Castlelands LRD, Mallow

Main Statement

Volume II

October 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

Castlelands LRD, Mallow

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CHAPTER 1

Introduction

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1 Introduction

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) sets out the results of the environmental assessments which have been completed for the proposed development to inform the planning consent process.

The assessment has been completed as a statutory environmental assessment. The environmental impact assessment process has been completed in line with Directive 2014/52/EU, based on the guidance presented in the Guidelines on the Information to be Contained in the Environmental Impact Assessment Reports (EPA, 2022).

EIA is a process for anticipating the effects on the environment caused by a development. The document produced as a result is termed the EIAR. Article 1(2)(g) of the 2014 Directive (2014/52/EU) states that:

> *"Environmental Impact Assessment means a process of consisting of:*
>
> *(i) The preparation of an environmental impact assessment report by the development, 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 present 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 decision referred to in Article 8a."*

The EIAR is a presentation of the potential environmental impacts of the proposed development with a focus on significant impacts.

This Chapter 1 introduces the project and describes the scope and methodology of the EIA process. The consultation process which was undertaken is outlined and the details of the environmental assessment team are also provided.

1.1.1 The Applicant

The applicant is Reside (Castlepark) Ltd. They are seeking permission for this large scale residential development to complete the existing housing development to the west.

1.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy. Saoirse holds a Bachelor's degree in Arts (International), majoring in Geography, and a Master's in Planning and Sustainable Development. She has over 5 years' experience working with multi-disciplinary teams and has provided input into a variety of projects. In particular, she has co-ordinated the preparation of the following three Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Population and Human Health, and Screening for Major Accidents chapters.

- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Bennetstown Large Scale Residential Development, Dunboyne, Co. Meath
- Clonmagadden Sheltered Housing Development, Navan, Co. Meath

1.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Development Description' of this EIAR.

In summary, the proposed Large Scale Residential Development will consist of the construction of 469 no. residential units, a creche, a café/interpretive centre and all associated site development works.

Figure 1.1 Site Layout Plan prepared by Deady Gahan (extract from Housing Quality Assessment)

1.4 Background and Purpose of the EIAR

The proposed development falls within the class of development types requiring an EIA under Schedule 5 of the Planning and Development Regulations 2001 (as amended). The proposed development is subject to Part 2 of this Schedule which deals with infrastructure projects where EIA is required for:

> *10. b (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).*

The proposed Large-Scale Residential Development (LRD) comprises the construction of 469 no. residential units, creche and ancillary/associated development on a gross site area of 18.2ha. An EIAR is therefore required as the LRD comprises urban development on a site area that exceeds the 10ha threshold in a built up area for a mandatory EIAR.

The criteria for assessing whether a development would or would not be likely to have significant effects on the environment is outlined in Schedule 7 of the 2001 Regulations and require the submission of information on the following:

- Characteristics of the proposed development
- Location of the proposed development, in terms of environmental sensitivity of geographical areas likely to be affected by the proposed development and
- Characteristics of the proposed impacts, in terms of the potential significant effects of the proposed development.

1.5 Methodology

This chapter has been prepared pursuant to Schedule 6 of the Planning and Development Regulations 2001 (as amended). Section 2 of the Schedule 6 sets out the additional information relevant to the specific characteristics of the project required, which includes a description of the likely significant effects on the environment of the proposed development.

1.5.1 Relevant Legislation & Guidance

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA), May 2022).
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).
- EU Environmental Impact Assessment of Projects: Guidance on the Preparation of Environmental Impact Assessment Report (EU, 2017).
- EU Environmental Impact Assessment of Projects: Guidance on Scoping (EU, 2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (OPR, 2018).

1.5.2 Site Surveys/Investigation

Site surveys and investigations were carried out as relevant and required by the various disciplines to inform the relevant EIAR chapters.

1.5.3 Description of Impacts

The significance of the effects of the development have been assessed according to the EIAR guidance and with the professional judgement of the competent experts who assisted in preparing this EIAR (the study team are presented in Table 1.3 of this EIAR). In this EIAR the terms “effects” and “impacts” are used interchangeably, unless stated otherwise.

Significance of effects is usually understood to mean the importance of the outcome of the effects (the consequences of the changes). Significance is determined by a combination of (objective) scientific and subjective (social) concerns. The significance of effects for each discipline is described using the terms provided in the 2022 EPA Guidelines documents (Table 1.1 following).

Table 1.1 Description of Effects

Quality of Effects **It is important to inform the non-specialist reader whether an effect is positive, negative, or neutral.**	Positive Effect A change which improved the quality of the environment (for example, by increasing species diversity, of the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effect No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environmental (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Describing the Significance of Effects **"Significance" is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see Determining Significance below).**	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 effects An effect which caused noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant effects 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 alters most of a sensitive aspect of the environment.
	Profound effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects **Context can affect the perception of significance. It is importance to establish if the effect is unique of, perhaps, commonly, or increasingly experienced.**	Extent Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established(baseline) conditions (is it the biggest, longest effect ever?).
Describing the Probability of Effects	Likely Effects The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.

Descriptions of effects should establish how likely it is that the predicted effects will occur – so that the CA can take a view of the balance of risk over advantage when making a decision.	Unlikely effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects **'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.**	Momentary Effects Effects lasting from seconds to minutes
	Brief effects Effects lasting less than a day
	Temporary effects Effects lasting less than a year
	Short term effects Effects lasting one to seven years
	Medium term effects Effects lasting seven to fifteen years
	Long term effects Effects lasting fifteen to sixty years
	Permeant effects Effects lasting over sixty years
	Reversible effects Effects that can be undone, for example through remediation or restoration.
	Frequency of effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, months, annually).

1.5.4 Study Area

In general, the study area comprises the entire gross site area. However, the study areas are defined individually for each environmental topic, according to guidance and the geographic scope of the potential impacts and/or the information required to assess those impacts. Details are provided by each discipline as part of the description of baseline conditions of the site.

1.5.5 Scope of Cumulative Effects

Directive 2014/52/EU substituted a new Annex IV into the Directive 2011/92/EU. Annex IV of the EIA Directive is to be read in conjunction with Article 5(1) and sets out the information to be included in an EIAR. Annex IV was transposed into national law via Article 97 of the European Union (Planning and Development) (Environment Impact Assessment) Regulations 2018 (under the "2018 Regulations") which substituted a new Schedule 6 into the Planning and Development Regulations 2000, as amended. The Directive required that the EIAR described the cumulation of effects with other existing and/or approved projects. Cumulative effects may arise from:

> *"The interaction between the various impacts within a single project; - The interaction between all of the differing existing and / or approved projects in the same areas as the proposed project."*

In August 2018, the Department of Housing, Planning and Local Government issued Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. The Guidelines summarise cumulative effects in the following way on page 40:

> *"Effects are not to be considered in isolation but cumulatively i.e. when they are added to other effects. A single effect on its own may not be significant in terms of impact on the environment but, when considered together with other effects, may have a significant impact on the environment. Also, a single effect which may, on its own, have a significant effect, may have a reduced and insignificant impact when combined with other effect."*

