts to nearby residents. Construction of the proposed development will be implemented in accordance with the Construction and Environmental Management Plan (CEMP) and Construction and Demolition Waste Management Plan (CDWMP) prepared by AECOM which are included in Appendices 2-2 and 2-3 of this EIAR. These documents describe a suite of mitigation measures to be strictly 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 proposed upgrades to the Terrace, including the implementation of a footpath, cycle lanes and pedestrian crossing, in addition to the construction of the southern apartment building/realignment of greenway may result in additional traffic congestion for a short period.

As described in Chapter 4 of this EIAR (Landscape and Visual), the construction phase of the development will require site clearance works, tree and vegetation removal. The proposed construction phase will result in short term/temporary negative impacts to the local landscape/visual context which will impact the local populations enjoyment of the existing landscape. The proposed landscaping mitigation planting scheme, which will be implemented during the construction phase, will mitigate the long-term impacts of the loss of existing high specimen trees, particularly in the southern parcel.

Chapter 6 of the EIAR refers to potential impacts on human health relating to the implementation of services and utilities. Potential 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 operations of the greenway and local road network. Where road opening is required to deliver utilities, this will require minor traffic management measures at off peak times or at night time hours. It is predicted that residual impacts will be not-significant following implementation of the identified mitigation measures.

Regarding human health effects, Chapter 7 (Land and Soils) notes that hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. It is predicted that the potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible.

Potential health effects are associated with negative impacts on public and private water supplies and potential flooding. With the proposed site design and mitigation measures outlined in EIAR Chapter 8 and the CEMP, it is predicted that the potential for impacts on the water environment are not significant.

Chapter 10 of this EIAR prepared by AWN Consulting assesses the potential impacts of noise and vibration during construction phase and predicts that the main source of noise and vibration will be due to the operation of various plant machinery and HGV movements to, from and around the site. It is predicted that subject to the mitigation measures, the cumulative impacts of the construction phase will be temporary to short-term, negative and not significant. The construction phase of the development may result in some slight, negative, short-term impacts on human health resulting from increased traffic on local road network and the generation of waste.

Chapter 11 of this EIAR, prepared by John Cronin & Associates assesses the potential cultural heritage impacts of the project during the construction phase. The proposed works to the southern parcel, particularly to facilitate the creation of a public footpath/cycle way, will result in the necessary removal of 8 no. heritage trees associated with the historical extended gardens of Ashbourne House. Ashbourne House itself (which is a Protected Structure as identified in the Cork County Development Plan), is within a separate site to the east of the southern parcel. It is predicted that the construction phase will result in direct, negative, moderate, and permanent impacts to the former garden, which will in turn impact human beings existing perception of historical landscape.

Chapter 12 of this EIAR, also prepared by AWN Consulting, assesses the potential impacts on air quality and climate during the construction stage of the project. The Construction Phase could have a slight negative impact on the surrounding area due to traffic and associated nuisance, dust and noise. However as confirmed in Chapter 12, the overall sensitivity of the area to human health impacts from dust emissions is considered low. Therefore, in the absence of mitigation, human health impacts are predicted to be short-term, localised, negative and slight.

13.3.2.2 Operational Phase

Once constructed, the proposed development will be permanent and non-reversible. The proposed development will result in several significant long-term positive impacts for the local population including.

- The proposed development will result in providing 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 result in the creation of a more compact settlement and assist in providing a critical mass of population to support local services and the local economy.
- The proposed pedestrian/cycle path which runs 'north-south' through the subject lands will result in a more permeable and accessible settlement for pedestrians and cyclists alike. The public realm upgrades including the proposed signalised pedestrian crossing on the Terrace will improve pedestrian, cyclist and traffic safety in the area, positively contributing to local human health and safety. As

demonstrated in Chapter 5, there is sufficient capacity within the local road network to facilitate the traffic generated by the proposed mixed-use development.

- The proposed public open spaces, amenity areas and multi-use games area within the development, will be accessible to all existing and future residents of the settlement. At present the subject lands are not accessible to the public.
- The proposed 67 no. place creche in the northern parcel will provide a childcare outlet for the existing and future residents of Glounthaune. The proposed creche is situated adjacent to the proposed multi-use games area and central parkland resulting in a central communal area in the site and opportunities for the future creche operator to utilise.
- The proposed commercial and community units at ground floor level of the southern apartment block will positively contribute to the local economy and community facilities in Glounthaune. The location of these units, immediately adjacent to the recently delivered greenway and existing commercial uses will consolidate this area as an important local service node in Glounthaune.

As detailed in EIAR Chapter 4 (Landscape and Visual), the operational phase of the proposed development will result in permanent changes to the landscape. The northern parcel, which includes 260 no. of the proposed 289 no. residential units is considered to be less visually sensitive with southern parcel of high visual and landscape significance. The proposed development incorporates pedestrian/cyclist connectivity through the site incorporated into the wider landscape strategy which is considered to be a human health benefit. The loss of specimen trees, particularly in the southern parcel will result in negative impacts to the local populations experience of the existing landscape. This will be most strongly felt in early stages of the operational phase, however in the long term once the replacement planting matures, these impacts will reduce over time.

Chapter 5 of this EIAR (Material Assets - Traffic & Transport) assesses the current and future capacity of 6 no. vehicular junctions in the vicinity of the site. Chapter 5 assesses the subject junctions both with/without development traffic for both AM and PM peak hours. Results are presented starting in 2026, 5 years after the scheme is complete, 2031, and 15 years after the full operation start 2041. Once operational, the proposed development will result in slight negative impacts to the local road network, with vehicular movements resultant from the proposed development potentially resulting in increased local traffic congestion at peak times impacting the local population. However, the local road network has capacity to accommodate the development with key population and human health benefits being the upgrade of the works to 'The Terrace' (installation of public realm and signalised pedestrian crossing) and the pedestrian/cycle path connecting to the greenway to the south. A Mobility Management Plan prepared by AECOM (Appendix 13.3) details how future residents and visitors to the site can be encouraged to avail of sustainable means of transport. It is predicted that the sites' location, relative to public transport opportunities and greenway to the south will promote sustainable and active modes of travel, benefitting human health of future residents.

As detailed in Chapter 6 of this EIAR relating to the implementation of material assets, services and 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 not be significant following the implementation of the stated mitigation and monitoring measures.

As confirmed in Chapter 8 of this EIAR, replacement of the greenfield surface with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. In the absence of appropriate migration measures, potential impacts on water supply and quality. However, it is concluded that the scheme design and proposed mitigation measures described ensures that the potential for impacts on the water environment relating to human health are not significant.

Regarding potential 'Noise and Vibration' impacts on human health during the operational phase of the development, Chapter 10 of this EIAR predicts that noise and vibrations sources from increased traffic, building services plant, deliveries and waste collections and other activities will not result in significant impacts on human health considerations.

Once operational, the proposed development will result in permanent changes the setting and appearance of Ashbourne Gardens. The proposed replacement/mitigation planting strategy includes the planting of 8 no. heritage trees, to replace the 8 no. that will be lost during construction. The planting of additional trees/hedgerows across the site will mitigate the long-term impacts of existing tree removal. The operational phase of the development provides that human beings will have access to the southern site, by way of the pedestrian/cycle path which is not currently provided as the lands are in private ownership. The proposed path will allow people to access and enjoy the southern parcel and the historical landscape of Ashbourne in addition to the stone grotto, which is currently overgrown and inaccessible. While it is predicted that the operational phase will result in negative/not significant/indirect/permanent impacts on the setting of Ashbourne House, the clearance of existing vegetation and planned programme of repairs to the grotto structure is predicted to result in direct/positive/moderate/permanent cultural heritage impacts and positively contribute to human health.

Negative impacts on air quality or emissions can result in knock on effects for population and human health. As detailed in Chapter 12 of this EIAR, the impact of the operational phase of the development on ambient air quality is predicted to be long-term, localised, negative and imperceptible. The proposed measures will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and imperceptible with respect to impact on human beings.

13.3.3 Impacts on Local Economy

13.3.3.1 Construction Phase

The duration of the construction phase is likely to result in moderate short-term positive impacts for the local economy. Construction workers will likely avail of local retail outlets and restaurants 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 provide for construction related employment opportunities.

13.3.3.2 Operational Phase

The proposed development will result in significant permanent positive impacts on the local economy. The 2016 Census confirms that the average household size the study area is approximately 3 no. persons per household. The proposed development of 289 no. dwellings in addition to the development permitted in Phase 1 to the west (38 no. dwellings) translates to an approximate uplift of approximately 980 no. persons. The projected increase in population of Glounthaune will create additional demand for local retail and service provision, providing increased local employment opportunities. The proposed development will result in providing 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 development will support the long-term future of Glounthaune train station a short distance south of the site.

13.3.4 Impacts on Amenity, Open Space and Sports

13.3.4.1 Construction Phase

It is envisaged that the construction phase will result in no significant impacts on existing open spaces and sports facilities in the area. The subject lands are in private agricultural use and are not publicly accessible. In order to construct the southern mixed-use building on Johnstown Close, realign the proposed greenway, and implement the proposed surface water/foul sewer upgrades, some temporary disruption may occur to the operations of the greenway during construction. However, these impacts will not impede the activities of the majority of the greenway of which some areas are currently under construction and nearing completion.

As detailed in Chapter 4 of this EIAR, the delivery of the proposed three metre pedestrian/cycle path linking the site to the new greenway, village core and train station which will necessitate the removal of a number of existing trees and hedgerows from the site, particularly in the southern parcel which is of higher landscape sensitivity than the northern parcel. Construction activities across

the site generally will also necessitate excavations and earthworks negatively impacting the existing visual amenities of the area from identified sensitive locations, particularly during construction and earlier years of the operational phase. As detailed in Chapter 3 of the EIAR (Alternatives Considered), the loss of some existing trees is unavoidable to accommodate pedestrian/cyclist connectivity from the northern parcel to the town centre/greenway. Chapter 3 describes how the final route and form of the proposed path has sought to minimise the removal of high specimen trees throughout the site with the construction phase of the development implementing a robust landscape and replacement planting strategy.

13.3.4.2 Operational Phase

Once operational the projected uplift in population will 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 previously, Glounthaune, and the defined study area is already well equipped for such facilities to serve the existing population. Local sports clubs such as Erins Own GAA club, Glounthaune United AFC will likely benefit from increased volunteer numbers and participation rates resulting in increased membership and financial/social benefits.

Once operational, the subject lands will be publicly accessible, resulting that the existing and future residents of Glounthaune will have convenient access to the attendant grounds/gardens of Ashbourne House which are not currently accessible to the public.

Once established, the proposed development will result in significant positive permanent impacts for Glounthaunes existing and future inhabitants. The proposed development provides for a range of public open spaces and amenity areas which will not only cater for the future residents of the proposed development but also the existing residents of Glounthaune. The proposed provides for a central multi-use-games area which will form a focal point of the proposed development in addition to a central parkland and several other smaller open space areas, which will positively contribute to the long-term public and amenity space provision in Glounthaune.

The proposed pedestrian/cyclist path will serve as a valuable amenity for existing and future residents of Glounthaune. The path will satisfy a natural desire line from the northern parcel and upper areas of Glounthaune and promote activity and exercise amongst the population, resulting in a significant positive and permanent impact in terms of recreation and amenity provision. The proposed public open spaces, amenity areas, multi-use games area will also positively contribute to the amenities of the settlement. Glounthaunes position on the suburban rail network and greenway to Carrigtwohill will result that the future residents of the scheme will be able to avail of amenity and sport facilities in the neighbouring settlements such as Carrigtwohill.

Regarding visual amenities, as referenced previously it is considered that negative impacts will be most pronounced from sensitive locations during the

construction phase and early years of the operational phase of the project until the proposed replacement/mitigation planting matures. Once the replacement/mitigation planting matures the visual setting of the development will improve incrementally over time.

13.3.5 Impacts on Childcare and Education

13.3.5.1 Construction Phase

It is considered that the proposed development will result not significant impacts on childcare or education outlets in the area during the construction phase. Some slight negative short-term impacts relating to noise, vibration, dust emissions and increased traffic levels may occur in the absence of appropriate mitigation measures during construction. It is concluded that the impacts of proposed construction phase will be neutral and will not negatively impact the operations of any childcare/education facility, subject to the specified mitigation measures as described in the Construction and Demolition Waste Management Plan (Appendix 2-2) and Construction & Environmental Management Plan (Appendix 2.3) being implemented.

13.3.5.2 Operational Phase

Childcare

The proposed development provides for a two storey, 551.4 sqm childcare facility with capacity for 67 no. children. The proposed development consists of the construction of 289 no. residential units comprising 201 no. dwelling houses and 88 no. apartment/duplex units. This is in addition to 38 no. units permitted in Phase 1 (comprising 25 no. 4 bed and 13 no. 3 bed units) permitted by Cork County Council Planning Reference 17/ 5699 (ABP Reference 300128-17) which is currently under construction. Cumulatively the permitted and proposed development provides for the delivery of 327 no. residential units at the wider lands consisting of.

- 86 no. 4 bedroom detached, semi-detached and townhouse dwellings,
- 92 no. 3 bedroom detached, semi-detached, townhouse and duplex dwellings,
- 112 no. 2 bedroom townhouses, duplexes/apartments.
- 37 no. 1 bedroom units

The proposed creche will result in a positive long-term impact, as the proposed creche will not only cater for the childcare needs of the proposed development but also the wider settlement of Glounthaune. The location of the creche, centrally within the northern land parcel, adjacent to the multi-use games area and central parkland represents that the northern parcel is served by central communal area, promoting a healthy sustainable new neighbourhood.

Schools

Of the permitted/proposed 327 no. units, 149 no. are 1 or 2 bedroom units (representing 45.5% of the total number of units on site) and are less likely to generate as much demand or school places as remaining 178 no. 3 and 4-bedroom dwellings within the development.

It should also be noted that it generally takes a multiple years for residential developments to become established and that the development will likely 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 2016 Census figures, approximately 16.7% of the resident population of the study area are of primary school age with 7.6% of the population of secondary school age.

Given the average household size in the study area is approximately 3.0 persons per household, the population uplift generated from the proposed development of 289 no. units in addition to the permitted phase 1 of 38 no. units permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17 would be circa 980 no. people. This reflects that the proposed development would result in an additional circa 160 -170 no. children (16.9%) of primary school age in the ‘worst case’ scenario. The 2016 census figures confirm that approximately 7.6% of the study areas resident population is of secondary school age (13-18 years). This reflects that the proposed development would result in an additional 70-80 no. children of secondary school age in future years in the ‘worst-case scenario’.

2016 Census Reference	No. of Persons in Private Households	No. of Households / Average Household Size	% of population of Primary School Age (4-12 years)	% of population of Post-Primary School Age (13-18 years)
Caherlag ED	7,462	2,423 no. households (3.0 no. persons per household)	1,209 no. children (16.2%)	647 no. children (8.6%)
Carrigtwohill ED	7,329	2,444 no. households (3.0 no. persons per household)	1,296 no. children (17.7%)	482 no. children (6.6%)
Small Area Ref: 047106013	108	41 no. households (2.6 persons per household)	31 no. children (28.7%)	8 no. children (7.4%)
Small Area Ref: 047106014	179	64 no. households (2.8 persons per household)	21 no. children (11.7%)	14 no. children (7.8%)

Table 13.9 Summary of ‘School Going’ Population of Study Area (Source: 2016 Census)

Projections from the Department of Education and Skills 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 published the ‘Projections of Full-Time Enrolment Primary and Second Level 2018-2036’ (2018) which outlines various scenarios of future intake for both primary and post-primary schools. The report estimates that primary school enrolment peaked in 2018 and a continuous decline in new enrolments is expected until 2036.

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.

Fig 13.15 Projections of Enrolment at Primary Level, 2018–2036 (Source: Projections of Full-Time Enrolment Primary and Second Level 2018-2036 - Department of Education and Skills)

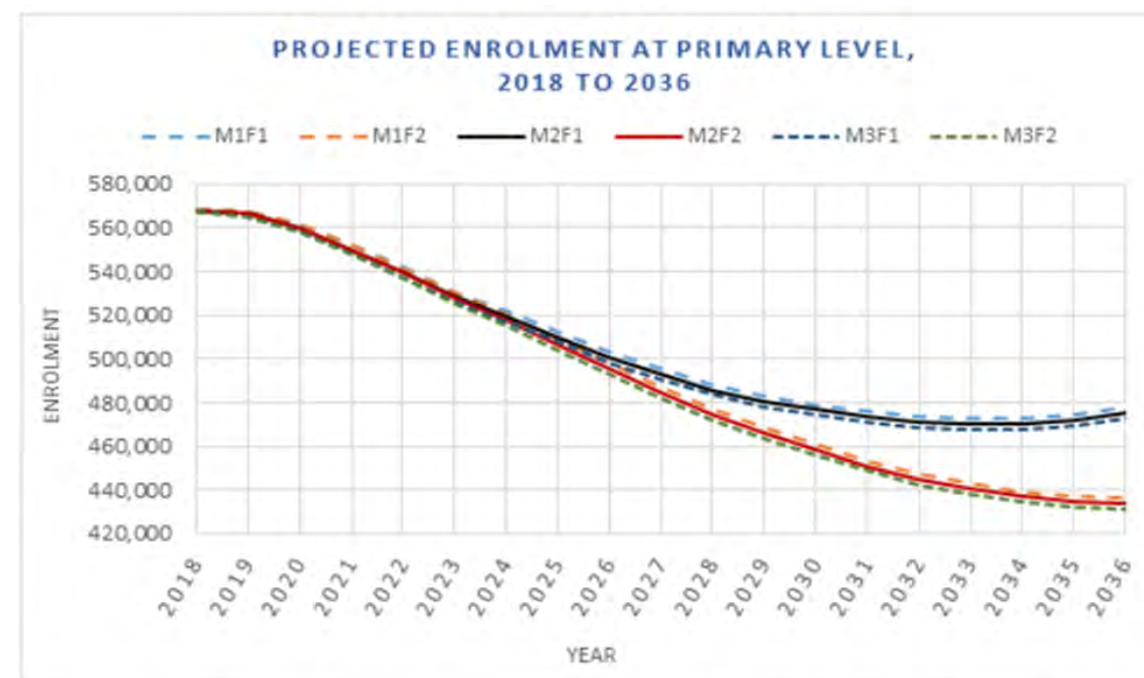
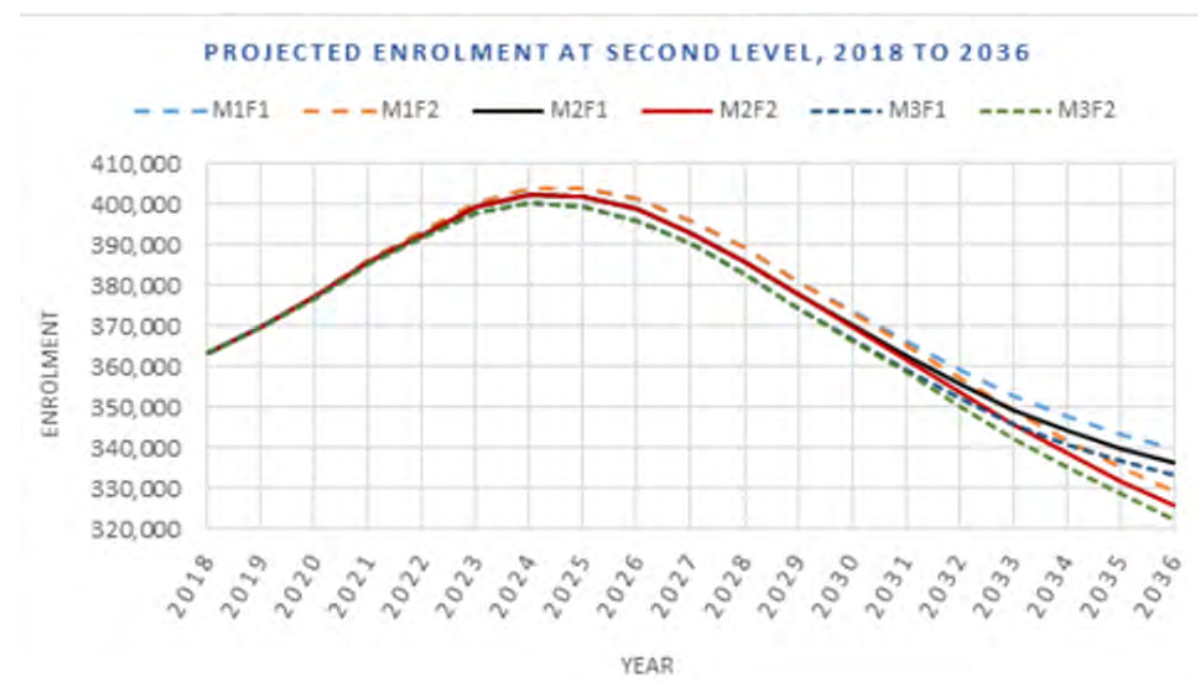


Fig 13.16 Projections of Enrolment at Second Level, 2018–2036 (Source: Projections of Full-Time Enrolment Primary and Second Level 2018-2036 - Department of Education and Skills)



Given the projected fall in both primary and secondary school enrolments in the coming years and the factors described relating to the proposed housing mix, it is considered likely, that the demand for school places will be less than the 'worst-case' scenario outlined above.

In preparation of this EIAR, a request was made to the Department of Education and Skills, 'Forward Planning' section in respect of local school's spare capacity data ⁴. At the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.

Notwithstanding, we note that the construction of a new schools campus at Carrigtwohill, containing 2 no. 24 classroom primary schools and 1 no. 1000 no. student post primary school is due to commence in the near future with tenders approved by the Department of Education to construct the project. It is considered likely that the schools' campus will be constructed and operational by the time the majority of the proposed development will be constructed.

Having regard to the above, and the wider network of existing schools in the area, it is considered that there will be sufficient capacity locally to cater for future demand arising from the proposed development and that the development will result in neutral impacts on local schools and educational facilities.

The proposed development will also result in moderate, positive and permanent impacts relating to sustainable mobility for pedestrians and cyclists in accessing Glounthaune National School to the west of settlement from the existing scenario. The school is situated to the western periphery of the settlement and is not currently served by an adequate footpath or cycle infrastructure.

The proposed development will provide a dedicated pedestrian/cycle route from the village core, through the site and tie in with the upgrades and signalised junction with the Cois Chuain residential development permitted in Phase 1, which is currently under construction. The proposed development will assist in contributing to enabling pedestrian and cycle links to the school through Cois Chuain resulting in a safer environment for motorists/cyclists and pedestrians alike.

⁴ Refer to Email Correspondence in Appendix 13-2

Fig 13.17 Pedestrian/Cyclist Connectivity to Glounthaune Primary School



13.3.6 Impacts on Community Facilities

13.3.6.1 Construction Phase

Due to the subject sites location proximate to the nearest health outlet/service, it envisaged that the construction phase of the development will result in no significant impacts.

13.3.6.2 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. In addition to the various public open spaces, play areas and multi-use games area within the northern parcel, the proposed development provides for a new 113.6 sqm community facility at ground floor level of the proposed apartment building fronting onto the new greenway and Johnstown Close. The subject community space will serve as a flexible space for existing and future residents of Glounthaune to facilitate local events, classes and a base for local clubs and organisations. It is considered that the proposed community space will represent a significant long-term positive impact and asset for the settlement and particularly cater for the growing population of Glounthaune, particularly to the east and north of the settlement.

13.3.7 Impacts on Retail Services

13.3.7.1 Construction Phase

Construction phase of the proposed development is likely to result in moderate short term positive impacts to local retail outlets. Construction workers will likely avail of local retail services for food and refreshments reflecting increased economic and retail activities in the settlement.

13.3.7.2 Operational Phase

Once operational, the population increase resultant from the proposed development will result in significant positive and permanent impacts to the local economy and retail services in Glounthaune. The proposed uplift in population will not only assist in achieving a critical population base in Glounthaune, supporting the continued viability of existing retail outlets, but also create further opportunities to diversify the existing retail/commercial environment in the village. The development itself includes a commercial unit of 77.8 sqm in area at ground floor level in the southern apartment block. The future use of this unit is flexible and can respond to local need/demand representing an additional significant positive permanent impact from the proposed development.

13.3.8 Impacts on Health Services

13.3.8.1 Construction Phase

Due to the subject sites location proximate to the nearest health outlet/service, it envisaged that the construction phase of the development will result in no significant impacts.

13.3.8.2 Operational Phase

Once operational, the population increase generated by the proposed development will result in increased demand for local healthcare services, particularly in the settlements of Little Island, Glanmire and Carrigtwohill. Given the wide variety of medical facilities in the study area and the predicted demographics of the proposed scheme it is considered that the proposed development will result in imperceptible impacts on local health services.

13.3.9 Impacts on Emergency Services

13.3.9.1 Construction Phase

There are no emergency services in the settlement of Glounthaune or the site's immediate vicinity. The construction phase will not result in imperceptible impacts for local emergency services.

13.3.9.2 Operational Phase

As referenced previously, the closest Garda Stations to Glounthaune are at Glanmire and Carrigtwohill and fire stations at Middleton and Cobh. The closest hospitals to the settlement include the Mater Private in Mahon, St Finbarrs Hospital and South Infirmary Hospital in 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 considered that the proposed development will result in imperceptible impacts on emergency service provision.

13.3.10 Impacts on Public Transport

13.3.10.1 Construction Phase

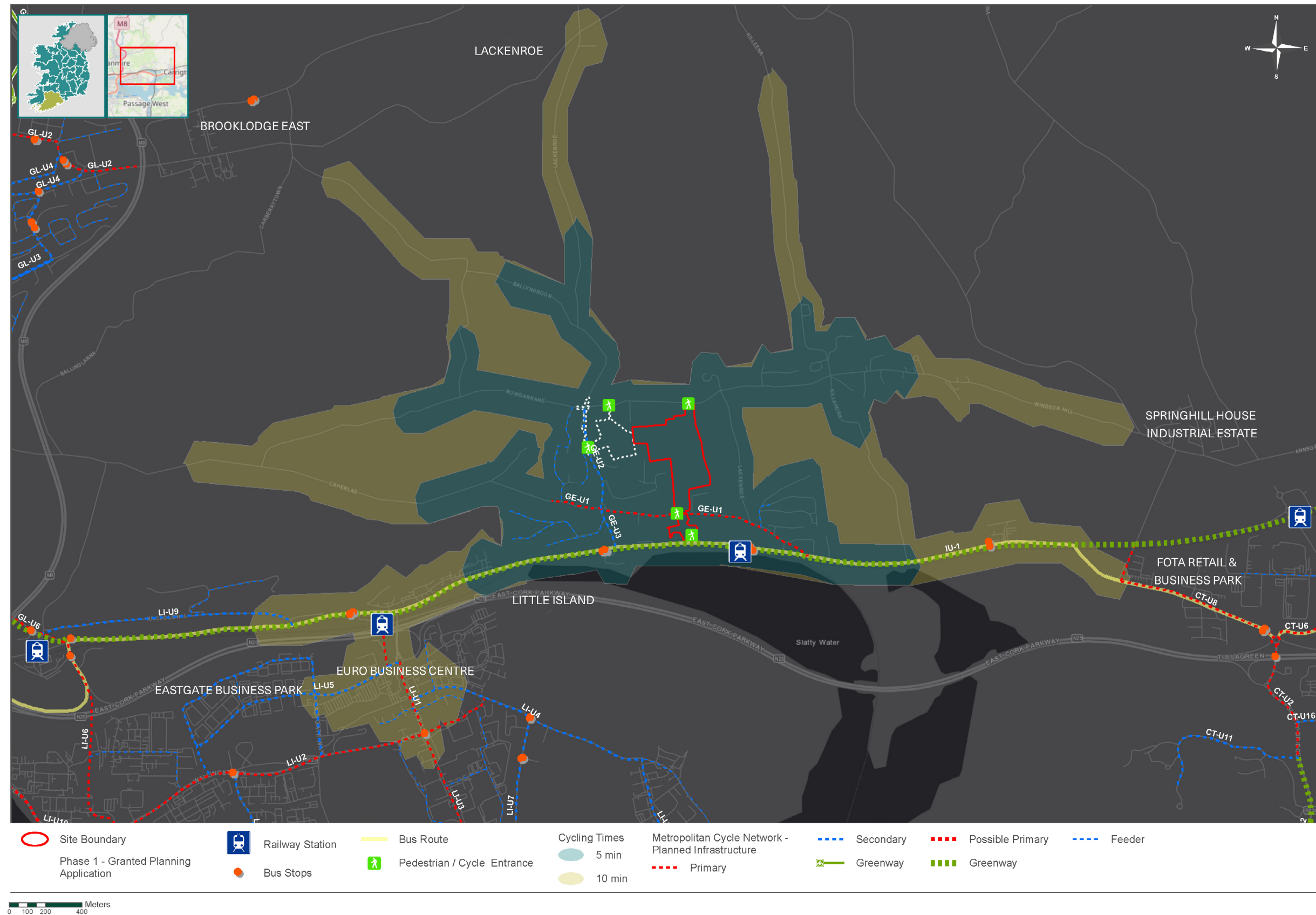
During construction, the proposed development is likely to result in moderate positive short-term impacts to local public transport services. Due to Glounthaunes position on the Cork Suburban Rail Network it is likely that construction workers will avail of rail, and to a lesser extent local bus services to access the site from other urban centres such as Middleton, Carrigtwohill, Cobh and Cork City. The increased use of public transport will promote sustainable commuting patterns and positively support public transport services in the area.

13.3.10.2 Operational Phase

Once operational, it is envisaged that the proposed development will likely result in profound positive, permanent impacts to the local population in terms of public transport provision. The proposed development will support the continued viability of public transport services in the area, reduce car dependency in the settlement and promote sustainable modes of transport.

The subject site's location immediately adjacent to the new greenway, which leads directly to the village train station and local bus stops, reflects that the future residents of the scheme will have dedicated and convenient pedestrian/cyclist access to a high frequency public transport link. The southern access to the site from Johnstown Close and the Greenway is approximately a 2-minute cycle or 3-5-minute walk from the train station and existing bus services in Glounthaune.

Fig 13.18 5-10 minute cycling times from the subject lands



0 100 200 400 Meters

The population uplift generated from the development will result in the creation of a new community who will avail of public transport as a means of commuting to other urban centres such as the City Centre, Carrigtwohill, Cobh and Midleton.

As evidenced by 2016 census information, despite its location on a high frequency public transport corridor Glounthaune exhibits relative high levels of car dependency. It is considered a primary reason for this is the lack of pedestrian/cyclist connectivity to the train station and the underutilisation of available development lands in the train station's immediate vicinity. The proposed development represents the concentration of growth on an undeveloped site within walking/cycling distance to the train station and public realm upgrades will promote sustainable commuting patterns and reduce car dependency. This will result in significant positive long-term impacts on sustainable modes of travel and public transport.

The proposed layout will provide for a very significant positive and permanent impact to access to public transport and wider connectivity in Glounthaune by satisfying a strong desire line, allowing existing and future residents of the settlement direct and convenient access to the train station, village core and amenities. This results that that there will be dedicated pedestrian connectivity between the train station and the existing residential areas to the north of Glounthaune, the Cois Chuain residential development and Glounthaune National School.

13.4 MITIGATION MEASURES, MONITORING AND RESIDUAL IMPACTS

13.4.1 Mitigation & Monitoring

13.4.1.1 Construction Phase

The potential impacts on the human environment relate to other environmental aspects such as air quality, noise and vibration, water quality and traffic and where required, the related mitigation measures are dealt with in the corresponding chapters of this EIAR. Full details of all mitigation and monitoring procedures during construction phase are described in the CDWMP (Appendix 2-2) and CEMP (Appendix 2-3) both prepared by AECOM. The CEMP and CDWMP have been specifically designed and will be monitored to ensure that any negative impacts arising from the construction phase of the development on neighbouring properties or surrounding areas are minimised through mitigation measures which include.

- The construction phase will be in accordance with guidance contained in the British Standard BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites.
- In addition to the CEMP the appointed Contractor will ensure any employed subcontractors will also be required to adhere to all safety reviews to ensure that all requirements of the proposed Project are safe. A Project Supervisor for the Design Process (PSDP) has been appointed as part of the design stage. Where issues are identified, corrective actions will be implemented to amend design issues prior to issuance of final design for construction. A Project Supervisor for the Construction Stage (PSCS) will be appointed as part of the construction stage.
- Protective barriers will be installed around trees to be retained prior to commencement of works on site which shall remain in place for the duration of construction works.
- Site hoarding and barriers will prevent unauthorised access to the each works area.
- In order to mitigate any impact of construction activities there will be, coordination of deliveries to site within working hours and scheduling of noisier activities at earlier times of the day Noise and vibration mitigation

measures will be adopted as outlined in the CEMP. The delivery of materials to the site during the construction phase shall be organised so that deliveries are minimised and do not cause traffic hazard. Deliveries will not be permitted a peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and all construction vehicles are parked within the site.

- No construction works will commence until the signalised junction permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17 is fully operational.
- A Dust Management Plan will be implemented.
- A monitoring regime will be put in place to protect neighbours & neighbouring properties with a full and detailed vibration, noise, dust, and groundwater monitoring regime put in place for the duration of the works.

13.4.1.2 Operational Phase

The site layout responds to the site's topography and the evolving development context in Glounthaune. The proposed landscape and planting strategy will assist in mitigating the tree loss required to accommodate the proposed pedestrian/cyclist path through the site and will provide future residents with direct access to the greenway and train station.

The pedestrian/cyclist path and signalised pedestrian crossing on the Terrace will result in significant positive and permanent impacts to pedestrian and cyclist mobility in the settlement. The crossing will be taken in charge by Cork County Council. The path will not only benefit future residents of the scheme but ensure enhanced road safety and promote the usage of public transport as a viable means of commuting to nearby urban centres. The propose public open spaces, creche, commercial and community uses will all significantly positively and permanently contribute to the communal and public facilities in Glounthaune.

13.4.2 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, CDWMP and EIAR being implemented, the proposed development will result in many positive and permanent residual impacts including.

- The creation of a new community in Glounthaune, orientated around a high frequency public transport link which can promote sustainable commuting patterns to nearby urban and employment centres.
- The delivery of a new 'north-south' pedestrian/cyclist route will complement the delivery of the recent east-west greenway to Carrigtwohill at Johnstown Close. The public realm upgrades which include the provision of a signalised pedestrian crossing on the Terrace will significantly improve pedestrian, cyclist and motorist safety in the area as well as providing dedicated pedestrian/cyclist connectivity to the greenway, village core and train station.
- The delivery of a new creche and community and commercial units which will positively contribute to Glounthaunes childcare, economy and community facilities.
- It is acknowledged that the loss of several mature trees will occur as a residual impact of the proposed development. As detailed in Chapter 3 of this EIAR (Alternatives Considered) the route and form of the proposed 3 metre pedestrian/cyclist path has been designed to ensure that all 'champion' trees as defined in the arborists report and as many 'heritage trees' as possible are retained. Although the development of the southern parcel will result in some medium term significant negative visual impacts, the proposed landscaping and planting strategy will mitigate the loss of those existing significant trees.
- In relation to the impact of the proposed project on Population and Human Health it is considered that the monitoring measures outlined in regard to the other environmental topics such as water, air quality and climate and noise etc. sufficiently address monitoring requirements.

13.5 CUMULATIVE IMPACTS

The projects in the area which have been assessed in terms of cumulative effects re outlined in chapter 1 of this EIAR.

13.5.1 Construction Phase

Assessing the cumulative impacts of the construction phase of the development is contingent on a number of other proposed developments in the area, which are currently in the planning application process. These include.

- Cork County Council Planning Reference 21/5072 – Construction of 94 no. residential units at the lands immediately east of the southern parcel.
- Cork County Council Planning Reference 21/4622 – Construction of 12 no. residential units at lands to the east of northern parcel.
- Cork County Council Planning Reference 21/6851 – Construction of 21 no. residential units at lands to west of the northern parcel.

For the purposes of this assessment of impacts a ‘worst case’ scenario has been assessed based on the information contained in these planning applications and the other projects stated in Chapter 1. As referenced in the CEMP, the construction phase of the proposed development will only commence, once the signalised junction and public realm upgrades permitted in Phase 1 are constructed and fully implemented. It is envisaged 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.

13.5.2 Operational Phase

Once constructed, the proposed development will be permanent and non-reversible. It is considered that cumulative impacts relating to human health factors including traffic, road safety, air quality, water quality, noise and vibration will be not significant.

The proposed development in context of other developments in the area may result in negative impacts in terms on the existing landscape, dependant on the context of the visual analysis conducted. This is further detailed in Chapter 4 of this EIAR.

However, in the context of profound benefits in terms of the delivery of new cyclist/pedestrian path which connects to the new greenway, which in turn serves the village core, train station and future schools campus in Carrigtwohill, that the development will result in significant benefits in terms of wider human health considerations.

13.6 DIFFICULTIES IN COMPILING INFORMATION

In preparation of this Chapter, the following difficulties were encountered.

- The census data which informed this chapter’s analysis are from 2016 and may be considered out of date. However, this is the most recent census data available.
- This chapter has been prepared during the Covid-19 pandemic.
- There are a number of planning applications in Glounthaune, proximate to the subject site which are currently at planning application stage. (Cork County Council Planning References 21/5072, 21/4622 and 21/6851).

- Despite a request from the Department of Education and Skills, ‘Forward Planning’ section in respect of local school’s spare capacity data, at the time of preparation of this EIAR no information was provided by the Department regarding the current excess capacity of existing schools within the study area.

Notwithstanding the above, 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

13.7 REFERENCES

www.education.ie

www.cso.ie

www.irishrail.ie

www.pobal.ie

Cork County Development Plan 2014.

Draft Cork County Development Plan 2021.

Cork County Councils Planning Enquiry System.

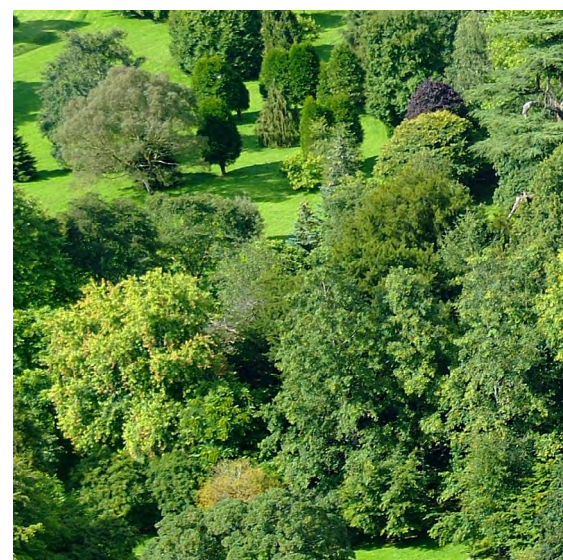
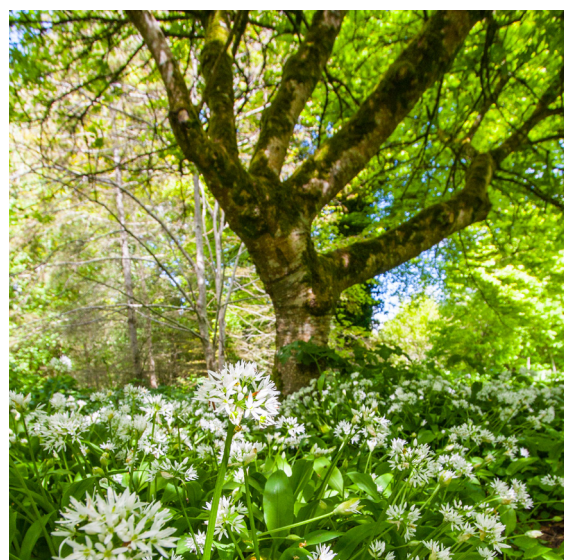
<https://www.corkcoco.ie/en/planning/traffic-transport/statutory-processes>



LACKENROE SHD

CHAPTER 14

Interaction of Impacts



VOLUME II | EIAR

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CHAPTER 14

Interaction of Impacts

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14 Interaction of Impacts

14.1 INTRODUCTION

14.1.1 Chapter Author

This Chapter has been prepared by Harry Walsh, (BA HONS, Master of Regional and Urban Planning, MIPI), Director at HW Planning. Harry has 22 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 the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

In preparing the EIAR each of the specialist consultants have and will continue to liaise with each other, and will consider the likely interactions between effects predicted as a result of the proposed development during the preparation of the proposals for the subject site, and this ensures that mitigation measures are incorporated into the design process. As this EIAR document has been prepared by a number of specialist consultants an important aspect of the EIA process is to ensure that interactions between the various disciplines have been taken into consideration.

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 interactions.

14.3 DESCRIPTION OF SIGNIFICANT INTERACTIONS

14.3.1 Landscape and Visual

Chapter 4 of this EIAR, prepared by Cunnane Stratton Reynolds, assesses landscape and visual impacts resultant from the proposed development.

14.3.1.1 Construction Phase

Population and Human Health – The construction phase of the development, and the necessary removal of existing trees/vegetation, construction traffic and excavation/earthworks will result in interactions between landscape and visual and population and human health impacts. Due to visually sensitive nature of the site and the southern parcel in particular, human beings existing visual amenities and interactions with the landscape will be negatively affected during construction, particularly from visually sensitive locations referenced in EIAR Chapter 4. The construction phase of the development provides for significant levels of mitigation/replacement planting which will mitigate the long-term impacts of the removal of existing vegetation and land cover.

Biodiversity – 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, Infrastructure & Utilities – The necessary earthworks/excavations to facilitate the proposed development including underground water infrastructure, estate roads, construction compounds, pedestrian/cyclist link and the construction of new buildings will result in the permanent loss of the existing landscape/soil cover of the site, representing an interaction between landscape/visual and material assets impacts during the construction phase. Visual impacts during the construction will be mitigated

through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site waste.

Cultural Heritage – Necessary tree felling, particularly in the southern parcel, will result in negative impacts to the setting of Ashbourne House and Gardens. Ashbourne House is identified as a 'Protected Structure' in the Cork County Development Plan 2014. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site which will be implemented during the construction phase.