Paragraph 2(i)(V) of Schedule 6 (paragraph 5(e) of Annex IV) provides as follows:

> *"The cumulative of effects with other existing or approved development, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources."*

The proposed development is located in Castlelands, Mallow, Co. Cork, to the immediate east of the existing Castlepark residential development. There are a number of applications within the immediate vicinity of the site and within the wider Mallow town area that are considered for cumulative impacts. The detail of these applications is provided in the table below:

Table 1.2 Projects Considered for Cumulative Impacts

	Reference	Development	Decision Details
1.	ABP Ref: JP04.320648	Section 177AE Application for 138 residential units and a creche on a developable area of 3.79ha on a total site area of 5.26ha on lands at Spa Glen, Mallow, Co. Cork.	Submitted: 23/08/2024. Decision Due: 17/02/2025
2.	24/4243; ABP 320525	LRD Application for 186 no. residential units at Spa Glen, Mallow, Co. Cork	Submitted: 14/02/2024 Granted: 19/07/2024 Appealed: 12/08/2024 Appeal Withdrawn: 01/10/2024
3.	24/5530	Construction of Creche to serve development at Annabella to replace previously permitted creche.	Submitted: 13/08/2024 Decision Due: 07/12/2024
4.	22/4676 ABP 315283	96 no. dwelling units at Old Course, Spa Glen, Mallow, Co. Cork.	Final Grant: 11/04/2024
5.	23/5952	Strategic Housing Development (SHD) Extension of Duration Application for 148 no. residential units and a creche. Original application: ABP 301429-18, amended by ABP 311986-21.	Granted: 17/01/2024
6.	22/6225	53 no. residential units at Ballydaheen Road, Ballydahin, Mallow.	Final Grant: 01/12/2023
7.	22/6156	Extension to Scoil Aonghusa CNS, Kingsfort Avenue, Castlepark Village, Castlelands.	Final Grant: 23/02/2023
8.	ABP 312640	Strategic Housing Development Application for 299 no. residential units at Annabella.	Granted: 27/05/2022

	Reference	Development	Decision Details
9.	21/5714	The construction of new prefabricated school building incorporating 4 general classrooms, office and toilet facilities, connection of foul and surface water sewer systems, relocation of existing car parking to existing tennis court along with all ancillary site works.	Final Grant: 06/01/2022
10.	23/5197	Extension of Duration Application for 16/6949/ABP 301221-18 application for 108 no. dwelling units and a creche.	Granted: 08/08/2023

Figure 1.2 Location of Applications Considered for Cumulative Impacts

1.5.6 Difficulties Encountered

Any limitations and/or difficulties encountered such as technical deficiencies or lack of knowledge in compiling the required information and the main uncertainties involved are outlined in each of the EIAR chapters, as relevant.

1.6 Report Structure

The EIAR has been prepared according to the 'Grouped Format Structure.' This means that each topic is considered as a separate section and is drafted by the relevant specialists.

The EIAR is divided into three volumes as follows:

- Volume 1: Non-Technical Summary

- Volume 2: Main Environmental Impact Assessment Report
- Volume 3: Appendices

Volume 1, the Non-Technical Summary (NTS), provides an overview of the project and the EIAR in non-technical terms, The summary is presented similar to the grouped format structure and discusses each environmental topic separately.

Volume 2, the main EIAR, provides the detailed information on the proposed development and the relevant environmental topics, with technical and detailed investigations of the topic areas as appropriate. This volume is prepared in the grouped format structure as it allows specialist studies to be completed for environmental topics in chapters.

Volume 3, the Appendices, contains supporting documentation and information on the EIAR.

1.7 EIAR Team

McCutcheon Halley Planning Consultants (MH Planning) are the planning consultants and project coordinators of the EIAR. The EIAR structure and consultant responsible for each of the chapters are presented in Table 1.3.

Table 1.3 EIAR Chapter List

Ch	Chapter Title	Consultant
1.	Introduction	MH Planning
2.	Site Location & Project Description	MH Planning
3.	Alternatives Considered	MH Planning/Deady Gahan Architects
4.	Population & Human Health	MH Planning
5.	Land, Soils & Geology	Enviroguide Consulting
6.	Hydrology & Hydrogeology	Enviroguide Consulting
7.	Air Quality	AWN Consulting
8.	Climate	AWN Consulting
9.	Noise & Vibration	AWN Consulting
10.	Landscape & Visual Impact	JBA Consulting
11.	Material Assets – Traffic & Transport	PUNCH
12.	Material Assets – Service Infrastructure & Utilities	DOSA
13.	Biodiversity	Enviroguide Consulting
14.	Cultural Heritage & Archaeology	John Cronin & Associates
15.	Significant Interactions of Impacts	MH Planning
16.	Summary of Mitigation Measures & Monitoring	MH Planning
17.	Screening for Major Accidents	MH Planning

The details of each consultancy within the EIAR team are provided in the table below. The qualifications of consultants responsible for each discipline is provided in the introduction to each chapter.

Table 1.4 EIAR Team Consultancy Details

Consultancy	Address	Phone	Email
MH Planning	6 Joyce House, Barrack Square, Ballincollig, Cork.	021 4208710	info@mhplanning.ie
Enviroguide Consulting	Head Office, 3D, Core C, Block 71, The Plaza, Park West, Dublin 12.	01 5657430	info@enviroguide.ie
AWN Consulting	The Tecpro Building, Clonshaugh Business and Technology Park, Dublin 17	01 8474220	Ciara.nolan@awnconsulting.ie
John Cronin & Associates	3a, West Point Trade Centre, Ballincollig, Cork.	021 4810311	info@johncronin.ie
JBA Consulting	24 Grove Island, Corbally, Limerick, V94 312N	061 579400	info@jbaconsulting.ie
PUNCH Consulting Engineers	Elm Court, Boreenmanna Road, Cork, T12 HHW2, Ireland	021 4624000	cork@punchconsulting.com
DOSA Consulting Engineers	Joyce House, Barrack Square, Ballincollig, Cork.	021 4871781	info@dosa.ie

1.8 Scoping and Public Consultations

The EIAR was scoped following an appraisal of the 2022 EPA Guidelines on Information to be contained within the EIAR, through design team meetings with the specialist consultants and the pre-planning meetings held with Cork County Council.

Prior to lodging this application, the required information has been issued to the Department of Housing, Planning and Local Government's EIA Portal. The purpose of this tool is to inform the public in a timely manner, of applications that are accompanied by an EIAR.

The following prescribed bodies have been consulted in relation to the general scope of the EIAR.