Land and Soils – Soil and bedrock excavations will be required for site levelling, for the installation of foundations, service trenching and proposed landscaping measures. This will result in a permanent relocation of soil and subsoil at most excavation locations. The excavations and earthworks during the construction phase will result in interactions with the existing landscape. The CEMP and CDWMP describe 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 – Traffic and Transportation – The construction phase of the proposed development includes the introduction of a signalised pedestrian crossing on the Terrace, which is identified as a scenic route in the current Cork County Development Plan 2014, reflecting an interaction between these landscape and traffic/transportation considerations. It is not considered that the introduction of the pedestrian crossing on the Terrace results in significant landscape impacts. Construction traffic, HGV movements and internal construction vehicular movements/parking also present a potential interaction between landscape and visual and traffic and transportation impacts.

14.3.1.2 Operational Phase

Population and Human Health – The proposed development will result in the permanent change of sites landscape and visual setting, particularly in its local context. The northern parcel is considered to be less visually sensitive and is predicted will have a moderate and neutral effect on the landscape context of the area. It is recognised that the southern parcel is visually more sensitive and contains 23 no. existing heritage/champion trees which contribute to

visual amenities and the human beings perceptions of the area. As described in Chapter 4, of the 14 no. viewpoints assessed as part of the Landscape and Visual Assessment, only one view is considered to have a significant impact (viewpoint 6 on the Terrace) and is localised in nature. The majority of the remaining views are considered neutral in quality and in general, views from the east, west and the scenic route north of the site show minimal visual effects with the development well set into the topography and appearing in the context of other built form.

Cultural Heritage – The characteristics and location of the development site reflects in significant interactions between landscape/visual and cultural heritage aspects. The operational phase will result in the permanent change to the former attendant gardens of Ashbourne House in the southern land parcel with 8 no. heritage trees and other less significant trees across the site being removed to accommodate the development. The proposed mitigation measures which include the replacement of 8 no. heritage trees to be lost, with 8 no. replacement heritage trees and incorporation of the remaining 15 no. champion/heritage trees within the wider landscaping strategy, will result that in the long term the landscape and visual context will evolve from the existing scenario. It is considered that the most pronounced visual/cultural heritage interactions will be evident during construction and earlier years of the operational phase until the proposed mitigation and replacement planting matures. The proposed accessibility of the grotto and the project objective to capitalise on its presence as a landmark feature within the landscape strategy during the operational phase, will result that the grotto and woodland will form a valuable landscape/ heritage amenity to the settlement. The proposed development will result that the lands will be publicly accessible, and that existing and future residents of the settlement will have the opportunity to enjoy the cultural heritage context of the site.

Biodiversity – Once operational, the proposed replacement/mitigation planting scheme and landscape strategy will provide new opportunities for flora and fauna habitats. The proposed mitigation proposals including shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers, native hedgerow planting as well as extensive native-dominant tree planting across the site will positively contribute to biodiversity in the long-term.

Material Assets – Traffic and Transportation – The proposed upgrades of the Terrace will result in an improved pedestrian/cyclist environment from the ‘do nothing’ scenario. The proposed pedestrian/cyclist path through the site which links with Johnstown Close to the south will improve traffic safety in the vicinity by providing dedicated pedestrian and cycle connectivity to the village core and train station to the south. It is considered that these interventions are largely positive and will benefit the landscape and visual context of the area.

Material Assets – Services, Infrastructure & Utilities – Utilities such as public lighting will result in interactions with landscape and visual considerations. The proposed lighting scheme is in accordance with national & international industry standards and accounts for light pollution, disability and discomfort glare and sky glow.

Land and Soils – The proposed landscape strategy responds to the sites topography, with cut and fill generate from the site utilised elsewhere in the site 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.

The potential impacts on landscape and visual has been considered within the relevant discipline/chapter and appropriate mitigation measures proposed. It is considered, that ‘landscape and visual’, ‘cultural heritage’ and ‘population and human health’ have unique interdependencies/interactions in this project.

14.3.2 Material Assets – Traffic and Transportation

Chapter 5 of this EIAR, prepared by MHL & Associates Consulting Engineers, assesses traffic and transportation impacts resultant from the proposed development.

14.3.2.1 Construction Phase

Landscape and Visual – The construction phase of the proposed development includes the introduction of a signalised pedestrian crossing on the Terrace, which is identified as a scenic route in the current Cork County Development Plan 2014, reflecting an interaction between landscape and traffic/transportation considerations. Construction traffic, HGV movements and internal construction vehicular movements/parking also present a potential interaction between landscape and visual and traffic and transportation impacts.

Population and Human Health – The construction phase of the project will result in higher levels of traffic in the area for the duration, potentially resulting nuisances such as increased traffic congestion on the local road network, impacting the local population and human health. The proposed upgrades to the Terrace including the implementation of a footpath, cycle lanes and pedestrian crossing, in addition to the construction of the southern mixed-use building/realignment of greenway may result in additional traffic congestion for a short period. The CEMP contains details of a Construction Traffic Management Plan (Appendix 2-3) which describes a suite of measures to mitigate interactions with local population during the construction phase including: (a) deliveries to site bring restricted to off peak hours, (b) the repair of any damage to existing roads or footpaths caused during construction, (c) parking of construction related vehicles and workers will only be accommodated on site, (d) wheel washing and road sweeping procedures and (e) practices to minimise the number of construction vehicles accessing the site at any one time. With the proposed mitigation measures in place, it is considered that there will be short term slight negative impact on the local road network and human health during the construction phase.

Noise and Vibration – Noise and vibrations generated from construction activities including plant machinery and HGV movements, may give rise to nuisances impacting the amenities of residents and businesses. Chapter 10 of this EIAR (Noise and Vibration) and the CEMP which includes the Construction Traffic Management Plan, provides for a range of mitigation and monitoring measures. It is predicted that interactions between construction traffic and noise and vibration will not be significant and short term in nature.

Air Quality and Climate – During the construction phase, potential significant interactions are possible between construction traffic and local air quality and climate in the absence of appropriate mitigation measures. Traffic emissions and dust associated with construction vehicles accessing the site also have the potential to impact air quality during the construction phase. As confirmed in Chapter 12 of this EIAR prepared by AWN Consulting, the proposed construction traffic numbers will not exceed the criteria stated in the ‘UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a),’ and it is not predicted that there will be significant interactions with air quality. Regarding climate, Chapter 10 also predicts that there is no potential for significant impacts to climate resultant for construction traffic.

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. The mitigation measures proposed in the CEMP and CDWMP prepared by AECOM reflect those residual impacts and interactions will not be significant with any negative interactions being slight and short term.

Water (Hydrology & Hydrogeology) – In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills, potentially impacting on local water quality. However, with the proposed suite of mitigation measures detailed in the CEMP, no significant interactions are envisaged.

Material Assets – Services, Infrastructure & Utilities – During construction, interactions between Material Assets and traffic /transportation, may include road openings to install project utilities. During these times, local traffic management measures will be required at off-peak times or at night resulting in slight temporary impacts. The CEMP contains a Traffic Management Plan detailing 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.

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 and CDWMP, 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 between biodiversity and traffic and transportation impacts during construction.

14.3.2.2 Operational Phase

Population and Human Health – Once operational, the proposed development will result in increased traffic volumes accessing the site and higher traffic volumes in the local road network and at key vehicular junctions. As detailed in Chapter 5 of this EIAR prepared by MHL & Associates, the surrounding road network has capacity to accommodate the development, however slight negative impacts on human health is predicted associated with higher traffic volumes in the area. However, it is considered that the proposed pedestrian/cycle crossing on the Terrace, and realignment of the greenway to facilitate motorists, pedestrians and cyclists may result in a likely slow-down of traffic speed benefitting pedestrians and cyclists in the area. As a result, users of the local road network may experience increased delays in car journeys as pedestrian/cyclist mobility is prioritised.

Noise and Vibration – As detailed in EIAR Chapter 10, the main potential sources of outward noise from the development during the operational phase, include additional traffic on surrounding roads/deliveries and waste collections. However, it is predicted that the change in noise levels associated with additional traffic due to the proposed development, will be negligible, imperceptible and long term. Due to the expected frequency of waste collections and deliveries for the future residential/commercial development and since the proposed development has been designed to accommodate these services, it is predicted that deliveries and waste collection will not result in significant noise impacts on the receiving environment.

Air Quality and Climate – Regarding Air Quality, EIAR Chapter 12 predicts that when operational and the predicted traffic modelling is realised, that any impacts on ambient air quality will be long-term, localised, negative and imperceptible. 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.

Landscape and Visual – The proposed upgrades to the Terrace, which is identified as a ‘scenic route’ in the current Cork County Development Plan, results in interactions between landscape and traffic and transport impacts. The local road to the north of the site (L-2969), is also identified as a scenic route in the County Development Plan. It is predicted that the proposed pedestrian crossing on the Terrace and upgrade of the public realm/greenway realignment will result in a significant improvement in pedestrian/cyclist mobility in Glounthaune and create a safer environment for pedestrian/cyclists and motorists to co-exist in 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 are predicted.

14.3.3 Material Assets – Services, Infrastructure & Utilities

Chapter 6 of this EIAR, prepared by AECOM, assesses servicing impacts resultant from the proposed development.

14.3.3.1 Construction Phase

Population and Human Health – The implementation and connection of services and utilities such as water, communications, electrical infrastructure during construction, may result in some temporary/short term negative interactions with population and health. These include the proposed works to deliver the proposed wastewater/ surface water upgrades to serve the proposed development and interactions and potential temporary disruption to the local road network and greenway. 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 may include road openings to deliver utilities. During these times minor local traffic management measures at off peak times or at night resulting in slight temporary impacts. As referenced previously, the CEMP includes a Traffic Management Plan detailing 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.

Landscape and Visual – Earthworks, site clearance and tree/vegetation removal required to implement services and utilities (such as underground water infrastructure, estate roads, construction compounds, pedestrian/cyclist link and the construction of new buildings) will result in changes to the existing landscape/land cover. Visual impacts during construction will be mitigated through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and public areas are kept free from building material and site waste.

Cultural Heritage – The southern land parcel includes the remnants of a former rock garden/quarry associated with Ashbourne House and gardens to the east. An existing stone grotto associated with the rock garden exists in the southern area of the southern land parcel. In the absence of appropriate mitigation measures, potential negative interactions between the installation of footpaths/service infrastructure and the retention of the grotto could occur. As detailed in EIAR Chapter 11 prepared by John Cronon & Associates, and the CEMP, a method statement regarding the safeguarding of the grotto during

construction will be strictly implemented, including vibration restrictions in this area of the site and the maintenance of a working distance of at least 2.7 metres from the feature. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between cultural Heritage and Material Assets.

Biodiversity – During construction, in the absence of appropriate mitigation measures the necessary works to accommodate service infrastructure including earthworks, tree/hedgerow removal, earthworks/excavation and refuelling on site may result in the displacement, deterioration or destruction of habitats, flora/fauna species and European sites (Cork Harbour SPA and Great Island Channel SAC). As detailed in EIAR chapter 9 prepared by Kelleher Ecology Services, with the proposed mitigation measures in place it is predicted that; (a) potential construction phase impacts in relation to surface-water run-off drainage on designated sites will be neutral, (b) potential construction phase effects on designated sites in relation to treated waste-water discharge will be neutral, (c) potential construction phase effects in relation to disturbance/displacement impacts on the qualifying interest species of Cork Harbour SPA will be neutral, (d) potential construction related effects on habitats/flora associated with downstream water-features in the wider area via surface-water and waste-water run-off impacts will be neutral, (e) potential construction related effects on fauna associated with water-features in the wider area via disturbance/displacement and surface-water run-off or waste-water discharge impacts will be neutral. A Natura Impact Assessment has also been prepared with respect of the proposed development (appended to Chapter 9) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

Land and Soils – During construction, the installation of services and utilities will have direct interactions with land and soils due to necessary excavations, site clearance, rock breaking and trenching. As detailed in Chapter 7 of this EIAR, given the specific nature of the proposed project and mitigation measures proposed it is not predicated that there will be significant negative interactions between Land & Soils and Material Assets during the construction.

Water (Hydrology & Hydrogeology) – Much of the utility service infrastructure to be installed for the development is to serve water infrastructure. 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. Any stockpiling of materials or works impeding site drainage may lead to temporary localised flooding if drains become blocked. However, as predicted in EIAR Chapter 8 (Water), interactions between the implementation of utilities and water will not be significant/negative. Chapter 8 predicts that; (a) the effects on surface water quality due to site excavation work are expected to be not significant, (b) the potential effects on the storm sewer will be slight as the flow and quality will be controlled for the short-term use of the discharge, (c)

the effects on surface water or groundwater quality are anticipated to be not significant, (d) no significant effects on surface water or groundwater quality are anticipated and (e) groundwater or surface water quality and downstream designated sites are anticipated to be not significant.

Noise and Vibration – The implementation of service infrastructure and utilities may result in noise and vibration emissions during construction. However, it is predicted that with the proposed mitigation measures in place that these interactions will not be significant.

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

Population and Human Health – Interactions between population and human health 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 that there will be sufficient capacity to accommodate the proposed development, and it is concluded that residual impacts on human health will not be significant.

Noise and Vibration – Potential Noise and vibration sources during the operational phase include mechanical and electrical plant used to service the buildings. As confirmed in EIAR Chapter 10, based on the assessments carried out, the cumulative plant noise from mechanical plant associated with the development will not exceed 32 dB LAeq, 15min and does not contain audible tones at any noise sensitive locations. It is predicted there will be no significant negative interactions between Noise & Vibration and Material Assets impacts during the operational phase.

Landscape and Visual – The proposed utility/servicing proposals will result in an altered landscape with public lighting and proposed tree/vegetation planting in particular having interdependencies. The proposed public open spaces will be served by public lighting resulting in more useable communal areas of the 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 9 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 9) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

Water (Hydrology & 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. EIAR Chapter 8 predicts that potential interactions between water and material assets will not be significant with (a) the impacts in terms of flooding or water quality due to the proposed development are considered to be not significant, (b) there are no proposed emissions to ground or surface water courses from the site during the operational phase and (c) The impacts in terms of water quality expected due to the proposed development are considered to be not significant.

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 are predicted.

14.3.4 Land & Soils

Chapter 7 of this EIAR, prepared by AECOM assesses 'Land and Soils' impacts resultant from the proposed development.

14.3.4.1 Construction Phase

Landscape and Visual – 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 and CDWMP describe 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.

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. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are predicted to be negligible.

Material Assets – Services, Infrastructure & Utilities – To accommodate in the installation of utilities and service infrastructure during construction land excavations, site clearance and rock breaking will be required. As the Land and Soils Chapter of this EIAR, given the specific nature of the proposed project and mitigation measures outlined, it is not predicated that there will be significant negative interactions between Land & Soils and Material Assets during the construction phase.

Material Assets – Traffic and Transportation – Site excavations and earthworks will require HGV's and other heavier machinery and vehicles to access the site during construction. Increased traffic associated with the construction works could 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 in the absence of mitigation. The mitigation measures proposed in the CEMP and CDWMP prepared by AECOM reflect those residual impacts and interactions will not be significant with any negative interactions being slight and short term.

Noise and Vibration – Excavation in existing rock will be required during construction resulting in a potential interaction with any broken rock being crushed and stockpiled on site. Any rock breaking, demolition or excavation activities will be carried out in accordance with standards outlined in section 10.3.2 of Chapter 10 of this EIAR and mitigation measures outlined in the CEMP/CDWMP relating to noise and vibration standards.

Air Quality and Climate – In the absence of appropriate mitigation measures, excavation and earthworks during construction phase of the project may result in dust emissions, negatively impacting the surrounding microclimate of the area. With the appropriate mitigation measures enforced to prevent fugitive dust emissions as identified in Section 12.5.2.1 and Appendix 12.3 of this EIAR, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality have been identified.

Cultural Heritage – Potential negative impacts may occur regarding previously undiscovered sub-surface remains being damaged or destroyed during site clearance and/or construction. As detailed in Chapter 11 of this EIAR, a programme of archaeological investigations, to comprise a geophysical survey of the undisturbed greenfield areas followed by targeted archaeological test trenching, will be undertaken prior to the commencement of construction to assess the likelihood of any significant undiscovered archaeological finds. As detailed in the CEMP and Chapter 11, construction works/excavations in the vicinity of the stone grotto will be mitigated to safeguard the presence of the feature, and ensure it forms part of the operational phases landscape strategy.

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. However, as described in detail in EIAR Chapter 9, it is not predicted there will be significant negative impacts and interactions between ecology and land and soils, with the treatment of existing invasive species on the site considered a beneficial aspect.

Water (Hydrology & Hydrogeology) – The main risk will be from surface water runoff from bare soil and soil storage areas during construction works. Excavation of subsoil layers will be required to facilitate site development works, in particular the construction of foul and surface water sewers and underground surface water storage structures (attenuation). In the absence of appropriate mitigation measures, construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP and Chapters 7/8 of this EIAR, that there will be no significant impacts.

14.3.4.2 Operational Phase

Landscape and Visual - The proposed landscape strategy responds to the sites 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 & Hydrogeology)

Chapter 8 of this EIAR, prepared by AECOM assesses Water (Hydrology & Hydrogeology) impacts resultant from the proposed development.

14.3.5.1 Construction Phase

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. Any stockpiling of materials or works impeding site drainage may lead to temporary localised flooding if drains become blocked. However, as predicted in EIAR Chapter 8 (Water), interactions between the implementation of utilities and water will not be significant/negative. Chapter 8 predicts that; (a) the effects on surface water quality due to site excavation work are expected to be not significant, (b) the potential effects on the storm sewer will be slight as the flow and quality will be controlled for the short-term use of the discharge, (c) the effects on surface water or groundwater quality are anticipated to be not significant, (d) no significant effects on surface water or groundwater quality are anticipated and (e) groundwater or surface water quality and downstream designated sites are anticipated to be not significant.

Material Assets – Traffic and Transportation –. In the absence of appropriate mitigation measures, construction vehicles at the site may give rise to hydrocarbon spills. With the proposed suite of mitigation measures as detailed in the CEMP, no significant interactions are envisaged.

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 to the south of Glounthaune, and local watercourses. Chapter 9 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 – Any contamination of local watercourses/water supply may result in negative geological impacts. The necessary excavations/earthworks to facilitate water infrastructure and utilities will require the alteration of the existing soil/land profile. Construction of service trenching, surface water attenuation features will generate excess material, and all excess material will be used locally within the site for landscaping. In the absence of appropriate mitigation measures, construction activities may result in discharge of contaminated run-off to surface water or result in contamination of groundwater. However, it is predicted that with the suite of relevant mitigation measures proposed in the CEMP and Chapters 7/8 of this EIAR that there will be no significant impacts.

14.3.5.2 Operational Phase

Population and Human Health – The replacement of the greenfield lands with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. The Site-Specific Flood Risk Assessment (SSFRA) prepared by AECOM (Appendix 8-1) demonstrates that the risk of the proposed development contributing to downstream flooding is unlikely, and that the risk of inundation of the buildings within the site during the operational phase is unlikely, due

to the proposed design floor levels/site layout and measures described in the SSFRA. The proposed development will also result in an increase for demand in for local water services. However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

Landscape and Visual - The proposed development provides for Sustainable Urban Drainage Systems (SUDs) which also is reflected in the wider landscape strategy for the site.

Material Assets – Services, Infrastructure & Utilities – 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. It is predicted that potential interactions between water and material assets will not be significant with; (a) the impacts in terms of flooding or water quality due to the proposed development being considered to be not significant, (b) There are no proposed emissions to ground or surface water courses from the site during the operational phase and (c) the impacts in terms of water quality expected due to the proposed development are considered to be not significant.

Air Quality and Climate – As the development is in close proximity to Cork Harbour, the risk of coastal flooding has been considered as part of the design and Flood Risk Assessment. A review of The Catchment Flood Risk Assessment and Management (CFRAM) study indicates that the development is not at risk from a 1 in 1000-year coastal event. This confirms the site in Flood Zone C with reference to coastal flood risk. It is also noted in the SSFRA that the proposed development will not increase the flood risk elsewhere.

Biodiversity – Operational surface-water run-off associated with the site will be discharged into Lough Mahon (Harper's Island) transitional waterbody via the public storm-sewer network. Regarding potential operational phase impacts it is predicted that the surface-water run-off drainage to the nearby European designated sites will be neutral. Operational impacts to European designated sites via treated waste-water discharge are also predicted to be neutral. Potential operational related effects on habitats/flora associated with downstream water-features in the wider area via surface-water and waste-water run-off impacts are also predicted to be neutral. Potential operational impacts relating to indirect habitat-loss/deterioration of fauna associated with aquatic habitats located downstream of surface-water and waste-water/foul effluent outputs are considered neutral with the implementation of the proposed SuDS drainage network and the appropriate treatment of waste-water.

Potential impacts of Water (Hydrology & Hydrogeology) 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.

14.3.6 Biodiversity

Chapter 9 of this EIAR, prepared by Kelleher Ecology Services, assesses Biodiversity impacts resultant from the proposed development.

14.3.6.1 Construction Phase

Landscape and Visual - 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, Infrastructure & Utilities – During construction the necessary works to accommodate service infrastructure including earthworks, tree/hedgerow removal, earthworks/excavation and refuelling on site may result in the short-term displacement, deterioration or destruction of habitats, flora/fauna species and European sites (Cork Harbour SPA and Great Island Channel SAC), in the absence of appropriate mitigation measures. As detailed in EIAR chapter 9, with the proposed mitigation measures in place, it is predicted that (a) potential construction phase impacts in relation to surface-water run-off drainage on designated sites will be neutral, (b) potential construction phase effects on designated sites in relation to treated waste-water discharge will be neutral, (c) potential construction phase effects in relation to disturbance/displacement impacts on the qualifying interest species of Cork Harbour SPA will be neutral, (d) potential construction related effects on habitats/flora associated with downstream water-features in the wider area via surface-water and waste-water run-off impacts, will be neutral, (e) potential construction related effects on fauna associated with water-features in the wider area via disturbance/displacement, surface-water run-off or waste-water discharge impacts will be neutral. It is therefore predicted that there will not be significant interactions between biodiversity and material assets during construction. A Natura Impact Assessment has also been prepared with respect of the proposed development (appended to Chapter 9) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

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 and CDWMP which prioritise 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.

Noise and Vibration – Noise from construction works can potentially lead to disturbance/displacement of fauna at or close to the site or disturb and/or displace waterbird species associated with the nearby Cork Harbour SPA. It is predicted that, the existing and on-going background noise levels associated

with vehicular/train movement on the public road and railway adjacent to the estuary/mudflats, as well as the other existing urban infrastructure associated with the wider Glounthaune/Little Island area, will effectively outweigh the noise from the proposed construction works.

Air Quality and Climate – As detailed in EIAR Chapter 10, demolition and earthworks during construction phase present a medium 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 due to the total building volume involved exceeding 100,000 m³. It is predicted that the proposed mitigation measures identified in the CEMP and CDWMP, including a Dust Management Plan will mitigate any significant negative interactions during construction.

Land and Soils – 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. However, as described in detail in EIAR Chapter 9, it is not predicted there will be significant negative impacts and interactions been ecology and land and soils, with the treatment of existing invasive species on the site considered a beneficial aspect.

Water (Hydrology & Hydrogeology) - 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 to the south of Glounthaune and local watercourses. Chapter 9 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.

14.3.6.2 Operational Phase

Landscape and Visual - Once operational, the proposed replacement/mitigation planting scheme and landscape strategy will provide new opportunities for flora and fauna habitats. The proposed mitigation proposals including shrub/groundcover planting, bulbs/perennials, conservation grade Irish wildflowers, native hedgerow planting as well as extensive native-dominant tree planting across the site, will positively contribute to biodiversity in the long-term.

Material Assets – Services, Infrastructure & Utilities – 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. However, it is predicted in EIAR Chapter 9 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 9) which concludes that no significant adverse effects arising from the proposed development are likely to occur in relation to the Natura 2000 sites (Cork Harbour SPA and Great Island Channel SAC).

Water (Hydrology & Hydrogeology) - Operational surface-water run-off associated with the site will be discharged into Lough Mahon (Harper's Island) transitional waterbody via the public storm-sewer network. Regarding potential operational phase impacts it is predicted that the surface-water run-off drainage to the nearby European designated sites will be neutral. Operational impacts to European designated sites via treated waste-water discharge are also predicted to be neutral. Potential operational related effects on habitats/flora associated with downstream water-features in the wider area via surface-water and waste-water run-off impacts are also predicted to be neutral. Potential operational impacts relating to indirect habitat-loss/deterioration of fauna associated with aquatic habitats located downstream of surface-water and waste-water/foul effluent outputs are considered neutral with the implementation of the proposed SuDS drainage network and the appropriate treatment of waste-water.

14.3.7 Noise & Vibration

Chapter 10 of this EIAR, prepared by AWN Consulting, assesses Noise & Vibration impacts resultant from the proposed development.

14.3.7.1 Construction Phase

Population and Human Health – It is predicted that the main source of noise and vibration during construction will be due to the operation of various plant machinery and HGV movements to, from and around the site. It is predicted, that subject to the proposed mitigation measures, the cumulative impacts of the construction phase will be temporary to short-term, negative and not significant. The construction phase of the development may result in some slight, negative, short-term impacts on human health resulting from increased traffic on local road network and the generation of waste.

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.

Biodiversity – Noise from construction works can potentially lead to disturbance/displacement of fauna at or close to the site or disturb and/or displace waterbird species associated with the nearby Cork Harbour SPA. It is predicted that, the existing and on-going background noise levels associated with vehicular/train movement on the public road and railway adjacent to the estuary/mudflats, as well as the other existing urban infrastructure associated with the wider Glounthaune/Little Island area, will effectively outweigh the noise from the proposed construction works.

Cultural Heritage – The presence of the existing stone grotto located in the southern parcel, to the northeast of the proposed mixed-use building has been identified as a vulnerable structure. A vibration threshold of 3 mm/s PPV (frequency range of predominant pulse) is recommended in this area of the site during construction to safeguard the feature. In the absence of appropriate monitoring, there is potential for this threshold to be exceeded during the construction phase of the apartment block due to necessary rock breaking works. Therefore, it will be necessary to carry out vibration monitoring during this phase to ensure that the threshold of 3 mm/s PPV is not exceeded. (Also refer to Appendix 11.3 'Outline Conservation Method Statement for the Grotto').

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.

14.3.7.2 Operational Phase

Population and Human Health – It is not predicted that noise and vibrations sources from increased traffic, building services plant, deliveries and waste collections and other activities will not result in significant impacts/interactions with human health impacts during the operational phase.

Material Assets – Services, Infrastructure & Utilities – One of the main potential sources of noise and vibration during operational phase will be mechanical and electrical plant used to service the buildings. As confirmed in EIAR Chapter 10, based on the assessments carried out the cumulative plant noise from mechanical plant associated with the development will not exceed 32 dB LAeq, 15min and does not contain audible tones at any noise sensitive locations. It is predicted there will be no significant negative interactions between Noise & Vibration and Material Assets impacts during the operational phase.

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. However, it is predicted that changes in noise level associated with additional traffic due to the proposed development has a negligible effect with imperceptible and long term impacts. Due to the expected

frequency of waste collection and deliveries to the proposed development, based on the number of residents, and since the proposed development has been designed to accommodate these services, deliveries and waste collection will not result in a significant noise impact on the surrounding area.

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 are predicted.

14.3.8 Cultural Heritage

Chapter 11 of this EIAR, prepared by John Cronin & Associates, assesses Cultural Heritage impacts resultant from the proposed development.

14.3.8.1 Construction Phase

Population and Human Health – The proposed works to the southern parcel, particularly to facilitate the creation of a public footpath/cycle way, will result in the necessary removal of 8 no. heritage trees associated with the historical extended gardens of Ashbourne House. Ashbourne House itself (which is a Protected Structure as identified in the Cork County Development Plan), is within a separate site to the east of the southern parcel. It is predicted that the construction phase will result in direct, negative, moderate, and permanent impacts to the former garden, which will in turn impact human beings existing perception of the historical landscape.

Landscape and Visual - Necessary tree felling, particularly in the southern parcel will result in negative impacts to the setting of Ashbourne House and Gardens. As detailed in Chapter 3 of this EIAR 'Alternatives Considered', a core objective of the proposed layout has been to minimise the felling of high specimen trees on the site. Where the loss of some trees is unavoidable, a key principle has been to ensure high quality replacement planting throughout the site which will be implemented during the construction phase.

Material Assets – Services, Infrastructure & Utilities – The southern land parcel contains the remnants of a former rock garden/quarry associated with Ashbourne House and gardens. An stone grotto associated with the rock garden exists in the southern area of the southern land parcel. In the absence of appropriate mitigation measures, potential negative interactions between the installation of footpaths, and service infrastructure and the retention of the grotto might occur. As detailed in EIAR Chapter 11 prepared by John Cronin & Associates, a method statement regarding the safeguarding of the grotto during construction will be implemented including vibrations restrictions in this area of the site during construction and the maintenance of a working distance of at least 2.7 metres. With the proposed mitigation measures in place, it is not predicted that there will be any significant negative interactions between cultural Heritage and Material Assets.

Noise and Vibration – The presence of the existing stone grotto located in the southern parcel, to the northeast of the proposed mixed-use building has

been identified as a vulnerable structure. A vibration threshold of 3 mm/s PPV (frequency range of predominant pulse) is recommended in this area of the site during construction to safeguard the feature. In the absence of appropriate monitoring, there is potential for this threshold to be exceeded during the construction phase of the apartment block due to necessary rock breaking works. Therefore, it will be necessary to carry out vibration monitoring during this phase to ensure that the threshold of 3 mm/s PPV is not exceeded. (Also refer to Appendix 11.3 'Outline Conservation Method Statement for the Grotto').

Land and Soils – Potential negative impacts may occur regarding previously undiscovered sub-surface remains being damaged or destroyed during site clearance and/or construction. As detailed in Chapter 11 of this EIAR, a programme of archaeological investigations, to comprise a geophysical survey of the undisturbed greenfield areas followed by targeted archaeological test trenching, will be undertaken prior to the commencement of the construction phase to assess the likelihood of any significant undiscovered archaeological finds. As detailed in the CEMP and Chapter 11, construction works/excavations in the vicinity of the stone grotto in the southern land parcel will be mitigated to safeguard the presence of the feature, and ensure it forms part of the operational phases landscape strategy.

14.3.8.2 Operational Phase

Population and Human Health – Once operational, the proposed development will result in permanent changes the setting and appearance of Ashbourne Gardens. The proposed replacement/mitigation planting strategy includes the planting of 8 no. heritage trees, to replace the 8 no. that will be lost during construction. The planting of additional trees/hedgerows across the site will mitigate the long-term impacts of existing tree removal. The operational phase of the development provides that human beings will have access to the southern site, by way of the pedestrian/cycle path, which is not currently provided as the lands are in private ownership. The proposed path will allow people to access and enjoy the lands and the historical landscape of Ashbourne in addition to the stone grotto, which is currently overgrown and inaccessible. While it is predicted that the operational phase will result in negative/not significant/indirect/permanent impacts on the setting of Ashbourne House, the clearance of existing vegetation and planned programme of repairs to the grotto structure is predicted to result in direct/positive/moderate/permanent cultural heritage impacts, and positively contribute to human health.

Landscape and Visual - The characteristics and location of the development site reflects in significant interactions between landscape/visual and cultural heritage aspects. The operational phase will result in the permanent change to the former attendant gardens of Ashbourne House in the southern land parcel with 8 no. heritage trees and other less significant trees across the site being removed to accommodate the development. The proposed mitigation measures which include the replacement of 8 no. heritage trees to be lost with 8 no. replacement heritage trees and incorporation of the remaining 15 no. champion/heritage trees within the wider landscaping strategy, will result

that in the long term the landscape and visual context will evolve from the existing scenario. It is predicted that the most pronounced visual/cultural heritage interactions will be evident during construction and earlier years of the operational phase, until the proposed mitigation and replacement planting matures. The proposed accessibility to the grotto and the project objective to capitalise on its presence as a landmark feature within the landscape strategy during the operational phase, will result that the grotto and woodland will form a valuable landscape/ heritage amenity to the settlement. The proposed development will result that the lands will be publicly accessible, and that existing and future residents of the settlement will have the opportunity to enjoy the cultural heritage context of the site.

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 are predicted.

14.3.9 Air Quality & Climate

Chapter 12 of this EIAR assesses, prepared by AWN Consulting, assesses the Air Quality & Climate impacts resultant from the proposed development.

14.3.9.1 Construction Phase

Population and Human Health – The Construction phase could have a slight negative impact on the surrounding area due to traffic and associated nuisance, dust and noise. However as confirmed in Chapter 12, the overall sensitivity of the area to human health impacts from dust emissions is considered low. Therefore, in the absence of mitigation, human health impacts are predicted to be short-term, localised, negative and slight.

Material Assets – Services, Infrastructure & Utilities – In the absence of appropriate mitigation measures, the installation of material assets including necessary excavation works and connections, may result in nuisances such as dust emissions which could 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.

Material Assets – Traffic and Transportation – During the construction phase, potential significant interactions are possible between construction traffic and local air quality and climate in the absence of appropriate mitigation measures. Traffic emissions and dust associated with construction vehicles accessing the site could also have the potential to impact air quality during the construction phase. As confirmed in Chapter 12, the proposed construction traffic numbers will not exceed the criteria stated in the 'UK Highways Agency Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a),' and there is no potential for significant impacts to air quality. Regarding climate, Chapter 10 also confirms that there is no potential for significant impacts to climate resultant for construction traffic.

Biodiversity – As detailed in EIAR Chapter 10, demolition and earthworks during construction phase present a medium 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 due to the total building volume involved exceeding 100,000 m³. It is predicted that the proposed mitigation measures identified in the CEMP and CDWMP, including a Dust Management Plan will mitigate any significant negative interactions during construction.

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.

Land and Soils – In the absence of appropriate mitigation measures, excavation and earthworks during construction phase of the project may result in dust emissions, negatively impacting the surrounding microclimate of the area. With the appropriate mitigation/monitoring measures enforced to prevent fugitive dust emissions as identified in Section 12.5.2.1 and Appendix 12.3 of this EIAR, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality have been identified.

14.3.9.2 Operational Phase

Population and Human Health – Negative impacts on air quality or emissions can result in knock on effects for population and human health. As detailed in Chapter 12, the impact of the operational phase of the development on ambient air quality is considered long-term, localised, negative and imperceptible. The proposed measures will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and imperceptible with respect to impact on human beings.

Material Assets – Traffic and Transportation – Regarding Air Quality, Chapter 12 predicts that when operational and the predicted traffic modelling is realised, that impact of the proposed development on ambient air quality will be long-term, localised, negative and imperceptible. 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 relating to climate during the operational stage of the proposed development is imperceptible, negative and long-term.

Potential impacts on Air Quality and 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 are predicted.

14.3.10 Population and Human Health

Chapter 13 of this EIAR, prepared by HW Planning, assesses Population and Human Health impacts resultant from the proposed development.

14.3.10.1 Construction Phase

Landscape and Visual - the construction phase of the development will require site clearance works, tree and vegetation removal. The proposed construction phase will result in short term/temporary negative impacts to the local landscape/visual context which will impact the local populations enjoyment of the existing landscape. The proposed landscaping mitigation planting scheme, which will be implemented during the construction phase, will mitigate the long-term impacts of the loss of existing high specimen trees, particularly in the southern parcel.

Material Assets – Services, Infrastructure & Utilities – Potential temporary/short-term negative impacts on existing services such as water, communications, electrical infrastructure resultant from connections, may occur from the proposed development to existing local services. These include the proposed works to deliver the proposed wastewater/ surface water upgrades to serve the proposed development and interactions and potential temporary disruption to the local road network and greenway. Where road opening is required to deliver utilities, this will require minor traffic management measures at off peak times or at night-time hours. It is predicted that residual impacts will be not-significant following implementation of the identified mitigation measures.

Material Assets – Traffic and Transportation – The construction phase of the project will result in higher levels of traffic in the area for the duration, potentially resulting nuisances such as increased traffic congestion on the local road network, impacting the local population and human health. The proposed upgrades to the Terrace including the implementation of a footpath, cycle lanes and pedestrian crossing, in addition to the construction of the southern mixed-use building/realignment of greenway may result in additional traffic congestion for a short period. The CEMP contains details of a Construction Traffic Management Plan (Appendix 2-3) which describes measures to mitigate interactions with local population during the construction phase including: (a) deliveries to site bring restricted to off peak hours, (b) the repair of any damage to existing roads or footpaths caused during construction, (c) parking of construction related vehicles and workers will only be accommodated on site, (d) wheel washing and road sweeping procedures and (e) practices to minimise the number of construction vehicles accessing the site at any one time. With the proposed mitigation measures in place, it is considered that there will be short term slight negative impact on the local road network and human health during the construction phase.

Cultural Heritage – The proposed works to the southern parcel, particularly to facilitate the creation of a public footpath/cycle way, will result in the necessary removal of 8 no. heritage trees associated with the historical extended gardens of Ashbourne House. It is predicted that the construction

phase will result in direct, negative, moderate, and permanent impacts to the former garden, which will in turn may impact human beings existing perception of historical landscape.

Noise and Vibration – It is predicted that the main source of noise and vibration during construction will be due to the operation of various plant machinery and HGV movements to, from and around the site. It is predicted, that subject to the proposed mitigation measures, the cumulative impacts of the construction phase will be temporary to short-term, negative and not significant. The construction phase of the development may result in some slight, negative, short-term impacts on human health resulting from increased traffic on local road network and the generation of waste.

Land and Soils – 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. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures. The potential residual impacts associated with soil or ground contamination and subsequent health effects are negligible. It is predicted that with the proposed mitigation measures in place that there will no significant interactions between population/human health and land and soils.

Water (Hydrology & 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. 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 are not significant.

Air Quality and Climate – The Construction Phase could have a slight negative impact on the surrounding area due to traffic and associated nuisance, dust and noise. However as confirmed in Chapter 12, the overall sensitivity of the area to human health impacts from dust emissions is considered low. Therefore, in the absence of mitigation, any human health impacts are predicted to be short-term, localised, negative and slight.

14.3.10.2 Operational Phase

Landscape and Visual - The proposed development will result in the permanent change of sites landscape and visual setting, particularly in its local context. The northern parcel is considered to be less visually sensitive and will have a moderate and neutral effect on the landscape context of the area. It is recognised that the southern parcel is visually more sensitive and contains 23 no. existing heritage/champion trees which contribute to visual amenities and the human beings' perceptions of the area. As described in Chapter 4, of the 14 no. viewpoints assessed as part of the Landscape and Visual Assessment, only one view is considered to have a significant impact

(viewpoint 6 on the Terrace) and is localised in nature. The majority of the remaining views are considered neutral in quality and in general, views from the east, west and the scenic route north of the site show minimal visual effects with the development well set into the topography and appearing in the context of other built form.

Material Assets – Services, Infrastructure & Utilities – Interactions between population and human health 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 that there is sufficient capacity to accommodate the proposed development and it is concluded that residual impacts on human health will not be significant following the implementation of the stated mitigation and monitoring measures.

Material Assets – Traffic and Transportation – Once operational, the proposed development will result in increased traffic volumes accessing the site and higher traffic volumes in the local road network and at key vehicular junctions. As detailed in Chapter 5 of this EIAR prepared by MHL & Associates, the surrounding road network has capacity to accommodate the development, however slight negative impacts on human health is predicted associated with higher traffic volumes in the area. However, it is considered that the proposed pedestrian/cycle crossing on the Terrace, and realignment of the greenway to facilitate motorists, pedestrians and cyclists may result in a likely slow-down of traffic speed benefitting pedestrians and cyclists in the area. As a result, users of the local road network may experience increased delays in car journeys as pedestrian/cyclist mobility is prioritised.

Cultural Heritage – Once operational, the proposed development will result in permanent changes the setting and appearance of Ashbourne Gardens. The proposed replacement/mitigation planting strategy includes the planting of 8 no. heritage trees, to replace the 8 no. that will be lost during construction. The planting of additional trees/hedgerows across the site will mitigate the long-term impacts of existing tree removal. The operational phase of the development provides that human beings will have access to the southern site, by way of the pedestrian/cycle path which is not currently provided as the lands are in private ownership. The proposed path will allow people to access and enjoy the southern parcel and the historical landscape of Ashbourne in addition to the stone grotto, which is currently overgrown and inaccessible. While it is predicted that the operational phase will result in negative/not significant/indirect/permanent impacts on the setting of Ashbourne House, the clearance of existing vegetation and planned programme of repairs to the grotto structure, is predicted to result in direct/positive/moderate/permanent cultural heritage impacts and positively contribute to human health.

Noise and Vibration – During the operational phase the proposed residential, commercial, community and creche uses will 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 administrative settlement of Glounthaune and the nature of existing land-uses in the sites immediate vicinity, it is not considered that these impacts will be significant and are typical of a growing urban settlement. It is not predicted that noise and vibrations sources from increased traffic, building services plant, deliveries and waste collections and other activities will not result in significant impacts/interactions with human health impacts during the operational phase.

Land and Soils – It is not considered that there will be significant interactions between population/human health and land and soils during the operational phase.

Water (Hydrology & Hydrogeology) - The replacement of the greenfield lands with hardstand surfaces will result in an increased risk of pluvial flooding, due to low permeability surfaces, potentially impacting the local population and human health. The Site-Specific Flood Risk Assessment (SSFRA) prepared by AECOM (Appendix 8-1) demonstrates that the risk of the proposed development contributing to downstream flooding is unlikely, and that the risk of inundation of the buildings within the site during the operational phase is unlikely, due to the proposed design floor levels/site layout and measures described in the SSFRA. The proposed development will also result in an increase for demand in for local water services. However, it is predicted that the scheme design and proposed mitigation measures will ensure that the potential for impacts on the water environment relating to human health are not significant.

Air Quality and Climate – Negative impacts on air quality or emissions can result in knock on effects for population and human health. As detailed in Chapter 12, the impact of the operational phase of the development on ambient air quality is considered long-term, localised, negative and imperceptible. The proposed measures will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and imperceptible with respect to impact on human beings.

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.