- Department of Housing, Local Government, and Heritage
- Department of Tourism, Culture, Arts, Gaeltacht, Sport & Media
- Department of Education
- Geological Survey Ireland (Department of the Environment, Climate and Communications)
- The Heritage Council
- Office of Public Works (OPW)
- Transport Infrastructure Ireland (TII)
- The National Transport Authority (NTA)
- The Health and Safety Authority (HSA)
- The Health Service Executive (HSE)
- Inland Fisheries Ireland

- Bat Conservation Ireland
- Uisce Éireann
- An Taisce
- Bord Gais
- ESB
- Environmental Protection Agency
- Fáilte Ireland

Responses received are presented in Appendix 1.1

1.9 References & Sources

Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency (EPA), May 2022); https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003). https://www.epa.ie/publications/monitoring--assessment/assessment/advice-notes-on-current-practice-in-the-preparation-of-environmental-impact-stat.php

EU Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EU, 2017). https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf

EU Environmental Impact Assessment of Projects: guidance on Scoping (EU, 2017). https://ec.europa.eu/environment/eia/pdf/EIA_guidance_Scoping_final.pdf

Guidelines for Planning Authorities and An Bord Pleanála on carrying our Environmental Impact Assessment (OPR, 2018). https://www.opr.ie/wp-content/uploads/2019/08/2018-Environmental-Impact-Assessment-1.pdf

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Volume II

Main Statement

CHAPTER 2

Site Location & Project Description

Ocotober 2024

McCutcheon Halley
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2 Site Location & Project Description

2.1 Introduction

According to the EIA Directive, an EIAR must provide a project description that includes information on the project's site, design, scale, and other relevant elements. The 2014 Directive stipulates in Recital 22 that:

> *"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 complies with the EIA Directive's criteria by giving information about the proposed project's location, size, and features.

2.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy. Saoirse holds a Bachelor's degree in Arts (International), majoring in Geography, and a Master's in Planning and Sustainable Development. She has over 5 years' experience working with multi-disciplinary teams and has provided input into a variety of projects. In particular, she has co-ordinated the preparation of the following three Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Population and Human Health, and Screening for Major Accidents chapters.

- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Bennetstown Large Scale Residential Development, Dunboyne, Co. Meath
- Clonmagadden Sheltered Housing Development, Navan, Co. Meath

2.3 Methodology

2.3.1 Relevant Legislation & Guidance

The relevant guidelines to the development of the built environment in Ireland are referenced by the architect. The following documents are among them:

- National Planning Framework 2040
- Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities, January 2024
- Quality Housing for Sustainable Communities
- Design Manual for Urban Roads and Streets (DMURS)
- Cork County Council Development Plan 2022-2028

2.3.2 Site Surveys/Investigation

The site's layout and design has been informed by site surveys completed as part of this EIAR and the planning application.

2.4 Difficulties Encountered

The subject site presented a number of design challenges which the design team has sought to resolve through our collaborative design process:

- Reaching an appropriate balance between current planning policy requirements while respecting the existing residential scale and context.
- Designing an appropriate drainage solution responding to both site conditions and existing limitations.
- Creating a scheme that minimised any potential impact on the Blackwater SPA located to the south of the site.

2.5 Baseline Environment

2.5.1 Site Location

The subject site is located within the townland of Castlelands, to the east of the town centre, and within the defined development boundary of, Mallow, Co. Cork.

The existing Castlepark Estate is to the immediate west of the site and the recently constructed Scoil Aonghusa Community National School is located to the immediate north of the site. The lands to the east and south consist of greenfield lands.

Figure 2.1 Site Location

2.5.2 Zoning

The subject site is zoned 'Residential.' Objective MW-R-01 applies to the subject site which has the following objective:

> *"Medium A Density Residential Development. Proposals will give appropriate consideration to archaeology on the site and seek to maximise physical and ecological connectivity of the site to the Blackwater Amenity Corridor. ^TIA and RSA required."*

The lands to the south of the masterplan area are zoned for Green Infrastructure. The Blackwater River Corridor further south is designated as a Special Area of Conservation (SAC).

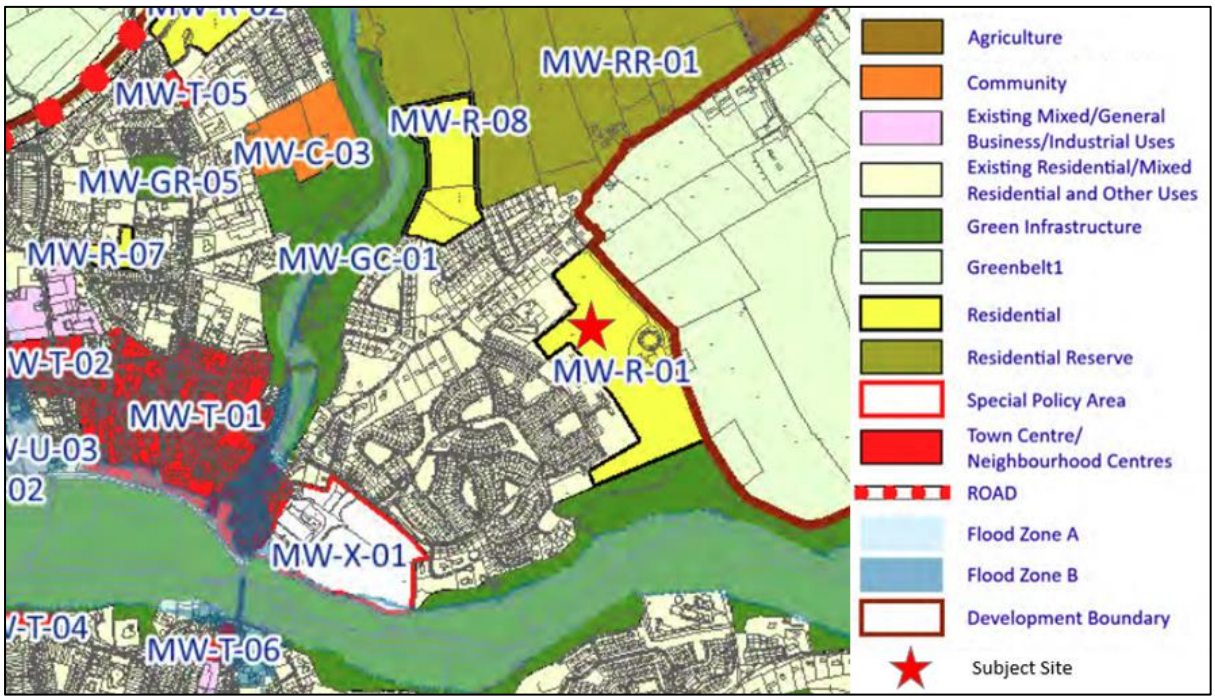

Figure 2.2 Location of Subject Site on Land Use Zoning Map in Volume 3

2.6 Proposed Development

The proposed development consists of:

- 469 no. residential units comprising 305 no. houses and 164 no. duplex/apartments.
- A 788.6sqm creche providing 122 no. childcare spaces and including a community room on the ground floor of the building.
- The redevelopment of the existing gate lodge to provide an interpretive centre and café.
- Landscaping and boundary treatments.
- The provision of wastewater treatment system.
- All associated site development works.