Interaction	Landscape & Visual	Material Assets - Traffic	Material Assets - Services	Land & Soils	Water (Hydrology & Hydrogeology)	Biodiversity	Noise & -Vibration	Cultural Heritage	Air Quality & Climate	Population & Human Health
Landscape & Visual		Con & Op	Con & Op	Con & Op	Op	Con & Op	-	Con & Op	-	Con & Op
Material Assets - Traffic	Con & Op		Con	Con	Con	Con	Con & Op	-	Con & Op	Con & Op
Material Assets - Services	Con & Op	Con & Op		Con	Con & Op	Con & Op	Con & Op	Con	Con	Con & Op
Land & Soils	Con & Op	Con	Con		Con	Con	-	Con	Con	Con
Water (Hydrology & Hydrogeology)	-	Con	Con & Op	Con		Con & Op	-	-	-	Con & Op
Biodiversity	Con & Op	Con	Con & Op	Con	Con & Op		Con	-	Con	-
Noise & Vibration	-	Con & Op	Con & Op	Con	-	Con		Con	Con	Con & Op
Cultural Heritage	Con & Op	-	Con	Con	-	-	Con		-	Con & Op
Air Quality & Climate	-	Con & Op	Con	Con	Op	Con	Con	-		Con & Op
Population & Human Health	Con & Op	Con & Op	Con & Op	Con	Con & Op	-	Con & Op	Con & Op	Con & Op	

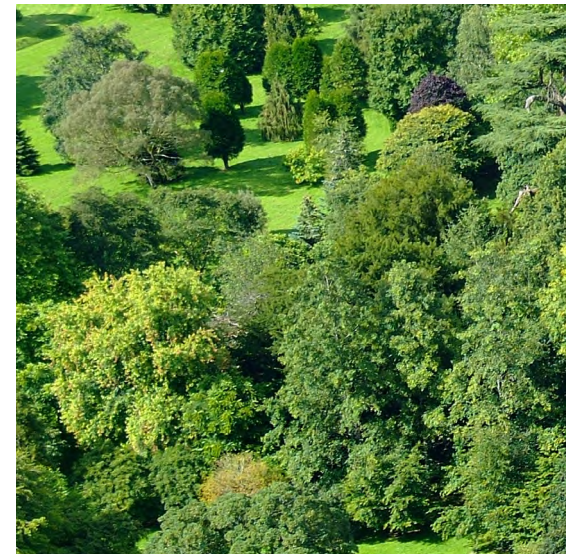
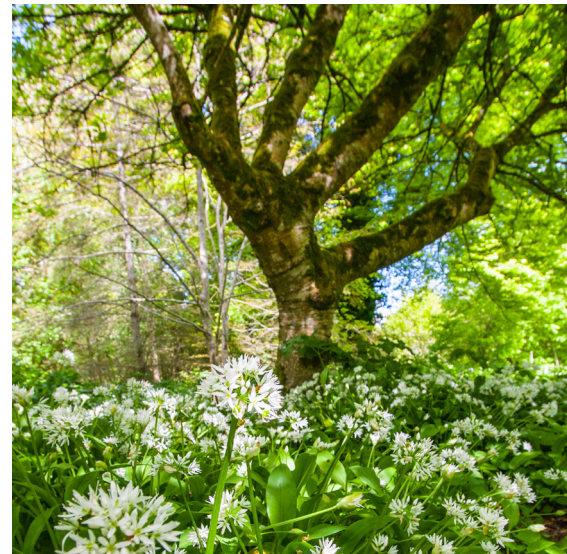
Table 14.1: Potential Interaction of Effects Matrix (Con = Construction, Op= Operational. If there is considered to be no potential for an effect, the box is left blank.)



LACKENROE SHD

CHAPTER 15

Summary of Mitigation Measures



VOLUME II | EIAR

LACKENROE SHD

CHAPTER 15

Summary of Mitigation
Measures

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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. Harry has 22 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 the development of the 'Shannonpark Urban Expansion Area' in Carrigaline, Co. Cork and the proposed expansion of the whiskey maturation facility at Ballymona North, Dungourney, Co. Cork on behalf of Irish Distillers Limited.

15.1.2 Chapter Context

The 2017 Draft EPA Guidelines regarding information to be contained in EIAR's identifies the following strategies for the mitigation of effects.

Mitigation by Avoidance: Avoidance usually refers to strategic issues, such as site selection, site configuration or selection of process technology. This may be the fastest, cheapest and most effective form of effect mitigation. In some cases mitigation by avoidance may also be considered 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.

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. This is regarded as a less sustainable, though still effective, approach, implemented through reducing the effect and/or reducing exposure to the effects.

Mitigation by Remedy/Offsetting: This is a strategy used for dealing with adverse effects which cannot be prevented or reduced. Remedy is compensating for or counteracting adverse effects. Examples include increased planting of specific trees/shrubs to replace unavoidable loss of vegetation, or provision of a new amenity area to compensate for the unavoidable loss of access to the grounds of an old house. Examples of Offsetting include reinstating buildings, walls or features, or the introduction of tunnels to enable wildlife to access other comparable habitats.

15.2 MITIGATION MEASURES PROPOSED

15.2.1 Population and Human Health

15.2.1.1 Construction Phase – Mitigation Measures

A Construction & Demolition Waste Management Plan (CDWMP) and Construction Environmental Management Plan (CEMP), both prepared by AECOM, are included as Appendices 2-2 and 2-3 of this EIAR. The following suite of mitigation/monitoring measures during the construction phase of the project relate to population, human health/human beings.

15.2.1.1.1 Waste Management

Waste generated from the development, may result in negative impacts on population and human health in the absence of appropriate mitigation measures. The following waste management practices will be adopted during the construction phase.

(a) Waste Minimisation

The following waste minimisation measures will be implemented during the course of the construction works:

- Facilitate recycling and appropriate disposal by on site segregation of all waste materials generated during construction into appropriate categories, including:
 - Topsoil, subsoil, gravel hard-core,
 - Concrete, bricks, tile, ceramics, plasterboard, Asphalt, tar and tar products,
 - Metals,
 - Dry Recyclables e.g. cardboard, plastic, timber.
- All waste assessed by the Waste Manager as 'not suitable for reuse' will be stored in skips or other suitable receptacles in a designated area of the site, to prevent cross contamination between waste streams, dispersion and leaching;
- Wherever possible, leftover materials (e.g. timber off cuts) and any suitable demolition materials will be reused on-site;

- Uncontaminated excavated material (top-soil, sub soil, etc.) will be segregated, stockpiled and re-used on site in preference to importation of clean fill, where possible; and
- Where possible, the Waste Manager will ensure that all waste leaving site will be recycled or recovered.

(b) Waste Identification, Classification and Quantification

The majority of waste generated will be soil and rock excavated during the course of the construction works. Should appropriate reuse be required, and practical, clean soil will be retained on site and reused in areas of soft landscaping, backfilling, etc. Crushed rock could be used in Crib or Gabion retaining walls. A record of the volumes and reuse requirements will be maintained by the Principal Contractor as part of their plan, as per Appendix C of the EPA 'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects'.

During the construction phase, there will be some building material and packaging waste generated. This will mainly include excess ready-mix concrete and mortar, timber off cuts, plastics, metal off cuts, cladding and tile offcuts, asphalt, tar, tar products as well as plastic and cardboard waste from packaging and potential over-supply of materials.

All individual waste arisings shall be identified, recorded, classified and quantified (volume, weight) as early in the project lifecycle as possible but, inevitably, unanticipated waste arisings may occur as site work progresses, necessitating the need for a procedure to provide for waste classification as the site work proceeds.

It is anticipated that the majority of non-hazardous and inert waste generated will be suitable for reuse, recovery or recycling and will be segregated to facilitate the reuse, recovery and/or recycling, where possible.

Wastes arising for the project will be segregated, identified and classified by the Principal Contractor in accordance with the EPA 'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects', EPA, 2021.

Wastes shall not be removed from the site until properly classified, assigned a correct LoW code and all appropriate tracking and disposal documentation is in place.

For each waste stream identified and classified, and for each waste stream that may arise during the course of the works, the following shall be identified and documented by the Principal Contractor in their Site Waste Management Plans (SWMP):

- An appropriate waste classification and correct LoW code; Where a waste type is considered a mirror entry, the classification of materials as non-hazardous and/or hazardous waste will be determined based on the www.hazwasteonline.com web-based waste assessment system (as recognized by the Environmental Protection Agency) and using Waste Acceptance Criteria in accordance with the European Communities (EC) Council Decision 2003/33/EC, which establishes criteria for the acceptance of waste at landfills;
- A suitable Waste Collection Contractor in possession of a valid Waste Collection Permit for the collection of waste within the Cork County Council area;
- Appropriate waste recovery, recycling or disposal facilities, including any required transfer stations whereupon the said facilities shall be in possession of a valid Waste Facility Certificate of Registration, permit or Waste License, as appropriate;
- A recovery, recycling or disposal plan for the waste, where applicable. Where any material is being recovered onsite or offsite for reuse; the Principal Contractor will provide confirmation of any application to the EPA under Article 273 or Article 284 to classify material as a by-product or as end of life waste respectively; and
- Final reconciled waste quantities generated, including details of waste disposal, reuse and recovery quantities.

(c) Waste Handling

The site manager will maintain a record of all waste removed from the site. The record shall include information on the type of waste removed, the quantity removed, the date removed, details of whether the waste in question was being removed for either disposal or recovery/ recycling, details of the transporter of waste, details of the facility to which waste is removed (including license or permit number). A location shall be identified where all records in regard to waste transport, recycling, disposal will be held for inspection.

Segregation and Storage

Wastes generated during works will be segregated and temporarily stored on site (pending collection or for re-use on site) in accordance with the Contractor's pre-determined segregation and storage strategy. The following minimum segregation and storage strategy requirements will be required:

- Waste streams will be individually segregated; and all segregation, storage & stockpiling locations will be clearly delineated on site drawings;
- Waste storage, fuel storage and stockpiling and movement are to be undertaken with a view to protecting any essential services (electricity, gas, water) and with a view to protecting existing localised groundwater

quality boreholes (if applicable);

- Roles and responsibilities of those managing the segregation and storage areas are to be identified;
- The waste storage area will contain suitably sized containers for each waste stream and will be agreed with the waste contractors in advance of the commencement of the project;
- All segregation and waste storage areas will be inspected regularly by the appointed Waste Manager;
- Waste will be stored on site, including metals, asphalt and soil stockpiles, in such a manner as to:
 - Prevent environmental pollution (bundled and/or covered storage, minimise noise generation and implement dust/odour/pest control measures, as may be required);
 - Maximise waste segregation to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery; and
 - Prevent hazards to site workers and the general public during construction phase (largely noise, vibration, dust and pests).

Waste Permitting, Licences & Documentation

Under the Waste Management (Collection Permit) Regulations 2007, as amended, a collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPPO), must be held by each waste collection contractor.

Waste may only be treated or disposed of at facilities that are licensed or permitted to carry out that specific activity (e.g. chemical treatment, landfill, incineration, etc.) for a specific waste type.

Operators of such facilities cannot receive any waste, unless they are in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments or a waste license granted by the EPA. The COR/permit/license held will specify the type and quantity of waste permitted to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

Records of all waste movements and associated documentation will be held at the site. Records management and maintenance will be the responsibility of the Principal Contractor.

Predicted Waste Streams

The majority of the waste material generated by the proposed development will consist of excavated soil, gravel, rock associated with the proposed site layout. This material will be segregated from all other waste components in accordance with general waste segregation policy. Material that cannot be reused on site will be transferred to a Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be further sorted into individual waste streams for recycling, recovery or disposal.

A temporary segregation bay will be set aside at the site for the duration of the construction and demolition phase of the development. The bay will include segregated areas for recyclable waste streams, such as gypsum (plasterboard), cardboard, timber, concrete/blocks/tiles, etc.

- Cardboard - will be segregated on site. The cardboard will be flattened and placed in a covered skip or tied and covered, to prevent the cardboard getting wet. A recycling contractor will collect it as required.
- Plasterboard - There will be a separate skip for plasterboard at the site. There are a number of specialist contractors that recycle plasterboard and they will be contracted to address this matter. Reprocessed gypsum powder, which makes up to 94% of the plasterboard, can be reprocessed into new plasterboard or converted for use in soil conditioners for the agricultural industry. The paper, which makes up to 6% of the plasterboard can be reused in various industries.
- Soil/Subsoil - Excess excavated soil will be disposed of off-site. Soil will be removed and disposed of by contractors licensed under the Waste Management Act of 1996, the Waste Management (Permit) Regulations of 1998 and the Waste Management (Collection Permit) Regulations of 2001. This material will be used for fill material on other sites, or capping purposes on site, e.g. at a landfill.
- Plastic - As plastic is now considered a highly recyclable material, much of the plastic generated during construction will be diverted from landfill and recycled. Clean plastic will be segregated at source and kept as clean as possible and stored in a dedicated covered skip.
- Timber - There will be timber waste generated from the construction work as off-cuts or damaged pieces of timber. Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc, will all be recycled. It will be stored on site in a designated skip, and collected by a recycling contractor. Such companies shred the timber and use it for manufacture of wood products or for landscaping (wood chips etc).
- Scrap Metal - Steel is a highly recyclable material and there are numerous companies that will accept waste steel and other scrap metals. A segregated skip will be available for steel storage on site pending recycling.
- Asbestos - A specialised contractor will be employed to remove asbestos from site and to ensure that all traces of contaminated material from the site. Asbestos containing materials will be disposed of at a licensed asbestos disposal facility.

Control Measures

The site control measures to manage and minimise waste include:

- Signage on the site office/ welfare bins to separate them as environmental /domestic waste bins,
- Briefings for all sub-contractors via induction handouts,
- Specific checks in all waste carriers licences.

15.2.1.1.2 Site Security Fencing and Hoarding

Site hoarding and barriers will prevent unauthorised access to each works area. A minimum 2.4 metre high plywood painted timber hoarding is to be provided around working areas. Heras type fencing will be used on short term site boundaries where appropriate to suit the works. The site compounds will each be fenced to deter unauthorised access. The contractor must regularly inspect and maintain the condition of the hoarding throughout the duration of the contract.

Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked for any time that these areas are not monitored (e.g., outside working hours). During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to & from site onto the public roads. All personnel working on site must have a valid Safe Pass card and be inducted by the Main Contractor with regard to site specific information.

The external hoarding and walkways must be maintained in good condition during the construction period. The external hoardings and walkways must not obstruct any drainage, surface water channels or traffic signals, signs, or lights.

The external hoarding and walkways are to be painted with two coats of an approved synthetic paint. Any logo and lettering as shown on drawings/details are to be provided by competent graphics painters and calligraphers.

No fences or hoarding is to be used for advertising purposes and the Contractor must keep the fences or hoarding clear from advertisements.

The Contractor will be responsible for the security of the site. The Contractor will be required to.

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current 'safe pass' cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Ensure restricted access is maintained to the works.

15.2.1.1.3 Site Working Hours

Unless otherwise required by the requirements of the planning permission, it is proposed that standard construction working hours will apply of 7am to 6pm Monday to Friday and 8am to 2pm on Saturdays. Any works proposed outside of these periods shall be strictly by agreement with the Local Authority in advance. In order to mitigate any impact of construction activities, the following measures are proposed.

- Coordination of deliveries to site within working hours,
- Scheduling of noisier activities early in the working day,
- The delivery of materials to the site during the construction phase shall

be organised so that deliveries are minimised and do not cause traffic hazard, deliveries not permitted at peak times of traffic 8.00am to 9.00am and 5.00pm to 6.00pm and that all construction vehicles are parked within the site.

15.2.1.1.4 Health and Safety

All construction works will be carried out under appropriate supervision. Works will be carried out by experienced contractors using appropriate and established safe methods of construction. All requirements arising from statutory obligations including the Safety, Health and Welfare at Work Act and associated regulations will be met in full. The Contractor must also comply with all guidelines and procedures in accordance with IÉ specification documents. All site works to be completed as per the Safety, Health and Welfare at Work (Construction) Regulations 2013. All personnel working on site must have a valid Safe Pass card and have completed PTS training.

15.2.1.1.5 Covid 19

The Contractor will follow the latest CIF safety protocols for COVID-19 in relation to all activities on site, in relation to travel to & from home to site for all staff, in relation to site visitors and in relation to any other relevant activities connected with the construction of the development.

15.2.1.1.6 Traffic Management

The Contractor is to inform and educate all regular suppliers and all sub-contractors and delivery drivers of the basic protocols. All deliveries will be controlled at the identified compound locations identified in the CEMP. The designated storage area will be identified prior to taking delivery of the materials and the driver will be directed to the compound. Site access, and the delivery of construction materials, will be carefully planned and managed throughout the construction works.

No works associated with the proposed development are to commence until the signalised junction permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17 is operational.

The Contractor will ensure that deliveries are coordinated on site so that trucks do not block the road outside the site. Delivery drivers will wear full PPE as per the site rules and sign the delivery rules at the controlled entrance gate. The site will be fenced and sealed with access gates secured at all times to prevent unauthorised access. The Contractor must provide wheel washing and road sweeping facilities to ensure that the roads are kept mud and debris free.

(a) Construction Route

All construction access to the lands to the north of 'the Terrace' will be via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17. As noted above, no works associated with the proposed development are to commence until this signalised junction is operational.

Construction access to the portion of the site where the 5 no. dwellings to the south of 'the Terrace' are proposed will be via a new entrance from 'the Terrace' while the works area for the proposed apartments will be accessed from Johnstown Close. In order to ensure that vehicles entering/ exiting the site associated with the proposed Apartment Block a banks man/ flag man will be stationed at the entrance to the site to safely direct traffic.

Materials will be delivered to the proposed site storage areas, offloaded within the site compound using a teleporter and there will be a temporary lay down area used for the duration of the offload. When delivery trucks leave the compound, the material can be delivered to the correct location within the site compound.

Following unloading at the site compounds to the north of 'the Terrace', the vehicle can then leave the site via the signalised junction from the L-2968 and internal road network permitted by Cork County Council reference 17/5699 and An Bord Pleanála reference 300128-17 at a safe speed ensuring there is no risk of incidents involving pedestrians or other road users. Vehicles leaving the site compound associated with the 5 no. dwelling houses to the south of 'the Terrace' using 'the Terrace' road (L-2970-38). Vehicular access to and from the proposed apartments will be provided from Johnstown Close (L-3004-31).

Similar practices shall be put in place for trucks removing excavated material / demolition waste from site. Provision for parking cars / vans etc. will be within a designated area within the site compounds.

(b) Contractor's Traffic Management Plan

A Traffic Management Plan will be prepared by the contractor and agreed with Cork County Council's Transportation Department & An Garda Síochána, to mitigate any impact of construction on the surrounding road network. The Contractor must propose a Construction Stage Traffic Management Plan in accordance with the following guidance documents for the temporary control of traffic at road works:

- Traffic Signs Manual Chapter 8 Temporary Traffic Measures and Sign Roadworks (2019);
- Traffic Management Guidelines, Department of Transport (2003);
- Requirements of Cork County Council.

The Traffic Management Plan will provide for the following:

- The contractor will be responsible for and make good any damage to existing roads or footpaths caused by his own contractor's or suppliers transport to and from the site.
- The contractor must at all times keep all public and private roads, footpaths entirely free of excavated materials, debris, rubbish, provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.

- The contractor must confine his activities to the area of the site occupied by the works and the builders' compound during any particular phase of the development.
- Haul routes to and from the site will be defined and agreed with the Local Authority.
- Properly designed and designated entrance and egress points to the construction site for construction traffic will be used to minimize impact on external traffic.
- Where traffic signals are not in place, flagmen must be used to control the exit of construction vehicles from the site onto the public road.
- Existing fire hydrants are to remain accessible for the duration of the works.

Due regard will be paid to minimising any impacts by construction vehicles on the surrounding area. Particular emphasis will be on the following:

- Construction and delivery vehicles must be instructed to use only the approved and agreed means of access; and movement of construction vehicles must be restricted to these designated routes;
- Warning signs / Advanced warning signs are to be installed at appropriate locations in advance of the construction access locations;
- Speed limits of construction vehicles are to be managed by appropriate signage, to promote low vehicular speeds within the site;
- Appropriate vehicles are to be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material;
- Parking of site vehicles must be managed by the Contractor and must not be permitted on public road;
- A road sweeper is to be employed to clean the public roads adjacent to the site of any residual debris that may be deposited on the public roads leading away from the construction works;
- On site wheel washing will be undertaken for construction trucks and vehicles to prevent any debris prior to leaving the site, to remove any potential debris on the local roads;
- All vehicles are to be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol, or diesel. Spill kits must be available on site. All scheduled maintenance carried out off-site must not be carried out on the public highway; and
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities must be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities must cater for vulnerable users including mobility impaired persons.

(c) Measures to Minimise Construction Vehicle Movements

Construction vehicle movements are to be minimised through:

- Consolidation of delivery loads to/from the site and scheduling of large deliveries to site to occur outside of peak periods;
- Use of precast/prefabricated materials where possible;
- 'Cut' material generated by the construction works is to be re-used on site where possible, through various accommodation works;
- Adequate storage space on site will be provided;
- Construction staff vehicle movements will also be minimised by promoting the use of public transport.
- Car sharing among the construction staff following Covid-19 safety guidelines may be used to reduce traffic numbers.
- Public Transport: An information leaflet to all staff as part of their induction on site highlighting the location of the public transport services in the vicinity of the construction site.

15.2.1.1.7 Environmental Management

The Contractor will be required to be accredited with ISO14001 Environmental Management Systems. The Contractor will be required to mitigate the impact of the construction works on the environment.

(a) Site Control Measures

The designated and operational on-site control measures, which will be established and maintained at this site, will include:

- Designated hard routes through the site,
- Each departing vehicles to be checked by banksman,
- Wheel wash facility at egress point,
- Provision and facilities to cover lorry contents as necessary,
- Controlled loading of excavated material to minimise risk of spillage of contents,
- Spraying/ damping down of excavated material on site,
- Facility to clean roads if mud or spillage occurs.

(b) Material Handling and Storage

Within the site compounds, a section within the area will be identified for material storage only. It is proposed that unloading bays are provided for deliveries to the site within the hoarding perimeter. They are to be accessible by forklifts. Appropriately demarcated storage zones will be used to separate and segregate materials.

Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains are to be provided.

(c) Spill Control Measures

It is not proposed to store any oils/fuels for the purpose of refuelling on the site. Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles are not to be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor. The following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- Eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other suitable material. Do not spread or flush away the spill.
- Cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
- Clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
- The Employers Representative will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.

15.2.1.1.8 Noise and Vibration

The Contractor will select and utilise methods of working and items of plant so that the maximum measured ground vibrations do not exceed the limits set out in Chapter 10 of the EIA. The Contractor will monitor ground vibrations at selected locations to the approval of the Employer's Representative during the progress of the works. The selected locations are to include the existing grotto structure at the southern end of the site.

Each vibrograph shall be certified as being in proper working order and shall unless otherwise approved, record vibrations in three directions simultaneously with print-out showing the amplitude and frequency of the vibrations.

The noise will comply with the following:

- BS 5228-1: 2009+A1:2014 Code of Practice for Noise Vibration Control on Construction and Open Sites: Noise;
- BS 5228-2: 2009 Code of Practice for Noise and Vibration control on Construction and Open Sites: Vibration;

- Environmental Protection Agency Act 1992 Sections 106-108, Local Authority's specific requirements depending on the location of the site, and
- Safety, Health and Welfare at Work (Control of Noise at Work) Regulations 2006 SI 371 (2006).
- Table 6-1 from the CEMP as shown, sets out the maximum permissible noise levels at the facade of dwellings during construction.

Table 6-1. Maximum permissible noise levels at the facade of dwellings during construction

Assessment category and threshold value period (L _{Aeq})	Threshold value, in decibels (dB)		
	Category A	Category B	Category C
Night-time (11.00pm to 7.00am)	45	50	55
Evenings (7.00pm to 11.00pm weekdays). Weekends (1.00pm to 11.00pm Saturdays and 7.00am to 11.00pm Sundays)	55	60	65
Daytime (7.00am to 7.00pm) and Saturdays (7.00am to 1.00pm)	65	70	75

Any contradiction between this table and the planning application documents, the contractor is to work to the most onerous time/noise limits. The limits outlined in above table may only be modified with the express written agreement of the Employer's Representative and the Local Authority.

Noise will be minimised, as far as practicable, by the selection of appropriate methods and equipment, and by the use of silencing devices wherever necessary. All compressors, percussion tools and vehicles will be fitted with effective silencers of a type recommended by their manufacturers. Measures shall be taken to minimise noise such turning off any machinery not in use.

Employees will not be permitted to use radios or other audio equipment in ways or at times which may cause nuisance and cause a Health and Safety risk. The Contractor will carry out their works such that the effect of vibration on the surroundings is minimised and does not cause any damage. The Contractor is to refer to Section 10.3.2 (Assessment Criteria), 10.6.1 (Potential Impacts) and 10.7.1 (Mitigation Measures) of Chapter 10 of the EIAR, this CEMP or tender / Contract documentation for further details of limits on vibration.

In the case of this development, vibration levels used for the purposes of evaluating building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s. BS 5228 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. This is summarised in Table 6-2 of the CEMP as shown.

Table 6-2 Vibration Limits (PPV)

Type of building	Transient Vibration	Continuous Vibration
Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s	25 mm/s
Unreinforced or light framed structures. Residential or light commercial-type buildings	15 mm/s	7.5 mm/s
Protected and Historic Buildings ^{Note 1}	6 mm/s – 15 mm/s	3 mm/s – 7 mm/s
Identified Potentially Vulnerable Structures and Buildings with Low Vibration Threshold	3 mm/s	

Note 1: The relevant threshold value to be determined on a case by case basis. Where sufficient structural information is unavailable at the time of assessment, the lower values within the range will be used, depending on the specific vibration frequency.

Chapter 10 of this EIAR and section 15.2.8 of this Chapter provide for additional measures which will be implemented for the duration of the construction works regarding noise and vibration emissions and potential impacts on population and human health.

15.2.1.1.9 Dust and Air Quality

The Contractor's proposals must include dust control measures in accordance with best practice and with reference to the following.

- The recommendations and mitigation measures outlined in Chapter 12 of this EIAR. (Also refer to Section 15.2.10) of this chapter.
- Air Pollution Act 1987,
- BS 6187: Code of Practice for Demolition.

In order to ensure that adverse air quality impacts are minimised during the construction phase and that the potential for soiling of property and amenity and local public roads is minimised, the following mitigation measures shall be implemented during the course of all construction activities:

- Avoid unnecessary vehicle movements and manoeuvring, and limit speeds on site so as to minimise the generation of airborne dust.
- Use of rubble chutes and receptor skips during construction activities.
- During dry periods, dust emissions from heavily trafficked locations (on and off site) will be controlled by spraying surfaces with water and wetting agents.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only.
- Re-suspension in the air of spillages material from trucks entering or leaving the site will be prevented by limiting the speed of vehicles within the site to 10kmh and by use of a mechanical road sweeper.
- The overloading of tipper trucks exiting the site shall not be permitted.
- Aggregates will be transported to and from the site in covered trucks.
- Where the likelihood of windblown fugitive dust emissions is high and during dry weather conditions, dusty site surfaces will be sprayed by a mobile tanker bowser.

- Wetting agents shall be utilised to provide a more effective surface wetting procedure.
- Exhaust emissions from vehicles operating within the construction site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised by routine servicing of vehicles and plant, rather than just following breakdowns; the positioning of exhausts at a height to ensure adequate local dispersal of emissions, the avoidance of engines running unnecessarily and the use of low emission fuels.
- All plant not in operation shall be turned off and idling engines shall not be permitted for excessive periods.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- Material stockpiles containing fine or dusty elements including top soils shall be covered with tarpaulins.
- Where drilling or pavement cutting, grinding or similar types of stone finishing operations are taking place, measures to control dust emissions will be used to prevent unnecessary dust emissions by the erection of wind breaks or barriers. All concrete cutting equipment shall be fitted with a water dampening system.
- Dust netting and site hoarding shall be installed along the north, south, east, and western site boundaries to minimise fugitive windblown dust emissions falling on third party lands and existing residential areas.

15.2.1.1.10 Fire and Explosion

Where material is to be stockpiled on site prior to disposal, the contractor will control all run-off to prevent contamination of surrounding watercourses. Any surplus material will be removed off site to a licenced facility. Contaminated soil will be assessed to determine its constituents and disposed of offsite in accordance with Irish Waste Management Legislation.

15.2.1.2 Construction Phase Monitoring Measures

15.2.1.2.1 Waste Management

(a) Waste Handling

All waste transfer notes will be checked and filed in the environmental plan for regular review and monitoring to ensure duty of Care Compliance. The site control measured to manage and minimise waste include:

- Signage on the site office/ welfare bins to separate them as environmental /domestic waste bins,
- Briefings for all sub-contractors via induction handouts,

- Specific checks in all waste carriers licences.

(b) Construction Phase Updates

Prior to commencing construction, the Contractor must update the resource inventory to list the following:

- Any changes to the generation volumes presented in the Design Phase Inventory;
- Any changes to the management routes presented in the Design Phase Inventory;
- The nominated permitted haulier who will be employed for each stream must be named along with the relevant permissions;
- The nominated destination site for all streams must be provided along with the relevant permissions.

(c) Waste Management Documentation

This plan will be updated by the Contractor to include a Waste Documentation System. The Principal Contractor will be responsible for implementation and auditing the Waste Documentation System on a regular basis. The documentation to be maintained, as a minimum, shall be the following:

- The names of the agent(s) and transporter(s) of the wastes;
- The name(s) of the person(s) responsible for the ultimate recycling, recovery or disposal of the wastes;
- The ultimate destination(s) of the wastes;
- Written confirmation of the acceptance and recovery, recycling or disposal of any waste consignments;
- The tonnages and LoW code for all waste materials;
- Details of any rejected waste consignments;
- Waste Transfer Forms (WTF) for hazardous wastes transferred from site and associated appendices;
- Completed Transfrontier Shipment Forms (TFS) for hazardous wastes transferred abroad;
- Written documentation of waste classifications, including any related analyses; and
- Certificates of Recycling, Recovery, Re-Use or Disposal for all wastes transferred from the site.

All waste records will be maintained for at least a period of 3 years and must be subject to verification and validation. All waste documentation will be maintained and made available for inspection by the Principal Contractor. This will be stored in a safe place, preferably on site, during the project implementation phase. Electronic records will be placed on a secure server that is backed up regularly. Allowance of time and resources will be made to collate outstanding waste records once the project implementation phase has been completed.

(d) Waste Audits

Details of the inputs of materials to the project site and the outputs of wastage arising from the Project will be investigated and recorded in a Waste Audit undertaken by the Principal Contractor.

This audit will identify the amount, nature and composition of the waste generated on the site. The Waste Audit will examine the manner in which the waste is produced and will provide a commentary highlighting how management policies and practices may inherently contribute to the production of demolition waste.

The Principal Contractor will be responsible for undertaking regular waste auditing and consulting with the local authority. The Design team may review the findings of the waste audits during the course of the construction stage. It is noted that this plan will be treated as a “live” document and regular review and update will be informed by the audit findings.

15.2.1.2.2 Dust & Air Quality

A programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM10 are not exceeded. Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented.

A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

The Dust Management Plan as set out in Chapter 12 (Appendix 12.3) of the EIAR will be enforced. At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust and other dust generating activities will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

15.2.1.2.3 Monitoring and Protection of Neighbouring Properties

A monitoring regime will be put in place to protect neighbours & neighbouring properties with a full and detailed vibration, noise, dust, and groundwater monitoring regime put in place for the duration of the works.

(a) Monitoring Works Specialist

The Contractor will appoint a competent person to be referred to as the Surveying, Instrumentation and Monitoring Subcontractor (MSC) and together with them will prepare and maintain the vibration, noise, dust, and groundwater monitoring plan, for the agreement/approval of the Client, Employers Representative, and the Technical Advisors.

(b) Condition Schedules

The MSC will be responsible for preparing or organising the preparation of condition surveys of surrounding buildings, walls, hardstanding area etc. prior to the carrying out of any works on site. Extent of surveys to be agreed. The condition surveys shall be carried out to a level of detail, suitable to the nature and extent of conditions encountered in order to obtain an understanding of the general structural condition of the property/structure and/or external environments.

(c) Movement & Vibration

Monitoring Movement & vibration monitoring of adjoining areas are not deemed to be required given the nature of the works and the site location.

(d) Recording

The MSC will monitor, collate, and report on noise & dust in report format, on a monthly basis, increased to weekly during critical activities.

15.2.1.3 Operational Phase – Mitigation Measures

The site layout responds to the site's topography and the evolving development context in Glounthaune. The proposed landscape and planting strategy will assist in mitigating the tree loss required to accommodate the proposed pedestrian/cyclist path through the site and will provide future residents with direct access to the greenway and train station.

The pedestrian/cyclist path and signalised pedestrian crossing on the Terrace will result in significant positive and permanent impacts to pedestrian and cyclist mobility in the settlement. The crossing will be taken in charge by Cork County Council. The path will not only benefit future residents of the scheme but ensure enhanced road safety and promote the usage of public transport as a viable means of commuting to nearby urban centres. The Mobility Management Plan (Appendix 13-3) prepared by AECOM, demonstrates how active and sustainable modes of transport will be promoted within the development.

The proposed layout and drainage/surface water strategy will not result in additional flood risk. Regarding the discharge of surface water, while it is proposed to discharge run-off from the proposed development to an area that is tidal in nature rather than a stream/ river, in order to reduce the rate of run-off from the proposed development it is proposed to limit discharge from the site to the greenfield rate. It is proposed to attenuate run-off from the proposed development through attenuation tanks, permeable pavement and a green roof is proposed as part of the proposed mixed-use building fronting onto Johnstown Close. Irish Water have confirmed by way of a Statement of Design Acceptance, that the proposed upgrades/surrounding water network can accommodate the development.

The proposed creche, community and commercial units, in addition to the Multi-Use Games Area, and various public open spaces will provide for new

opportunities for existing and future residents of the settlement to avail of public areas and services.

The proposed realignment of the greenway on Johnstown Close will result in an improvement in vehicular/pedestrian and cyclist safety in this area of the settlement and reduce potential conflicts between various users.

15.2.2 Landscape and Visual**15.2.2.1 Construction Phase – Mitigation Measures**

- Implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, delivery of materials.
- Appropriately scaled hoarding will be erected to restrict views of construction site.
- The proposed temporary construction compound and car parking area is located within the northern part of the site and away from any entrances to minimise visual effects.

Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish).

As detailed in the CEMP protective barriers will be installed by the Contractor around trees to be retained prior to the commencement of works on site. The locations of all tree protection barriers will be as shown on the Tree Protection Plan (TPP) prepared by CSR and as per BS5837. These barriers will remain in place for the duration of the works.

15.2.2.2 Operational Phase – Mitigation Measures

The site layout responded to the topography and existing vegetation by concentration the areas of built form and vehicular access in areas to the north and south and minimising built form and vehicular access in the centre of the site. Throughout the design process, efforts were made to create a sense of place, prioritise pedestrian and cycle permeability and to provide a hierarchy of open spaces. The layout aims to minimise tree removal, as the importance of the mature trees and hedgerows to the site were evident, both to maintain the landscape character, and the screening to reduce visual effects. Key elements of mitigation include.

- Retention of an important mature hedgerow and tree line in the northeast of the site and incorporation into an open space
- A total of 593 linear metres of hedgerow was removed while 800 linear metres of hedgerow planting is proposed.
- Retention of trees along east and western boundaries north of The Terrace

- Retention of several large mature trees in southeast corner of the site, near the main road at Glounthaune
- Planting of 8 no. heritage trees to replace 8 no. trees which have to be removed
- The removal of 137 trees in total is proposed, and planting of an additional 656 trees are proposed. An additional 316 smaller trees (whips) for woodland planting are proposed.
- A and a stone grotto located in close proximity to the proposed apartment block is to be retained and incorporated as a feature into the design.

The buildings and proposed path connecting the north and south of the site to the village centre necessitated the removal of some trees in order to achieve an acceptable gradient and width. The importance of the southern part of the site and its historic association with Ashbourne House as detailed and assessed in Chapter 11 has led to design changes proposed to minimise landscape effects on the former woodland garden.

Removal of trees in the site's southern section was minimised, however, to facilitate the proposed building south of the Terrace, a number of trees are to be removed. Replacement tree planting is proposed on the site, both east and west of the proposed buildings, and in other areas where tree removal was necessary. These measures are evident in the Landscape Plan and Tree Removal Plan (drawings 20543-2-101 and 20543-2-103) as well as a drawing 20543-2-104 illustrating the Heritage and Champion trees to be retained, those removed, and specific mitigation planting to replace the Heritage trees with a similar species.

15.2.3 Material Assets – Traffic & Transportation**15.2.3.1 Construction Phase – Mitigation Measures**

- The re-use of excavated materials generated on-site to reduce the total volume of imported material thereby reducing traffic generation.
- Defining delivery times to site to avoid background traffic peak periods.
- Construction stage site staff starting at 07:00 and ending at 18:00 to avoid the recorded peak periods.
- Road cleaning and wheel-wash systems put in place.
- The adoption of the previously referenced Traffic Management Plan (Refer to Section 15.2.1.1.6).

15.2.3.2 Construction Phase – Monitoring Measures

Refer to section 15.2.1.1.6 of this Chapter regarding the monitoring of traffic management procedures during the construction phase.

15.2.3.3 Operational Phase - Mitigation Measures

- The scheme proposes significant pedestrian/cycle connectivity works to promote the use of sustainable transport solutions on offer in the area, these being the existing Midleton/Cork Rail Service and development of the east/west greenway. Facilitating safe off-road access to these modes of travel will reduce the volume of traffic generated from the site thereby reducing the impact of development traffic on the existing roads network into the future. In addition to accommodating the proposed development the connectivity works will also facilitate existing housing that at present require persons to walk/cycle using the public road network without footpath facilities in parts (estimated at 20% of the local road network).
- Government policy to reduce dependence on private car use, is directing the development of new residential schemes in areas where public transport and sustainable solutions are available or will be available in the foreseeable future. The proposed development falls within this category and will positively impact the economic viability of public transport offerings in the area into the future.
- The traffic modelling results indicate that Junction 3: Glounthaune Road/ Johnstown Close, will deteriorate over time both with/without development traffic. Additional delay is incurred when development traffic is included with the Level of Service (LOS) going from D to E from 2031 to 2041 for the AM peak (08:00-09:00). As this uncontrolled junction crosses the IU-1 Inter-Urban Greenway there is a likelihood that this junction will be signalised in the foreseeable future. This would resolve any capacity issues whilst improving safety for all road users.

15.2.3.4 Operational Phase - Monitoring Measures

The operation of the local roads network and the effectiveness of the Greenway as well as public transport usage will be monitored by the Local Authority on an on-going basis. Traffic modelling has shown that most of the road's network will operate within capacity into the future, with Junction 3 the only junction showing a degradation in capacity for future years. The signalisation of this junction would resolve this issue as well as improving safety on the Inter-Urban Greenway. The implementation of such junction improvements will be carried out by the Local Authority when required.

15.2.4 Material Assets – Services Infrastructure and Utilities

15.2.4.1 Construction Phase - Mitigation Measures

The contractor will be obliged to put temporary measures in place to limit the rate of surface run-off from the site. They will also be obliged to manage the quality of surface water runoff and ensure run-off from the site does not

result in excessive siltation of the receiving drainage channels. This will be managed in line with the CEMP and as follows:

- It is not proposed to store any oils/fuels for the purpose of refuelling on the site.
- Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles are not to be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.
- The following steps provide the procedure to be followed in the event of any significant spill or leak.
 - Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
 - Eliminate any sources of ignition in the immediate vicinity of the incident
 - Contain the spill using the spill control materials, track mats or other suitable material. Do not spread or flush away the spill.
 - Cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
 - Clean up as much as possible using the spill control materials.
 - Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
 - Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
 - The Employers Representative will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- All watercourses must be protected from sedimentation and erosion throughout the duration of the Works.
- Surface water management on site will comply with the following guidelines from CIRIA:
 - C532 Control of Water Pollution from construction Sites, Guidance for Consultants and Contractors,
 - C741 Environmental Good Practice on Site - 4th Edition.
- Run-off control measures to include the following:
 - Dewatering measures will only be employed where there are no other alternatives.
 - For groundwater encountered during construction phase, mitigation measures will include:
 - › Dewatering by pumping to a soakaway.
 - › Excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e., highly vulnerable groundwater areas.
 - If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.
 - Existing surface drainage channels within the site that serve adjacent lands will be retained where possible to prevent causing increased flooding impacts.
 - Any surface water sewer connections will be made under the supervision of the Local Authority/Irish Water and checked prior to commissioning.
 - New onsite surface water drains will be tested and surveyed prior to commissioning to prevent any possibility of ingress of ground water.
 - All surface water manholes and drains will be inspected and sealed to ensure that uncontrolled ground water inflow does not occur.
 - Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.
 - Areas surrounding the site are to be protected as necessary from sedimentation and erosion due to direct surface water runoff generated onsite during construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works, as noted in the points above, until the permanent surface water drainage system of the proposed site is complete.
 - Regular inspections of de-watering settlement tanks, if used, are to be carried out and additional treatment used if settlement is not adequate.
 - Bunded areas will be created for the storage or use of any fuels, oils, greases, cement, etc.
 - Emergency spill kits will be kept close to the works.
- The Contractor is expected to agree a dedicated water supply connection and a wastewater discharge connection for the construction activities. It is expected they will consult Irish Water to obtain these connections. The demand during the construction phase is not expected to be significant enough to affect existing pressures or capacities.
- The Contractor will be obliged to put measures in place to ensure that there are minimal or no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority.
- All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company and/or local authority and will be in compliance with any requirements or guidelines

they may have. Where new services are required, the Contractor will apply to the relevant utility company for a connection permit where appropriate and will adhere to their requirements.

15.2.4.2 Construction Phase - Monitoring Measures

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development and close contact with the electricity, gas and water utility providers will be under the control of the main contractor.

15.2.4.3 Operational Phase - Mitigation Measures

Due to the measures already incorporated in the design (e.g., silt management, restricted discharge off site) no additional mitigation measures will be necessary on surface water during the operational phase.