An overview of the key development statistics is set out in the table below:

Table 2.1 Development Overview

Development Statistics	
Gross Site Area	18.2ha
Net Site Area	12.7ha
Residential Units	469 no. residential units
Creche	788.6sqm creche (122 no. children)
Unit Mix	68 no. 4 beds; 192 no. 3 beds; 124 no. 2 beds; 85 no. 1 beds.
Density	36.9uph
Houses	305 no. houses
Apartment Duplexes	164 no. apartment duplexes
Building Height	1-3 no. storeys
Car Parking	589 no. car parking spaces
Cycle Parking	498 no. cycle parking spaces
Public Open Space	17.5% public open space
Communal Open Space	2,225sqm
Dual Aspect Units	100% dual aspect
Plot Ratio	0.38
Site Coverage	15.6% gross site area; 22.4% developable area

2.6.1 Layout

The proposed development will function as an extension of the existing Castlepark housing development to the immediate west.

The layout has been informed by the archaeological features located within and adjacent to site.

One archaeological feature is located outside the site area to the east. An appropriate buffer to this archaeological feature has been maintained by providing open space along the site boundary and placing the proposed streets and houses outside the buffer area.

The second archaeological feature is located within an open space area that was provided as part of the adjacent housing development. The proposed layout maintains and extends this open space to ensure an appropriate buffer area is provided to the archaeological feature.

The creche building is located to the east of this open space area and has been designed to provide a focal point to the scheme. The community room within the creche will ensure that the building can provide multiple functions for the wider community.

The layout has also been informed by the Blackwater River and existing public park located to the south. The proposed site layout provides an extension to the existing public park, with apartments and duplexes located along the southern boundary to residential zoned lands. This will provide a strong frontage to the public park, ensuring a strong sense of safety and passive surveillance. It will also provide the apartments and duplexes with pleasant views and easy access to the public park and riverside.

A greenway route is provided through the site which will provide a central spine of open spaces connecting the public park to the south with the open spaces by the creche and archaeological features.

The location of the national primary school to the immediate north of the site has also been a key factor in layout design. The proposed houses along this boundary have been orientated to minimise overlooking between the homes and the school.

Figure 2.3 Site Layout Plan prepared by Deady Gahan (extract from Housing Quality Assessment)

2.6.2 Unit Mix and Type

The proposed development includes a mix of terraced, semi-detached, and detached houses, and duplex-apartments. The unit mix is shown in the table below:

Table 2.2 Unit Size and Breakdown

Unit Size	Number	%	Unit Type Breakdown
1 bed	85	18.12%	82 no. apartments (96.47%) 3 no. houses (3.53%)
2 bed	124	26.44%	82 no. apartments (33.87%) 42 no. houses (66.13%)
3 bed	192	40.94%	192 no. houses (100%)
4 bed	68	14.50%	68 no. houses (100%)
Total	469	100%	164 no. apartments (34.97%) 305 no. houses (65.03%)

2.6.3 Creche / Community Room

A creche measuring c. 788.6sqm with 122 no. childcare spaces is provided in the north-western portion of the site.

This creche building is 1-2 storeys and the layout has been carefully designed to provide an active frontage to the surrounding public realm and provide a strong focal point within the scheme.

A community room is provided on the ground floor of the building, which has its own external access. This room will serve as a multi-functional room that can be used by the wider community. It can also function as an additional room for the creche during the creche opening hours.

The creche's location provides easy, safe, access to the existing primary school to the north and the proposed opens spaces to the south and west. The orientation of the building and the play spaces has been carefully considered to ensure the provision of a high-quality environment.

Figure 2.4 Extract from Creche Site Plan and 3D Render

2.6.4 Interpretive Centre/Café

There is an existing former lodge located to the south of the site, within the zoned public open space lands, which is currently vacant and derelict.

The proposed development includes the refurbishment and conversion of this former lodge into an interpretive centre and café. This will provide additional community space for both the proposed residential development and the wider community.

Figure 2.5 Extract from Architect's Design Statement providing details of lodge conversion

2.6.5 Landscape and Open Space

2.6.5.1 Public Open Space

Approximately 6.52ha of public open space is provided throughout the site.

Approximately 2.22ha of this is provided within the net developable area which equates to 17.5% net site area. This public open space is dispersed throughout the site to ensure easy access for all residents. Amenity pathways are provided throughout the open spaces to provide alternative walking routes and to connect the green spaces as much as possible.

The landscaped area to the south of the site is zoned public open space and therefore is excluded from the net site area. This area will provide a c. 4.3ha public park. This public park connects with the existing public park located along the northern side of the River Blackwater and connects with Mallow Town centre to the west.

2.6.5.2 Communal Amenity Space

Communal amenity spaces have been provided for the apartments-duplexes in line with the 2023 Apartment Guidelines.

These communal amenity spaces are provided in courtyard areas which are overlooked by the proposed apartments.

A total of 2,225sqm communal open space is provided which exceeds the 984sqm required. This communal open space is provided in 5 no. separate spaces varying in size from 185sqm to 780sqm.

2.6.5.3 Private Amenity Space

Private amenity space is provided for all of the proposed houses and apartments/duplexes. The houses are provided with rear gardens while the apartments/duplexes are provided with either ground floor terrace/patio areas or first floor balconies. These spaces have all been designed in accordance with the relevant guidelines and requirements.

2.6.5.4 Boundary Treatment

The Proposed Internal Boundary Treatment Plan (drawing number: 23107/P/005) prepared by Deady Gahan Architects provides details of the internal boundary treatments.

The boundaries around rear gardens will comprise 1.8m high post and panel fence, and 1.8m high concrete block wall rendered and capped to public face where applicable.

The boundaries between adjacent houses will comprise a 1.8m high fair faced concrete block wall.

The boundaries around the private amenity space of the apartment-duplexes will consist of 0.8m high concrete block wall rendered and capped with 1m high railing above and hedge for privacy.

2.6.6 Parking

The proposed development includes a total of 589 no. car parking spaces and 498 no. cycle parking spaces.

Car parking spaces are provided at a rate of 2 no. spaces per 4 bed house, 1 no. space per 1/2/3 bed house, and 0.8 no. spaces per apartment. 41 no. accessible and short stay E.V. car parking spaces, 23 no. visitor car parking spaces, and 14 no. creche parking and drop-off spaces are provided.

Cycle parking spaces are provided at a rate of 1 no. space per bedroom for the 1/2/3 bed mid terrace townhouse units, the bungalow, and the duplex apartment Type M and N units.

The semi-detached, end of townhouse, and end ground floor apartments have direct access to their private amenity space and as such dedicated bike stores are not provided for these units.

Cycle parking spaces are provided at a rate of 1 no. space per bed and 1 space per 2 apartments units for the duplex apartment type K units. Visitor cycle parking spaces is provided at a rate of 1 space per 5 no. housing units and 1 space per 2 type M and N apartment units.

12 no. covered cycle parking spaces, and 3 no. secure cargo bike spaces are provided for the creche.

Table 2.3 Proposed Parking Provision

	Car Parking Spaces	Cycle Parking Spaces
Total Private Parking Spaces	507 no.	399 no.
Accessible and Short Stay EV Spaces	41 no.	N/A
Visitor Parking	23 no.	84 no.
Creche Parking and Drop Off	14 no.	15 no. (incl. 3 no. cargo)
Total Parking	**589 no.**	**498 no.**

2.6.7 Access

Vehicular, pedestrian, and cyclist access to the site will be provided through the existing housing development located to the east.