The potable water network is designed in accordance with the Irish Water Code of Practice and Standard Details to provide a robust construction to prevent failure of the system under normal conditions. Watermains are located in public spaces to ensure that access is available to allow for inspection and maintenance. The water system will be metered to determine water consumption and facilitate leakage detection.

The proposed wastewater drainage network is designed in accordance with the Irish Water Code of Practice and Standard Details to provide a robust construction to prevent failure of the system under normal conditions. Sewers are located in public spaces to ensure that access is available to allow for inspection and maintenance.

The proposed development will result in increased volumes of sewage discharge to the public wastewater system. This involves extending the Irish Water sewer network by approximately 400m on 'the Terrace' to the south of the development. Irish Water have confirmed that capacity is available to serve the proposed development. Therefore, the proposed development will not have a significant impact on sewage treatment.

Connection agreements will be made with Irish Water regarding water supply to the site and foul water discharge off site. No additional mitigation measures will be required. Irish Water have been consulted and confirmed capacity within their networks.

New electrical supplies will be fitted with dedicated circuit breakers to ensure health and safety. Supplies will also be metered to facilitate monitoring of power consumption.

While it is proposed to discharge run-off from the proposed development to an area that is tidal in nature rather than a stream/ river, in order to reduce the rate of run-off from the proposed development it is proposed to limit discharge from the site to the greenfield rate. It is proposed to attenuate run-off from the proposed development through attenuation tanks, permeable pavement and a green roof is proposed as part of the proposed apartment block.

15.2.4.4 Operational Phase - Monitoring Measures

All utilities will be monitored and metered in accordance with the service agreements for the various utilities. Appropriate maintenance regimes will be put in place to monitor/maintain surface water drainage. This will include periodic cleaning out of gully pots & drainage channel sumps and cleaning of pipes if/when blockages occur. Hydrocarbon interceptors will be fitted with sensors/alarms designed to notify the site maintenance team when hydrocarbon levels are such that the unit needs to be emptied.

15.2.5 Land & Soils

15.2.5.1 Construction Phase – Mitigation Measures

The following mitigation measures will be implemented in accordance with the CEMP/CDWMP:

15.2.5.1.1 Soil/Subsoil Excavation and Bedrock Excavation

- Top soil will be stock piled on site and reused where possible;
- Excavated (existing) overburden material will be reused on site, where possible;
- Construction of service trenching, pumping station and surface water attenuation features will generate excess material, and all excess material will be used locally within the site for landscaping;
- Top-soiling and landscaping works will take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties.
- The construction phase will be monitored, in particular in relation to the following;
 - Protection of topsoil stockpiled for re-use;
 - Adequate protection from contamination of soils for removal;
 - Cleanliness of adjoining road network;
 - Prevention of oil and petrol spillages;
 - Dust control.
- Reusable excavated gravels, sands or rock will be retained on-site for backfilling or drainage purposes to reduce the total volume of imported material. Rock will be crushed and graded on site.
- Excavated materials will be visually assessed for signs of contamination. Should material appear to be contaminated, soil samples will be analysed by an appropriate testing laboratory. Contaminated material will be treated in accordance with the Waste Management Regulations, 1998.
- Excess fill, unsuitable material and suitable material will be removed off-site. Removal will be in accordance with the relevant Waste Management Regulations and Construction and Demolition Waste

Management Plan.

- Further ground investigation will be undertaken to inform the detailed design of the scheme. This will include testing of soil and made ground to identify any potentially contaminated material to ensure adequate classification and disposal.
- The Contractor will monitor ground vibrations at selected locations to the approval of the Employer's Representative during the progress of the works. The selected locations are to include the existing grotto structure at the southern end of the site.
- A condition survey of existing structures adjacent to the proposed development is to be undertaken by the contractor. Monitoring of neighbouring structures immediate to the development site for the effects of any vibration, movement and settlement arising from the excavation works based on condition surveys carried out by the Contractor prior to the works.
- Testing and monitoring of water and gas will be undertaken during excavation works.
- Monitoring of water movements either seepages or through control points.

15.2.5.1.2 Contamination of Soil/Subsoil/Bedrock by Leakages and Spillages

- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Refuelling of construction machinery shall be undertaken in designated areas located away from surface water drainage. Spill kits shall be kept in these areas in the event of spillages;
- Refuelling will be completed in a controlled manner using drip trays at all times;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas away from open water;
- Fuel containers will be stored within a secondary containment system, e.g. bunds for static tanks or a drip tray for mobile stores;
- Containers and bunding for storage of hydrocarbons and other chemicals will have a holding capacity of 110% of the volume to be stored;
- Ancillary equipment such as hoses and pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Drip-trays will be used for fixed or mobile plant such as pumps and generators in order to retain oil leaks and spills;
- Only designated trained operators will be authorised to refuel plant on

site;

- Procedures and contingency plans will be set up to deal with emergency accidents or spills;
- An emergency spill kit with oil boom, absorbers etc. will be kept on-site for use in the event of an accidental spill. A specific team of staff will be trained in the use of spill containment;
- Oil and fuel stored on site will be stored in designated areas. These areas shall be bunded and will be located away from surface water drainage;
- Hazardous waste shall be dealt with in accordance with the Waste Management (Hazardous Waste) Regulations, 1998;
- All potentially hazardous materials shall be securely stored on site.

Highest standards of site management will be maintained and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively.

15.2.5.1.3 Soil and Subsoil Compaction

The underlying in-situ soils and subsoils will be subject to a certain amount of compaction, but this will be unavoidable. Any infill material/landscaping that is required will be placed and levelled in appropriate lift thicknesses to ensure the material is not over compacted thereby retaining its drainage properties.

15.2.5.1.4 Excavated Material Management

Section 7 of the CDWMP refers to 'Excavated Material Management' mitigation procedures to be implemented during construction.

The Principal Contractor will, as part of their Site Waste Management Plan (SWMP), prepare a project-specific Excavated Material Management Plan, which will detail the following as a minimum:

- Detail in-situ (prior to excavation) and ex-situ (post excavation) methodologies to classify waste soil for appropriate disposal, in accordance with relevant Irish and EU legislation and guidance.
- Identify reuse requirements and soils suitable for reuse on site in consultation with the design team, including assessment methodology to determine which soils are suitable for re-use onsite.
- Site management procedures, including waste minimisation, stockpile management, temporary storage procedures, waste license requirements.

15.2.5.1.5 Excavated Soil & Materials

The SWMP to be developed by the Principal Contractor will detail relevant procedures including further environmental sampling, testing and assessment requirements, sampling protocols and sample density targets to supplement the existing soil data.

Where any hotspots of potential contamination are encountered, and prior to disposal, further assessment will be undertaken by a suitably qualified environmental scientist to determine the nature and extent of remediation required.

(a) Soil and Crushed Rock for Reuse on Site

Where the Principal Contractor proposes to reuse excavated soil or crushed rock within the works e.g. as backfill, or crushed rock within crib retaining walls and where reuse is permitted in accordance with the relevant legislation and provided that the reuse meets the engineering requirements for material used within the works, the Principal Contractor shall set out their proposal for its management, documentation and reuse. This shall include:

- Define the criteria by which the suitability of the soils for reuse will be assessed (e.g. analytical parameters and limits);
- Delineation of areas where excavated soil is intended for disposal off-site as waste, and where it is intended for re-use on site;
- Identification and recording of the location from where the soil | rock will be excavated and its proposed re-use location and function;
- Engineering assessment to confirm its suitability for re-use; and
- Any proposed treatment or processing required enabling its reuse, as well as any associated treatment permits or licenses required.

(b) Excavated Material for Removal Off-site

Where appropriate, excavated soil and material intended for recovery or disposal offsite shall require appropriate waste classification in order to select an appropriate receiving facility for the waste.

Assessment of the excavated material shall be carried out with due regard to the following guidance and legislation:

- EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002);
- Regulation (EC) No. 1272/2008: the classification, labelling and packaging of substances and mixtures (CLP);
- Environmental Protection Agency document entitled Waste Classification; List of waste and determining if waste is Hazardous or Non Hazardous; and
- UK Environment Agency Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste.
- Waste soil and material intended for offsite disposal, recycling or recovery shall not be removed from site prior to appropriate waste classification and receiving written confirmation of acceptance from the selected waste receiving facility.

(c) Stockpile Management

Soil stockpiles might be generated as part of the operations, for example while classification and acceptance at a waste facility is pending or awaiting reuse. The contractor will consider the following measures to ensure that stockpiles are managed in an appropriate manner.

- A suitable temporary storage area shall be identified and designated;
- All stockpiles are to be assigned a stockpile number;
- Stockpiles shall not be positioned adjacent to ditches, watercourses or existing or future excavations;
- Soils will be stockpiled in the driest condition possible and tracked equipment will be used to reduce compaction;
- Contaminated or potentially contaminated soil shall be stockpiled only on hard-standing or high-grade polythene sheeting to prevent cross-contamination of the soil below;
- Soil stockpiles are to be covered with high-grade polythene sheeting to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust; and
- Mixing of unclassified stockpiles of different origin, or of stockpiles having different classification, will not be carried out. When a stockpile has been sampled for classification purposes, it shall be considered to be complete and no more soil shall be added to that stockpile prior to disposal.
- An excavation/stockpile register shall be maintained on site.

15.2.5.1.6 Hazardous Materials Waste Management

As the subject site is primarily greenfield and has not been developed previously it is not anticipated that hazardous material will be encountered during construction works. No contaminated materials were identified as part of the ground investigation work undertaken in 2018. Where hazardous waste is generated/ encountered, the Principal Contractor must undertake the following:

- Immediate notification of the nature of the hazardous waste to the design team in writing;
- Submission of a revised plan detailing the nature and management of the hazardous waste prior to off-site waste disposal; and
- The Principal Contractor must establish a specific procedure for the management of the asbestos cement watermain which traverses the site. The management of such wastes shall be co-ordinated with the client representative, Irish Water and in accordance with the Safety and Health Plan for the overall works, in order to ensure that personnel within the construction site and the local residents are protected against exposure to asbestos. Prior to commencement of any asbestos removal works, the Principal Contractor shall identify a suitable Waste Collection Contractor with a Waste Collection Permit for the transfer of the asbestos cement pipework.

15.2.5.1.7 Waste Management Plan Awareness & Training

Copies of this plan must be made available to all personnel on site. All site personnel and sub-contractors will be instructed about the objectives of these plans and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation and selective material reuse techniques apply, each member of staff will be given instructions on how to comply with the plan. Posters will be designed to reinforce the key messages within the plan and will be displayed prominently for the benefit of site staff. Specialist training as may be required (e.g. asbestos containing materials handling) will be assessed or provided as required.

15.2.5.2 Operational Phase – Mitigation Measures

No impacts on soils and geology are anticipated during the operational phase. The operational stage of the proposed development consists of the typical activities in a commercial and residential area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

15.2.6 Water (Hydrology & Hydrogeology)

15.2.6.1 Construction Phase - Mitigation Measures

15.2.6.1.1 Earthworks (Excavations & Stock Piling)

A summary of surface water controls that can be employed during the earthworks and construction phase are as follows:

- **Source controls:** Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- **In-Line controls:** Silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- **Treatment systems:** Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.
- **Silt Fences:** Silt fences will be placed up-gradient of the site sump. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the sump of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase.
- **Silt Bags:** Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped

through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with to the east of the site and the discharge allowed percolate to ground.

Management of surface water runoff and subsequent treatment prior to release offsite will be undertaken during construction work as follows:

- Prior to the commencement of earthwork silt fencing will be placed down-gradient of the construction areas where drains or drainage pathways are present.
- No pumped construction water will be discharged directly into any local watercourse.
- Daily monitoring and inspections of site drainage during construction will be completed.
- Good construction practices such wheel washers and dust suppression on site roads, and regular plant maintenance will ensure minimal risk. The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites ('Control of Water Pollution from Construction Sites, guidance for consultants and contractors', CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of construction activities will contain minimum sediment.

15.2.6.1.2 Potential Release of Hydrocarbons during Construction Stage

On-site refuelling will be carried out at designated refuelling stations on site. Drip trays will be used when refuelling all plant. Absorbent material and pads will be available in the event of any accidental spillages. Alternatively, mobile double skinned fuel bowsers may be used. Fuel bowsers will be parked on a level area in the site when not in use. Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be used during all refuelling operations.

The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- Minimal maintenance of construction vehicles or plant will take place on site.
- Drip trays will be used to control on-site refuelling at controlled fuelling stations.
- On-site diesel tanks will be double skinned to 110% of their capacity.
- Containment stores will be used for refuelling of small plant such as consaws etc.
- Any fuel bowsers used on site will be custom-built / banded to 100% of capacity. Fuel bowsers will be parked on a level area in the construction compound when not in use.

- Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
- Fuels volumes stored on site will be minimised. Any fuel storage areas will be banded appropriately for the fuel storage volume for the time period of the construction.
- Plant used will be regularly inspected for leaks and fitness for purpose.
- Any Hazardous Materials will be stored in drip trays in secure containment stores.
- Refuelling/containment store signage will be erected at predetermined locations around the site.
- An emergency plan for the construction phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with any accidental spillage in and outside the refuelling area

15.2.6.1.3 Groundwater and Surface Water Contamination from Wastewater Disposal

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works.
- No wastewater will be discharged on-site during either the construction or operational phase.

(a) Release of Cement-Based Products

- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only the chute need be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Use weather forecasting to plan dry days for pouring concrete; and,
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.

(b) Potential Impacts on Hydrologically Connected Designated Sites

The proposed mitigation measures for protection of groundwater quality and surface water quality which will include on site drainage control measures (i.e. sump and settlement/holding tank) will ensure that the quality of runoff from

proposed development areas will be very high. As outlined above controls will also be put in place to manage risks associated with hydrocarbons/chemicals and cement-based products used during construction phase. The majority surface water arising on site will drain to ground, with no proposed outfall other than intermittent and temporary pumping of surface water to the municipal foul sewer. Groundwater quality risks are reduced during the construction phase by use of the control measures described above.

15.2.6.2 Construction Phase - Monitoring Measures

An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any construction works. Regular inspections of the sump and holding tank will be undertaken, especially after heavy rainfall, to check for visual evidence of sediment in the water body.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for the holding/settlement tank, and specifically following heavy rainfall events (i.e. weekly, monthly, and event-based monitoring is proposed).

15.2.6.3 Operational Phase - Mitigation Measures

15.2.6.3.1 Potential Increased Downstream Flood Risk due to Increased Hardstanding Area

- The risk of flooding is minimized by the collection, treatment and discharge of water to the municipal sewers.
- The mitigation measures described in the Site-Specific Flood Risk Assessment (Appendix 8-1) reduces this risk. Water quality risks are reduced by use of hydrocarbon interceptors and silt traps.
- The surface water run-off from the proposed development is to be separate from the development's wastewater drainage network as described in the Infrastructure Report prepared by AECOM (included in Appendix 2-1).
- All surface water run-off from roof areas and hardstanding areas shall be collected in the gravity pipe network. The surface water from any open deck parking areas or pavements shall be collected via a series of gullies and channels. On-site attenuation is to be provided to restrict flows from the development to greenfield run-off rates across the site.

15.2.6.3.2 Potential Emissions to Groundwater and/or Surface water

The risk of emissions is minimized by the collection, treatment and discharge of water to the municipal sewers. Water quality risks are reduced by use of hydrocarbon interceptors and silt traps.

15.2.7 Biodiversity

15.2.7.1 Designated Nature Conservation Sites

The following mitigation measures will be integrated as part of the proposed development regarding environmental protection specific to the site, works/operations and Lough Mahon (Harper's Island) transitional waterbody with associated Cork Harbour SPA and Great Island Channel SAC in relation to potential construction/operational phase surface-water run-off drainage effects.

15.2.7.1.1 Construction Phase

Implement the following construction related run-off controls that are proposed as part of the development in question (after AECOM 2021 in Appendix 2-3 of this EIAR).

(a) Spill Control Measures

It is not proposed to store any oils/fuels for the purpose of refuelling on the site.

Onsite plant will be refuelled by an external contractor who will call to site as required. Road vehicles are not to be refuelled at the site. Minor spills and leaks may occur from road vehicles and the onsite excavator. Any oils or fuels onsite will be removed by an experienced and authorised contractor.

The following steps provide the procedure to be followed in the event of any significant spill or leak.

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- Eliminate any sources of ignition in the immediate vicinity of the incident
- Contain the spill using the spill control materials, track mats or other suitable material. Do not spread or flush away the spill.
- Cover or bund off any vulnerable areas where appropriate such as drains or watercourses.
- Clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the Contractor immediately giving information on the location, type, and extent of the spill so that they can take appropriate action and further investigate the incident to ensure it has been contained adequately.
- The Employers Representative will inspect the site and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.

(b) Run-off Control Measures

- Dewatering measures will only be employed where there are no other alternatives.
- For groundwater encountered during construction phase, mitigation measures will include;
 - Dewatering by pumping to a soakaway.
 - Excluding contaminating materials such as fuels and hydrocarbons from sensitive parts of the site i.e. highly vulnerable groundwater areas.
- If concrete mixing is carried out on site, the mixing plant will be sited in a designated area with an impervious surface.
- Existing surface drainage channels within the site that serve adjacent lands will be retained where possible to prevent causing increased flooding impacts.
- Any surface water sewer connections will be made under the supervision of the Local Authority/Irish Water and checked prior to commissioning.
- New onsite surface water drains will be tested and surveyed prior to commissioning to prevent any possibility of ingress of ground water.
- All surface water manholes and drains will be inspected and sealed to ensure that uncontrolled ground water inflow does not occur.
- Filters and silt traps will be used to prevent rain washing silts and other materials into the surface water network and creating blockages.
- Areas surrounding the site are to be protected as necessary from sedimentation and erosion due to direct surface water runoff generated onsite during construction phase. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works, as noted in the points above, until the permanent surface water drainage system of the proposed site is complete.
- Regular inspections of de-watering settlement tanks, if used, are to be carried out and additional treatment used if settlement is not adequate.
- Bunded areas will be created for the storage or use of any fuels, oils, greases, cement, etc.
- Emergency spill kits will be kept close to the works.

15.2.7.1.2 Operational Phase

Implement operational stage run-off proposals that will be integrated into the development under consideration here that are summarised as follows (see AECOM 2021 in Appendix 2-1 of this EIAR).

- The proposed SuDS surface-water drainage design includes green roofing and permeable paving along with hydrocarbon interceptors and attenuation tanks.

- Maintenance of the drainage system will be carried out on an on-going basis to ensure the system is operating correctly. Maintenance will consist of inspection and assessment, with remedial measures undertaken where required.

15.2.7.2 Habitats & Flora

15.2.7.2.1 Construction Phase

- No removal/damage of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the development site works area/footprint will be clearly marked for associated site staff.
- The final landscape plan will incorporate a native/non-native pollinator friendly dominant tree/shrub and ground flora planting scheme (in line with All Ireland Pollinator Plan recommendations and associated guidance such as NBDC 2016) that will result in a net gain of native tree/hedge/shrub planting. This is achieved by landscaping proposals for the proposed development here (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane Stratton Reynolds- EIAR Appendix 4-5).
- A site assessment will be undertaken by a suitably qualified/experienced Ecologist or Invasive Plant Specialist prior to enabling/construction activities to assess the most up-to-date status of invasive plants at the site relative to the works area. The Invasive Plants Survey and Management Plan that has been developed in relation to the Third Schedule species for the study site will be implemented (see IPS 2021 in Appendix 9-3). All other non-native plant species that are not listed on the Third Schedule will also be managed/eradicated in line with current guidelines where available (e.g. NRA 2010) under the advice/supervision of a suitably qualified/experienced Ecologist or Invasive Plant Specialist. The management of invasive plants will need to be incorporated into the final Construction and Environmental Management Plan for the project (as per Section 4.4 of CEMP by AECOM 2021 in Appendix 2-3 of this EIAR).
- Existing trees/hedgerow being retained at/close to the development area will be protected in line with tree protection recommendations where relevant (e.g. Arbor Care 2019, Dermot Casey Tree Care 2021 and TMS 2021) as well as current guidelines (e.g. NRA 2006, BS 5837).
- Measures summarised in Section 9.6.1.1 of Chapter regarding potential surface-water related impacts and associated effects will be implemented to ensure protection of downstream water-features in the wider area (i.e. Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora.

15.2.7.2.2 Operational Phase

- Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing frequency; avoidance/reduction of pesticide/herbicide use within green areas; native supplementary planting at retained hedgerow sections; reduced hedgerow trimming frequency. This measure overlaps with operational phase mitigation for fauna below.
- As mentioned in Section 9.6.1.2 of Chapter 9, the surface-water drainage network (including hydrocarbon interceptors etc.) will be maintained on a regular basis in accordance with established guidelines. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation to downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora.