Two existing spurs off Kingsfort Avenue, off St. Joseph's Road, will provide two access points into the site. The third vehicular access will be provided south of the junction of Maple Square with Kingsfort Avenue.

A separate pedestrian/cyclist connection to the site will be provided through the existing and proposed public park area to the south. The proposal includes a pathway through the site that will connect with the existing pathways, providing a safe, alternative route from the site to the town centre.

2.6.8 Drainage

2.6.8.1 Wastewater

A Pre-Connection Enquiry was submitted to Irish Water. The Irish Water Reference Number for this enquiry is CDS22002703. The response to this Enquiry was issued by Irish Water on 25th September 2024. This confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network could be facilitated.

The Applicant has the relevant control and authority to undertake any infrastructure upgrades which may be identified by Uisce Eireann as part of the connection application. The Applicant is in a position to obtain all necessary quality assurances, wayleaves, easements, confirmation of capacity and permissions with regard to infrastructure connections to the development

2.6.8.2 Surface Water

The subject lands are drained naturally and have the benefit of direct access to the public stormwater network in the existing estate.

Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control devices (Hydrobrakes or equivalent) and associated detention basins. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site).

The proposed surface water drainage network will collect surface water runoff from the site via a piped network prior to discharging off site via the detention basins, flow control devices and separator arrangement as noted above. Surface water runoff from the site's road network will be directed to the proposed pipe network/ constructed swales in green areas via conventional road gullies with additional surface water runoff from driveways and roofs also routed to the proposed surface water pipe network.

The site's surface water management infrastructure has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS).

2.6.8.3 Sustainable Urban Drainage Systems (SuDS)

The SUDS selection process used for this site is in accordance with SUDS selection flow chart, Volume 3, Section 6.5, Figure 48 of the GDSDS. The characteristics of the site are utilised to select the various SUDS techniques that would be applicable.

The SuDS treatment train approach proposed includes permeable paving, rainwater harvesting, filter drain, detention basin, flow control devices, petrol interceptor, swales, management train.

2.6.8.4 Water Supply

As with the drainage network, a Pre-Connection Enquiry was submitted to Irish Water under Reference No. CDS22002703. This confirmed that, subject to a valid connection agreement being put in place, the proposed connection to the Irish Water network could be facilitated.

It is proposed to provide a new 100mm/150mm (internal diameter) connection to the public watermain on the adjacent Castlepark estate Road with associated valves and metering requirements. Internally within the development it is proposed to have a series of 100mm Ø branches and loops with associated hydrants, valves, and metering requirements.

2.7 Construction Stage

The construction of the proposed development is expected to take approximately 96 months as follows:

- Phase 1A: 12 months
- Phase 1B: 12 months
- Phase 1C: 18 months
- Phase 2: 30 months
- Phase 3: 24 months

2.7.1 Construction Site Establishment

A temporary site compound will be set up during the construction stage of the works, which will be located in the northern corner of the site, with construction access provided from St. Joseph's Road to the north. Construction support activities, including offices and welfare facilities, will be contained within the site compound.

Proposed works will include construction of a site compound, perimeter hoardings, provision of site security and access points, and erection of cranes, as necessary. Safeguards will be put in place to protect the site, the works, materials and plant. Existing buildings, persons and access will be protected during the works.

Hoarding will be required to secure the entire site boundary. The hoarding will reach a height of approximately 2.4m and will be secure and non-climbable.

It is envisioned that vehicle gates with barriers will be accommodated at a security hut to control pedestrian and vehicle access.

Safety and ease of access to the site are to be provided for by the Main Contractor when planning the works. Separation of vehicular and heavy plant traffic from pedestrians and operatives will be implemented as far as is practical when considering the layout of the site infrastructure and access points.

2.7.2 Working Hours

The maximum working hours during the construction phase will be 08:00 to 18:00 Monday to Friday (excluding bank holidays) and 08:00 to 14:00 Saturdays. It is not expected that work will take place on Sundays or Bank Holidays.

2.7.3 Demolition

The proposed development includes the removal of a small portion of the existing former lodge, in the south-western corner of the site. It is expected that the waste generated from this demolition will be limited.

2.7.4 Construction Sequencing and Phasing

The construction will be carried out in 5 phases as follows:

- Phase 1A comprising 49 no. residential units, the greenway connection, and the public park.
- Phase 1B comprising the creche and 49 no. residential units.
- Phase 1C comprising 90 no. residential units and the interpretive centre/café.
- Phase 2 comprising 161 no. residential units.
- Phase 3 comprising 120 no. residential units.

2.7.5 Earthworks

During construction of foundations, underground services and utilities, and flood attenuation tanks, site earthworks will be required. Site investigations will be carried out by the contractor prior to construction. Any contaminated soils will be segregated and removed off-site in accordance with relevant waste legislation.

The programming and scheduling of earth works will be managed by the Main Contractor.

2.7.6 Traffic Management

One of the main construction traffic generating activities will be associated with the removal of surplus and waste material during the demolition and enabling works phases.

An Outline Construction Traffic Management Plan (OCTMP) has been prepared by PUNCH Consulting Engineers and submitted with the application.

2.7.7 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared by Enviroguide Consulting and submitted with the application. The construction and demolition phases will be carried out in accordance with the measures outlined in the CEMP.

In advance of construction works commencing onsite, the appointed Main Contractor will prepare a detailed Construction Traffic Management Plan (CTMP) taking account of the particulars of the grant of planning and in consultation with Cork County Council where necessary in advance of construction works commencing onsite.

All works will be undertaken in accordance with the procedures outlined in the CEMP to ensure the protection of local ecology or on any designated nature conservation sites associated with the Construction Phase of the Proposed Development.

2.7.8 Site Services and Waste Management

A Resource Waste Management Plan (RWMP) has been prepared by Enviroguide Consulting and submitted with the application. Waste generated during the construction and demolition phases will be managed in accordance with the measures outlined in the RWMP.

A dedicated, secure waste segregation area will be provided onsite for the duration of the demolition and enabling works. The dedicated waste storage areas within the Waste Segregation points will house all bins and skips for the storage of segregated construction waste generated. All containers will be marked with clear signage which will identify which waste types are to be placed into each container.

2.8 References & Sources

Deady Gahan 2021b, Architectural Design Statement

Deady Gahan, 2024a, Architectural Drawing Pack

DOSA Consulting Engineers, 2024a, Surface Water Management Plan

DOSA Consulting Engineers, 2024b, Infrastructure Report

Enviroguide, 2024a, Construction Environmental Management Plan (CEMP)

Enviroguide, 2024b, Resource Waste Management Plan (RWMP)

Enviroguide, 2024c, Operational Waste Management Plan (OWMP)

PUNCH Consulting Engineers, 2024, Outline Construction Traffic Management Plan

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Main Statement

CHAPTER 3

Project Need & Alternatives Considered

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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3 Project Need & Alternatives Considered

3.1 Introduction

Consideration of reasonable alternatives is an important aspect of the EIA process and is necessary to evaluate the likely environmental consequences of a range of development strategies for the site of the proposed development within the constraints imposed by environmental and planning conditions. This section provides a description of the reasonable alternatives that have to be considered.

The EIA Directive 2014/52/EU notes that the following is required in relation to the consideration of alternatives in the preparation of the EIAR:

> *'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 objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option.' It is generally sufficient to provide a broad description of each main alternative, and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option.

This section of the EIAR provides an explanation of the reasonable alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the proposed development, taking into account and providing a comparison of the environmental effects. The alternatives may be described under the following headings.

- Alternative locations
- Alternative designs
- Alternative layouts
- Alternative processes

Alternatives may also be described at six levels: do-nothing alternative, alternative locations, alternative layouts, alternative design, alternative processes, and alternative mitigation measures.

3.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy. Saoirse holds a Bachelor's degree in Arts (International), majoring in Geography, and a Master's in Planning and Sustainable Development. She has over 5 years' experience working with multi-disciplinary teams and has provided input into a variety of projects. In particular, she has co-ordinated the preparation of the following three Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Population and Human Health, and Screening for Major Accidents chapters.

- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Bennetstown Large Scale Residential Development, Dunboyne, Co. Meath
- Clonmagadden Sheltered Housing Development, Navan, Co. Meath

3.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Development Description' of this EIAR.

3.4 Methodology

The following factors have influenced the development of the proposed design:

- Guidance documents referred and their relevance to the proposed development.
- Analysis of the physical site context, including detailed topographical and site survey information.
- Planning history of the subject site and surrounding area.
- Collaboration with design team members and relevant departments of the Local Authority, with an iterative approach to design that addresses the requirements of all disciplines in a balanced manner.

3.4.1 Relevant Legislation & Guidance

The relevant guidelines to the development of the built environment in Ireland are referenced by the architect. The following documents are among them:

- National Planning Framework 2040.
- Quality Housing for Sustainable Communities, 2007.
- Cork County Development Plan 2022-2028.
- Design Manual for Urban Roads and Streets (DMURS), 2019.
- Sustainable Residential Development and Compact Settlements Guidelines, 2022.

3.5 'Do Nothing' Scenario and Alternative Locations

The Do-Nothing Alternative would see this residential zoned site remain an undeveloped greenfield site adjacent to the existing Castlepark housing development. The Do- Nothing Alternative would not help Mallow achieve its population and housing targets identified in the Cork County Development Plan 2022-2028.

The subject site belongs to Reside (Castlepark) Ltd. and is zoned for residential development. It is a greenfield parcel of land situated in an area which has already been developed for residential use. The site has access to infrastructure (drainage and transport), services and Mallow town centre via the existing footpath network along St. Joseph's Road to the north and the proposed pathways through proposed park to the south of the site.

Given the site is owned by the applicant, purchasing an alternative site with residential zoning/planning permission was discounted due to the unlikely availability of such a similar sized site

on the market and the levels of capital that would be required to purchase such a site. In addition, another site would not have the proximity to the Mallow town centre as well as other services and institutions in the area that would provide sustainable connectivity and community.

The development of this site will complete the improvement of the surrounding residential area. If the site was to remain undeveloped, it would place additional pressure on development of other zoned lands in order for Mallow to meet its housing and population targets.

The development of the site will create new landscaped spaces and amenities overlooked by houses which will promote active use and passive surveillance in this area. It will create new landscaped spaces, play areas, and a creche which will enhance the area and provide new connections through the site and parkland to the south.

Having regard to the above alternatives, the selected location is considered the most suitable location for the proposed development.

3.6 Alternative Uses

The proposed development is located in the townland of Castlepark within the town of Mallow, Co. Cork, which is zoned for residential development in the Cork County Development Plan 2022-2028 and is a key site in terms of Mallow reaching its housing/population allocation as set out in the core strategy of the plan.

The Development Plan notes that these areas are intended primarily for housing development but may also include uses such as creches, schools, nursing homes or homes for older people, open space, recreation, and amenity uses.

Therefore, the proposed residential development, which includes a creche, is considered an appropriate use for the subject site.

3.7 Alternative Processes

Due to the nature and scale of the proposed development (i.e. a residential development greater than 100 residential units), the only option is to submit a Large-Scale Residential Development planning application to Planning Authority. Therefore, there is no alternative process to consider.

3.8 Alternative Design/Layout

The layout of the proposed development went through a detailed design process with input from Cork County Council and the entire applicant's design team and the EIAR team.

Four alternative layouts (Alternatives A to D) were considered and presented to Cork County Council before the final layout (Alternative E) was developed. These five layouts are discussed below. Alternatives A and B were submitted with the Section 247 requests for the Phase 1 application, but the entire masterplan area was discussed at these meetings. Alternative C was submitted with the LRD S247 request for the full LRD site area.

3.8.1 Alternative A

Alternative A was presented to Cork County Council and discussed as part of the Section 247 meeting held on the 16th February 2023. This meeting was primarily to discuss the Phase 1 application which was submitted separately, and the masterplan layout was presented to demonstrate how the development of the entire site would integrate with Phase 1.

This initial masterplan layout included two sites. 'Site A' included a site adjacent to St. Jospeh's Road and the masterplan proposed a retail unit, offices, and a creche on this site. 'Site B' included the residential area, and the masterplan proposed a total of 430 no. units (comprising 330 no. houses and 100 no. apartments) on this site.

The Council provided feedback on this layout including the following key points:

- Opportunity for active travel and pedestrian/cycle connectivity to be incorporated.
- Green infrastructure and SuDS approach to inform layout.
- Requirement for net biodiversity gain.
- Buffer zones to be provided around archaeological features.
- Recommended that creche is relocated to a more integrated location.
- Layout and orientation of 3 storey blocks to be reconsidered in terms of daylight sunlight and recommended blocks should face each other in a courtyard layout.
- Poor sense of place and the centre of the scheme is not clear.
- Commercial proposal too large for the area.

The key site statistics for this alternative layout are provided in the table below and an extract from the site layout is provided on the following page.

Table 3.1 Key Site Statistics – Alternative A

Site Statistics	Alternative A – First Layout Submitted to Council
Site Area	32.6ha (gross) 13ha (net)
Total No. Units	430 no.
Houses	330 no. (77%)
Apartments	100 no. (23%)
Unit Mix Breakdown	Mix of 1 bed, 2 bed, 3 bed and 4 beds
Creche	800sqm (125 no. childcare spaces)
Retail	400sqm
Offices	400sqm
Density	33uph
Open Space	1.82ha (14%)

Figure 3.1 First Layout Submitted for Pre-Planning Discussions

3.8.2 Alternative B

Following the feedback received from the Council, Alternative A was developed further to provide Alternative B and was discussed with the Council in a second S247 meeting held on the 19th May 2023.

As with Alternative A, this S247 meeting was primarily to discuss the Phase 1 site area which has been submitted as a separate application, but the entire masterplan area was discussed.

Similar to Alternative A, this layout included two sites. 'Site A,' located adjacent to St. Joseph's Road, included office and retail space in a smaller scale than the previous iteration. 'Site B' included 492 no. residential units and the creche.

Key changes to this layout compared to Alternative A include the following:

- Relocation of the creche to a more central location.
- Reduction in office and retail space provided.