15.2.7.3 Fauna: Birds, Non-volant Mammals, Bats, Other Taxa & Aquatic

15.2.7.3.1 Construction Phase

- Subject to other environmental concerns (e.g. soil and water management) and as far as is reasonable, the removal of woody vegetation (scrub, hedgerow, trees) during site enabling/clearance/construction activities will not be undertaken during the bird nesting season (currently defined by the Irish Wildlife Acts 1976 - 2018 as March 1st to August 31st inclusive); this will protect nesting birds and eggs/chicks from disturbance (especially through nest failure), injury, fatality.
- In tandem with study site enabling/clearance/construction activities, a suitably qualified/experienced Ecologist will supervise/check areas where woody vegetation removal is due (e.g. hedgerow, scrub, woodland undergrowth) to identify potential unforeseen wildlife issues (e.g. unknown badger sett) so that appropriate measures can be undertaken in accordance with best practice guidelines and in consultation with NPWS where relevant.
- All trees due for felling that have been identified with potential to support bat roosts (as outlined in Table 9.6 of Section 9.4.6 of the EIAR) or were inaccessible for visual assessment as part of this EIAR study (as outlined in Section 9.4.6) will be assessed in advance of felling by a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. BTHK 2018, Collins 2016). All such trees will be marked in the field to allow easy identification for all site staff and thereby ensure protection from inappropriate felling (e.g. erect a notice as per NRA 2005). The subsequent felling of all such trees to be undertaken under the advice/supervision of a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. NRA 2005) and in consultation with NPWS where relevant (e.g. derogation licence to remove bat tree roost; see NRA 2005).
- Where the removal of the unoccupied building will occur during the months of April to October inclusive, the building will be reassessed for bat roosting activity in advance of removal works by a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. BTHK 2018, Collins 2016). The subsequent demolition of the building will be undertaken under the advice/supervision of a suitably qualified/experienced Ecologist in accordance with best practice guidelines (e.g. NRA 2005) and in consultation with NPWS where relevant (e.g. derogation licence to remove bat roost; see NRA 2005).
- Where a fauna species is found actively using the development footprint for breeding/resting (e.g. bird nest, bat roosting, hedgehog) during site enabling/clearance/construction activities, relevant works will cease immediately and the area will be cordoned off until advice is sought from a suitably qualified/experienced Ecologist.
- Construction operations during the hours of darkness will be kept to a minimum; this will minimise disturbance to species that are roosting/resting or active at night.
- Where open excavations must be left in-situ overnight during the construction phase, measures will be taken to ensure that fauna such as mammals do not become inadvertently trapped and potentially injured within such open excavations. Such measures (covering, fencing off, allowing access/egress) will be decided under the advice of an Ecologist.
- The construction phase lighting scheme will be designed to minimise light spillage nuisance at retained/new woody vegetation features of the study site (i.e. hedgerow, tree line/groups, woodland/woodland edge) by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). This will benefit bats as well as other fauna active/resting at night.
- The final landscape plan will incorporate a native/non-native pollinator friendly dominant tree/shrub and ground flora planting scheme (in line with All Ireland Pollinator Plan recommendations and associated guidance such as NBDC 2016) that will result in a net gain of native tree/hedge/shrub planting, while also ensuring that new planting connects to woody habitat/other vegetation in order to maintain and provide connectivity for fauna via wildlife corridors. This is achieved by landscaping proposals for the proposed development here (see Landscape Master Plan Drawing No. 21543-2-101 by Cunnane

Stratton Reynolds accompanying the planning application and EIAR Appendix 4-5).

- Measures summarised in Section 9.6.1.1 of this EIAR regarding potential surface-water related impacts and associated effects will be implemented to ensure protection of downstream water-features in the wider area (i.e. Lough Mahon (Harper's Island) transitional waterbody in this case) and associated fauna.

15.2.7.3.2 Operational Phase

Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing frequency; avoidance/reduction of pesticide/herbicide use within green areas; native supplementary planting at retained hedgerow sections; reduced hedgerow trimming frequency. This measure overlaps with operational phase mitigation for habitats and flora above.

The operational phase lighting scheme will be designed to minimise light spillage nuisance at retained/new woody features (i.e. hedgerow, tree line/groups, woodland/woodland edge) by using shielded, downward directed lighting wherever possible; switching off all non-essential lighting during the hours of darkness; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). This will benefit bats as well as other fauna active/resting at night. The proposed lighting scheme achieves this by focusing lighting on areas where it is needed as much as possible (roads, streets, footpaths) and minimising spillage onto relevant retained/new woody features (i.e. hedgerow, tree line/groups, woodland/woodland edge) at the study site or the adjoining area (see Glouthaune Development Public Lighting drawing by Lighting Reality accompanying the planning application). – in the event the proposed operational artificial lighting scheme will be changed, the revised scheme will also be reviewed by an Ecologist/Bat Specialist and altered accordingly under their advice.

As mentioned in Section 9.6.1.2 of this EIAR, the surface-water drainage network (including hydrocarbon interceptors etc.) will be maintained on a regular basis in accordance with established guidelines. Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation to downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated fauna.

Mammal access to the study site will be maintained (i) either through the incorporation of mammal access points at regular intervals (at least every 50-75m) along the proposed new outer boundary perimeter fencing (i.e. concrete post and concrete panel fence or weldmesh fence) or (ii) ensuring

that a minimum gap of 200mm is maintained between the bottom of the perimeter fence and ground throughout. In the case where access points are incorporated into the perimeter fence at regular intervals, such mammal access points will be designed in accordance with standard guidelines for the provision of mammal access (e.g. DMRB 1997), where openings will be at least 250mm high x 220mm wide. Such measures will be designed to allow small and medium sized mammals to pass through freely under the advice and/or supervision of an ecologist.

15.2.7.4 Construction Phase Monitoring

A suitably qualified/experienced Ecologist will be engaged in the role of Ecological Clerk of Works (ECoW) for the construction phase of the project, whose role will include the following monitoring in relation to relevant proposed mitigation measures (as outlined in Section 9.6 of the EIAR) through liaising with relevant experts/team-members where required;

- Ensure that the development works area/footprint is clearly marked out with no removal of habitats or movement of construction machinery outside of this area.
- Review final landscaping plan to ensure it is in line with/equivalent to proposed mitigation regarding native and non-native pollinator friendly dominant tree/hedge/shrub planting and wildlife corridor connectivity.
- Ensure that retained trees/hedgerow are adequately protected.
- Ensure that invasive plants are appropriately managed/eradicated in accordance with best practice (e.g. Invasive Species Management Plan for Third Schedule invasive plant species after IPS 2021 in Appendix 9-3).
- Ensure that measures outlined in Sections 6.4 and 6.6 of the Construction Management Plan by AECOM (2021b in Appendix 2-3 of this EIAR) and summarised in Section 9.6.1 regarding potential surface-water related impacts and associated effects will be implemented to ensure protection of downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora and fauna.
- Ensure that the removal of woody vegetation features (scrub, hedgerow, trees) does not occur during the bird nesting season subject to other environmental concerns (e.g. soil and water management) and as far as is reasonable.
- Ensure that areas where woody vegetation removal is due (e.g. hedgerow, scrub, woodland undergrowth) are checked for unforeseen wildlife issues (e.g. unknown badger sett) with appropriate follow-up actions where required.
- Ensure that a pre-felling/removal assessment of bat roosting potential/activity in relation to relevant trees/buildings due for removal is undertaken, with subsequent protection and appropriate follow-up actions where required.
- Ensure that where a fauna species is found actively using the

development footprint for breeding/resting (e.g. bird nest, bat roost) during site clearance/construction phase, relevant works are ceased immediately and that the area is cordoned off until appropriate follow-up actions are undertaken where required.

- Assess the potential for overnight open excavations to inadvertently trap mammals with appropriate follow-up actions where required.
- Review construction/operational phase lighting plan to ensure minimal light spillage nuisance on retained/new woody vegetation features of the study site (i.e. hedgerow, tree line/groups, woodland/woodland edge).
- Ensure that mammal access is correctly incorporated into proposed new outer boundary perimeter fencing comprising of concrete post and concrete panel fence or weldmesh fence.

15.2.7.5 Operational Phase Monitoring

The following operational stage monitoring will be undertaken in relation to relevant proposed mitigation measures (as outlined in Section 9.6 of the EIAR) by engaging the relevant experts;

- Ongoing maintenance and management of habitats/landscaped areas associated with the development will include wildlife considerations such as pollinators that will be implemented through a Habitats & Landscape Wildlife Management Plan under the advice/supervision of a suitably qualified/experienced Ecologist or similar specialist. The Habitats & Landscape Wildlife Management Plan will address the following at a minimum in line with current guidelines (e.g. NBDC 2016): reduced grass/lawn mowing frequency; avoidance/reduction of pesticide/herbicide use within green areas; native supplementary planting at retained hedgerow sections; reduced hedgerow trimming frequency.
- The surface-water drainage network (including hydrocarbon interceptors etc.) will be maintained on a regular basis in accordance with established guidelines (see AECOM 2021 in Appendix 2-1 of this EIAR). Such maintenance will ensure that excessive build-up of sludge is identified and appropriately removed before it becomes a pollution (risk) item in relation to downstream water-features in the wider area (Lough Mahon (Harper's Island) transitional waterbody in this case) and associated habitats/flora and fauna.

15.2.8 Noise & Vibration

15.2.8.1 Construction Phase – Mitigation Measures

BS 5228-1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites Parts 1 and 2 provide guidance on noise and vibration control in the context of construction. The control of noise from

construction works can be divided into two categories, (i) Controlling the noise at source, and (ii) Controlling the spread of noise.

Mitigation measures that will be employed in order to control construction noise at its source include the following:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Use rubber linings in, for example, chutes and dumpers to reduce impact noise
- Minimise drop height of materials;
- Start up plant and vehicles sequentially rather than all together;
- The normal operating hours of the site will be adhered to. This also applies to the movement of plant onto and around the site;
- The plant and activities chosen to carry out the construction work will be the quietest available means of achieving the required purpose;
- Modifications may be made to plant and equipment, if appropriate, for noise attenuation purposes, provided the manufacturer has been consulted. For example, a more effective exhaust silencer may be fitted to a diesel engine;
- As far as is reasonably practicable, sources of significant noise will be enclosed provided that ventilation and potential hazards to operators have been considered;
- Plant and noisy activities will be located away from noise-sensitive areas where practicable and sources of directional noise should be oriented away from noise-sensitive areas;
- All plant and equipment will be regularly maintained (increases in plant noise are often indicative of future mechanical failure).

Mitigation measures that will be employed in order to control the spread of construction noise include the following:

- The distance between noise sources and noise-sensitive areas will be increased as much as is reasonably practicable;
- Where noise control at source is insufficient and the distance between source and receiver is restricted, screening will be implemented. The location of barriers providing screening is an important consideration. Barriers will be located either close to the source of noise (as with stationary plant) or close to the listener. The height of the barrier must also be considered. BS 5228-1 states that an approximate attenuation of 5 dB is achieved when the top of the plant is just visible to the receiver over the noise barrier, while an attenuation of 10 dB is achieved when the noise screen completely hides the sources from the receiver. A barrier height will be chosen so as to completely hide the source at least along the boundaries adjacent to the commercial premises. Furthermore, where the noise source is 1 m from the façade

of a building, an allowance of +3 dB will be made for reflection.

Mitigation measures that will be employed in order to control vibration from construction works, with reference to BS 5228-2, include the following:

- The plant and activities chosen to carry out the construction work will be chosen to cause as little vibration as possible while achieving the required purpose;
- All plant and equipment will be regularly maintained to reduce unnecessary vibration;
- Activities causing significant vibration will be located away from sensitive areas and/or isolated using resilient mountings where practicable;

15.2.8.2 Construction Phase – Monitoring Measures

The grotto located to the north-east of the apartment block has been identified as a vulnerable structure and, therefore, the vibration threshold of 3 mm/s PPV recommended in BS 7385 and BS 5228 applies to it (Refer to Section 10.3 of this EIAR). There is potential for this threshold to be exceeded during the construction phase of the apartment block due to necessary rock breaking works. Therefore, it will be necessary to carry out vibration monitoring during this phase to ensure that the threshold of 3 mm/s PPV is not exceeded. Vibration monitoring will be carried out at the grotto site located to the north-east of the apartment block (southern end of the site) to ensure the applied threshold is not exceeded since the grotto has been identified as a vulnerable structure.

15.2.8.3 Operational Phase – Mitigation Measures

At the detailed design stage, best practice measures relating to building services plant will be taken to ensure there is no significant noise impact on noise-sensitive locations. Best practice measures in this context include the following:

- Where ventilation is required for plant rooms, consideration will be given to acoustic louvers or attenuated acoustic vents, where required, to reduce noise breakout;
- Ventilation plant serving plant rooms and car parks will be fitted with effective acoustic attenuators to reduce noise emissions to the external environment;
- The use of perimeter plant screens will be used, where required, for roof-top plant areas to screen noise sources;
- The use of attenuators or silencers will be installed on external air-handling plant;
- All mechanical plant items, e.g. fans, pumps etc., shall be regularly maintained to ensure that excessive noise generated by worn or rattling components is minimised;

- Any new or replacement mechanical plant items, including plant located inside new or existing buildings, shall be designed so that all noise emissions from site do not exceed the noise limits outlined in this document;
- Installed plant will have no tonal or impulsive characteristics when in operation,

15.2.9 Cultural Heritage

15.2.9.1 Construction Phase – Mitigation Measures

15.2.9.1.1 Archaeology

Given the scale and extent of the proposed development works within undeveloped greenfield areas, a programme of archaeological investigations, to comprise a geophysical survey of such areas followed by targeted archaeological test trenching, will be undertaken prior to the commencement of the construction phase. The presence of woodland and thick overgrowth within the southern end of the proposed development will act as a constraint for carrying out pre-development geophysical and test trenching investigations in this area.

All vegetation clearance and ground works within this area will be, therefore, subject to constant archaeological monitoring during the construction phase. These works will be carried out by a suitably qualified archaeological specialists under licences issued by the National Monuments Service. In the event that any previously unrecorded archaeological or cultural heritage features are identified during these site investigations, they will be recorded and left to remain in situ within cordoned off areas while the National Monuments Service and the Cork County Council Archaeologist are consulted to determine further mitigation measures which may entail preservation by avoidance or preservation by record through systematic archaeological excavation.

There are a number of obligatory processes to be undertaken as part of archaeological licence applications and these will allow for monitoring of the successful implementation of the archaeological mitigation measures. Method statements detailing the proposed strategy for site investigations will be submitted for approval to the National Monuments Service as part of the licence applications. These will clearly outline the proposed extent of works and outline the consultation process to be enacted in the event that any unrecorded archaeological sites or other features of cultural heritage significance are identified, including remains of the rock garden features within the southern end of the proposed development.

A report will be compiled on all site investigations which will clearly present the results in written, drawn and photographic formats. Copies of these reports will be submitted to the National Monuments Service, Cork County Council and the National Museum of Ireland. In the event that any sub-surface archaeological deposits, features or artefacts are identified during site investigations the

Planning Authority and the National Monuments Service will be consulted to determine further appropriate mitigation measures.

15.2.9.1.2 Architectural Heritage

The locations of the remnant boundary features associated with the former Anne Mount House property, which now form garden boundaries of modern detached houses adjoining the north end of the proposed development will be cordoned off for the duration of the construction phase.

15.2.9.1.3 Undesignated Cultural Heritage Assets

The following mitigation measures (derived from an outline conservation method statement contained in Appendix 11.3) will be adopted during the construction phase to ensure the protection of the extant grotto feature within the southern end of the proposed development

- Preliminary Works
 - The principal requirement will be the demarcation and protection of the structure prior to commencement of any site development works. Given the overgrown nature of the structure, it is easily overlooked and consequently vulnerable to inadvertent damage through tree-felling and machine/plant movements.
 - A masonry conservation specialist shall be appointed to oversee the demarcation and vegetation clearance for the creation of a buffer/protection zone. A tree surgeon will undertake targeted tree-felling within the environs under the supervision of the conservation specialist, if required. At later stages of the works, the protection/buffer zone will provide protection from construction activity/traffic associated with the wider site. The fencing will also control access mortar mixing area and storage of materials.
 - The structure will be demarcated by buffer zone consisting of a temporary demountable fence (i.e. "Heras" fence or similar) that provides a minimum of 2.7 metres clearance around the structure. To achieve the clearance to erect the fence line, trees and shrubbery within the buffer zone will be cut back, taking due care to prevent damage to structure. No removal of embedded roots (or grubbing up of the ground surface) will be undertaken without the express consent/approval from the masonry conservation specialist.
 - On the removal of the vegetation to expose the structure, a full appraisal of the structure, including the compilation of detailed drawn and photographic records, will be undertaken by the masonry conservation specialist. If necessary, scaffolding will be erected to provide safe access to the upper portions of the structure. Following such an appraisal the masonry specialist will specify any required additional and/supplementary conservation measures.

- Guidance for conservation works
 - A suitably experienced masonry contractor shall be appointed to undertake the conservation of the grotto structure. The contractor shall have demonstratable experience of the repair of dry-stone walling and the use of traditional lime mortars; the contractor will be directed and supervised by the client's masonry conservation specialist.
 - Mortar has been used within the core of the walls to provide a key for walling material; however, the walling has a drystone appearance that is imperative to retain. To provide a sound base for the replacement any mortar, it will be necessary to remove any decayed or defective mortar. The raking-out will be done with care to avoid damaging the edges of the underlying stones. The aim is to reach the position where sound mortar remains within the body of the walls. In the raking out process, power tools will not be used as they can be difficult to control and can badly damage or mark the remaining stonework.
 - In some localised areas, it may be necessary to dismantle and repair a particular loose section of the masonry. Dismantling will occur so that the stones are carefully laid out beside each other in the manner by which they were taken apart from the wall.
 - In preparation of mortar, it will be important to "batch" the volume of the lime, sand, and aggregates accurately so that the successive mixes can follow the same proportions.
 - As works progresses care will be exercised to finish off the appearance of the structure in such a way as to match the original. The dry-wall appearance will be retained/maintained.
 - Works will not be carried out in extreme weather conditions, and particular care needs to be exercised if work is being carried out when there is a risk of frost. In such cases, some form of insulation should be provided to protect the wall face that has been worked on. Usually this is provided by hessian sheets. Equally, care needs to be exercised during repointing works when heavy rain is expected. In extremely hot weather intermittent gentle spraying with clean, or covering the work with dampened hessian, will help prevent too rapid drying.

15.2.9.1.4 Construction Phase - Monitoring Measures

As detailed in the CEMP, the Contractor must adhere to the vibration limits set out in the CEMP and described in Chapter 10 of this EIAR. In order to ensure that the site activities are conducted to minimise the vibration impacts on the existing grotto, vibration monitoring shall be conducted during the course of the works associated with the proposed apartment block and path through the site to the south of 'the Terrace'. It is proposed that vibration monitoring will be conducted using calibrated vibration monitors and geophones and that audible and visual alarm units are installed to ensure if vibration levels

approach or exceed the specified limits, site personnel will be alerted to cease at the earliest instance and appropriate mitigation measure may then be implemented to minimise the vibrational impact on the existing grotto structure.

15.2.10 Air Quality & Climate

15.2.10.1 Incorporated Design Mitigation

The proposed development has been designed so as to reduce the impact on climate as much as possible during operation. The accompanying Energy Statement (Appendix 12-4) details a number of design measures that have been considered in order to reduce the impact on climate wherever possible. Such measures include:

- The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards;
- A renewable energy rating (RER) of 20% will be achieved to comply with Part L (2019) of the NZEB regulations;
- Minimising heat loss where possible;
- Provision of electric car charging points;
- Rainwater harvesting system;
- Design of glazing to maximise solar heat gain.

The following heating and renewable strategies are also being considered for use:

- A Mono-Bloc heat pump (MBHP);
- Split-Bloc heat pump (SBHP);
- Air to Air Heat Pump (AAHP);
- Ground Source Heat Pumps;
- Photovoltaic (PV) systems.

These measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Cork County Council Draft Climate Adaptation Strategy.

In addition, adequate attenuation and drainage have been incorporated into the design of the development to avoid potential flooding impacts as a result of increased rainfall events in future years. This includes for drainage system and attenuation storage design allow for a 20% increase in rainfall intensities, as recommended by the GSDS.

15.2.10.2 Construction Phase – Mitigation Measures

15.2.10.2.1 Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. A dust management plan will be implemented onsite. The main contractor will be responsible for the coordination and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in Appendix 12.3 (Volume III). These measures will be incorporated into the overall CEMP for the site.

In summary the measures which will be implemented will include:

- Drop heights from conveyors, loading shovels, hoppers and other loading equipment will be minimised, if necessary fine water sprays will be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- When conditions are such that there is a risk of trackout of dust (i.e. very dry or muddy), vehicles exiting the site shall make use of a wheel wash facility prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted through speed limit implementation, and this speed restriction will be enforced rigidly. On any site roads, this will be 20 kmph.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust and other dust generating activities will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

15.2.10.2.2 Climate

Impacts to climate during the construction stage are predicted to be imperceptible however, good practice measures can be incorporated to ensure potential impacts are lessened. These include:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.
- 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.

15.2.10.3 Construction Phase – Monitoring Measures

Monitoring of construction dust deposition at locations along the site boundary close to the 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 2m above ground level. The TA Luft limit value is 350 mg/(m²*day) during the monitoring period between 28 - 32 days.

15.2.10.4 Operational Phase – Mitigation Measures

The impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no additional site specific mitigation measures are required.

15.2.10.5 Operational Phase – Monitoring Measures

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