- Provision of additional open space as a buffer around the archaeological feature to the west.
- Amended open space to provide green route through scheme, improving connectivity through site.
- Amended to apartment block layout to provide apartments overlooking courtyard spaces.

The council provided feedback including the following key points:

- Road and car dominance near green areas to be reduced.
- Alternative car parking options, including communal car parking, to be explored.
- Area around creche to be defensible and space.

Table 3.2 below provides an overview of the site statistics for this alternative layout. An extract from the site layout submitted with this S247 request is provided on the following page.

Table 3.2 Key Site Statistics – Alternative B

Site Statistics	Alternative B – Second Layout Submitted to Council
Site Area	34.33ha 0.37ha (net developable area for neighbourhood centre development) 12.94ha (net developable area for residential development)
Total No. Units	429 no. units
Houses	333 no. houses (77%)
Apartments	96 no. apartments (23%)
Unit Mix Breakdown	Mix of 1 bed, 2 bed, 3 bed and 4 beds
Creche	770sqm (125 no. childcare spaces)
Retail	330sqm
Office	413sqm
Density	33.1uph
Open Space	1.94ha (15%)

Figure 3.2 Alternative B – Layout Submitted with Second Pre-Application Consultation Request.

3.8.3 Alternative C – LRD S247

The feedback received from the council was taken on board to develop Alternative C. This alternative layout was submitted to Cork County Council with an LRD S247 request for the development of the full masterplan area.

It is worth noting that at this point in the design process, it was decided that 'Site A' would form part of a separate future application, and that the LRD application would focus solely on 'Site B.'

The main changes to the layout for this alternative include the following:

- Removal of 'Site A' with office and retail space from application area.
- Amendment to creche building.
- Slight reduction in number of childcare spaces provided.
- Adjustments to unit types and unit mix.

This alternative provided the same quantum of residential units as Alternative B (429 no.) with a slightly higher proportion of houses and slightly less apartments. The developable area is slightly less than Alternative B which results in a slightly higher residential density.

The LRD meeting took place on the 3rd August 2023 and the council provided the following feedback:

- Car parking provision to be reduced to encourage modal shift to sustainable transport.
- Connect green link with existing development.
- Nature based SuDS to be provided.

Table 3.3 below provides an overview of the site statistics for this alternative layout. An extract from the site layout submitted with this LRD S247 request is provided on the following page.

Table 3.3 Key Site Statistics – Alternative C

Site Statistics	LRD S247 Proposals
Site Area	32.8ha (landholding) 12.9ha (developable area)
Total No. Units	429 no. units
Houses	341 no. houses (79.5%)
Apartments	88 no. apartments (20.5%)
Unit Mix Breakdown	44 no. 1 beds (10.3%) 87 no. 2 beds (20.3%) 212 no. 3 beds (49.4%) 86 no. 4 beds (20%)
Creche	789.6sqm (122 no. childcare spaces)
Retail	0sqm
Office	0sqm
Density	33.2uph
Open Space	15.3%

Figure 3.3 Layout submitted to Cork County Council for LRD S247

3.8.4 Alternative D – LRD S32B

Following the feedback received on Alternative C, the layout was further refined, taking into account the *Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities* which were published on the 15th January 2024.

Alternative D was submitted to Cork County Council with an LRD S32B meeting request on the 25th March 2024 and the LRD S32B meeting with Cork County Council was held on the 22nd April 2024.

This alternative included the following key changes, compared to Alternative C:

- Increase in the quantum of residential units from 429 no. to 463 no.
- Increase in density from 33.2uph to 35.9uph (on same developable area).
- Reduction in proportion of houses and increase in proportion of apartments.
- Inclusion of wastewater treatment plant (WWTP)

- Inclusion of former lodge building to provide interpretive centre and café.

Following this LRD meeting, Cork County Council issued their LRD Opinion on the 20th May 2024, which included the following comments on the layout submitted:

- Native planting in line with the All-Ireland Pollinator Plan to be provided.
- Bird watching tower to be removed.
- Lighting appropriate to Blackwater River SAC and bat commuting corridors to be provided.
- SuDS to reflect topography, geology, and drainage characteristics of site.
- Liaise with Uisce Éireann on requirement for WWTP.
- 3 storey duplex and apartment blocks to be revised.
- At least 4m width preferred for 'greenway' route.
- Details on archaeological buffers to be provided.

Table 3.4 below provides an overview of the site statistics for this alternative layout. An extract from the site layout submitted with this LRD S32B request is provided on the following page.

Table 3.4 Key Site Statistics – Alternative D

Site Statistics	LRD S32B Proposals
Site Area	17.9ha (gross) 12.9ha (net)
Total No. Units	463 no. units
Houses	291 no. houses (62.9%)
Apartments	172 no. apartments (37.1%)
Unit Mix Breakdown	86 no. 1 beds (18.6%) 117 no. 2 beds (25.3%) 184 no. 3 beds (39.7%) 76 no. 4 beds (16.4%)
Creche	788.6sqm (122 no. childcare spaces)
Retail	0sqm
Office	0sqm
Density	35.9uph
Open Space	15.5%

Figure 3.4 Alternative D - LRD S32B Layout

3.8.5 Alternative E – Final Layout

Following the LRD S32B meeting and the issue of the LRD Opinion, the layout was further revised to take on board all the comments and feedback received.

Alternative E represents the final layout which is submitted with this LRD application. This layout includes the following key changes from Alternative D:

- Slight increase in quantum of residential units from 463 no. to 469 no.
- Slight reduction in developable area from 12.9ha to 12.7ha.
- Increase in residential density from 35.6uph to 36.9uph.
- Increase in open space provision from 15.5% to 17.5%.

- Increase in proportion of houses and decrease in decrease in proportion of apartment-duplexes.
- Removal of WWTP
- Re-orientation of houses along eastern boundary to provide buffer to archaeological feature on adjacent site.
- Additional pedestrian link provided to the park area to the south of the site.

It is considered that this layout provides the most appropriate response to the site's context, taking into account all environmental constraints and relevant planning policy.

In addition, it is important to note that this final layout has been designed to connect seamlessly with the Phase 1 application which was submitted as a separate application (reference: 24/04519).

Table 3.5 below provides an overview of the site statistics for this layout. An extract from the final site layout submitted with this LRD application is provided on the following page.

Table 3.5 Key Site Statistics – Alternative E

Site Statistics	LRD Proposals
Site Area	18.2ha (gross) 12.7ha (net)
Total No. Units	469 no. residential units
Houses	305 no. houses (65%)
Apartments	164 no. apartment duplexes (35%)
Unit Mix Breakdown	85 no. 1 beds (18.1%) 124 no. 2 beds (26.4%) 192 no. 3 beds (40.9%) 68 no. 4 beds (14.5%)
Creche	788.6sqm (122 no. childcare spaces)
Retail	0sqm
Office	0sqm
Density	36.9uph
Open Space	17.5%

Figure 3.5 Alternative E – Final Layout

3.9 The Existence of the Project

The Construction Phase is expected to last approximately 72 months. For the duration of the Construction Phase of the proposed development there will be a short-term increase in construction employment in the area, which will have a positive impact, both directly and indirectly, on the local economy.

The Operational Phase of the proposed development will result in an increase in the population of the area, and it will have a positive impact on the long-term supply of housing in Mallow. In addition to housing construction, the proposed development will have the potential to create employment in the local area through the proposed childcare facilities. The provision of passive and active public open space with a mixture of recreational and amenity facilities will have a long-term, positive impact on the local human health and the socio-economic environment.

The primary likely significant environmental impacts of the proposed development are fully addressed in the relevant specialist Chapters of this EIAR. These impacts relate to Population & Human Health, Land & Soil, Hydrology and Hydrogeology, Landscape & Visual, Noise & Vibration, as well as Air Quality & Climate associated with the proposed development.

The proposed development has the potential for cumulative, secondary, and indirect impacts, these can be difficult to quantify due to complex inter-relationships. All interactions and cumulative impacts have been addressed in Chapter 15 Significant Interactions with cumulative impacts and interactions fully addressed in the relevant specialist Chapters of this EIAR.

3.10 Climate Change Preparation

The proposed scheme has been developed in consideration of future climate change impacts. All houses will feature high levels of insulation to maximise energy efficiency. The proposed layout has been developed to encourage pedestrian and cycle connectivity between neighbourhoods. The creche facilities have been located in a central location to reduce reliance on car trips.

Existing trees have been retained as far as practicable and will enhance the new neighbourhoods and landscaped open spaces. The play areas are located around existing trees to facilitate shading and create a high-quality natural environment for younger children. The proposed surface water drainage strategy has been designed to reflect future expectations relating to climate.

3.11 Conclusion

Throughout the design evolution of the subject site, the advantages and disadvantages of each early and alternative options were examined, with solutions considered in detail and the more favourable elements threaded through to the final and preferred strategy. As a result, it is our opinion that the proposed final layout and design strategy outlined in Figure 3.5 (i.e. Alternative E – Final Layout), is the most appropriate scheme with the highest quality of residential amenity and least environmental effects. The final scheme is consistent with both local and national planning policy and will create a new residential community with a strong identity, within a built-up urban environment.

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CHAPTER 4

Population and Human Health

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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4 Population & Human Health

4.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on population and human health that are note covered elsewhere in the EIAR. It also details the proposed mitigation measures where necessary. The potential impacts on, and mitigation measures for, population and human health were assessed under the following headings: Do nothing Scenario, Human Health (including health and safety), Population and Economic Activity, and Local Amenity.

4.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Aida Vaisvilaite, Planning Consultant of McCutcheon Halley Planning Consultancy, and Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy.

Aida holds a bachelor's degree in Arts, majoring in English, and a Masters in Planning and Sustainable Development. She has over 3 years' experience working with multi-disciplinary teams and has provided input on a variety of projects. In particular, she has prepared an EIA Screening report.

Saoirse holds a bachelor's degree in Arts (International), majoring in Geography, and a Master's in Planning and Sustainable Development. She has over 5 years' experience working with multi-disciplinary teams and has provided input into a variety of projects. In particular, she has co-ordinated the preparation of the following three Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Population and Human Health, and Screening for Major Accidents chapters.

- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Bennetstown Large Scale Residential Development, Dunboyne, Co. Meath.
- Clonmagadden Sheltered Housing Development, Navan, Co. Meath.

4.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Site Location and Project Description' of this EIAR. To summarise, the applicant seeks to apply for an LRD application, for the construction of 469 no. of residential units, a creche, an interpretive centre/café, and all associated site development works at Castlepark, Castlelands (townland), Mallow, Co. Cork.

4.4 Methodology

This chapter has been prepared pursuant to Schedule 6 of the Planning and Development Regulations 2001 (as amended). Section 2 of Schedule 6 sets out the additional information relevant to the specific characteristics of the project required, which includes a description of the likely significant effects on the environment of the proposed development resulting from, among other things;

(IV) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters).

The Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022) state that:

> *"… in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g., under the environmental factors of air, water, soil, etc."*

Recital 22 to the EIA Directive provides that:

> *"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."*

The EPA Advice Notes (EPA 2003) recommend considering the following issues when assessing the potential impacts and effects of a proposed development on Population and Human Health:

- Economic Activity Likely to Lead to Projects – Will the development stimulate additional development and/or reduce economic activity, and if either, what type, how much and where?
- Social Consideration – will the development change the intensity of patterns and types of activities and land use?
- Land Use – will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings?
- Tourism – will the development affect the tourism profile of the area?
- Health – have the vectors through which human health impacts could be caused been assessed, including adequate consideration of inter relationships between those assessments.

4.4.1 Relevant Legislation & Guidance

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002)
- Advise Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003)
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (EU, 2017).

4.4.2 Site Surveys/Investigation

The appraisal of the likely significant effects of the proposed development on population and human health was conducted by reviewing the current socio-economic environment in the EIAR study area. This comprised site visits and visual assessments of the proposed site and the surrounding area, as well as an analysis of aerial photography and Ordnance Survey (OS) mapping.

Information was gathered with respect to the demographic and employment characteristics of the resident population within the relevant catchment area, sourced from the 2016 and 2022 Census date.

The data included information on population, age profile, household size, number of persons at work, and the unemployment profile. A desktop study of the following documents and websites was also undertaken:

- Cork County Council Development Plan 2022 – 2028
- Central Statistics Office (CSO) website www.cso.ie;
- Department of Education and Sciences (DES) website www.education.ie

4.4.3 Consultation

Consultations with both the local authority and statutory bodies were also used to ensure that environmental issues, including socio-economic, recreational and amenity issues relating to the proposed development were addressed. Further information on the consultation process and responses received is provided in Appendix 1.1

4.5 Difficulties Encountered

No significant difficulties were encountered in accessing information during the preparation of this chapter.

4.6 Baseline Environment

The following provides a description of the receiving environment, with a focus on demography, land use and local amenity. The demographic profile of the Urbans Area within the study was examined utilising the CSO Census of Population Statistics dated 2022. Therefore, the data presented within this section reflects the most recent data available to the public.

4.6.1 Demography

4.6.1.1 Population

As per the 2022 Census, the population of the town of Mallow has been totalled to be 13,456 persons which is an 8% increase on the 12,459 population as per the 2016 Census figures. This growth figure is significant as the CSO statistics show that Cork County Council has seen a decrease in population between the years 2016 and 2022 by -13.68%. The Cork County Council Development Plan 2022 has allocated a target population growth of 15,351 persons to be and achieved by 2028 and estimates that 1,105 no. housing units will be required for the town.

The study area population is evenly split between males and females, with females constituting 51% and males accounting for 49% of the population.

The two largest age cohorts for the study area of Mallow are the 40-44-years-old (8.9%) and the 45-59-year-olds (8%). These two age cohorts are also the largest for County Cork. The two smallest age cohorts in the study area are the 0-years-olds (1.1%) and the 2-year-olds (1.2%). However, the opposite has been seen in County Cork, with the two smallest age cohorts in the county being the 80-84-year-olds (1.9%) and the 85-and-over-year-olds (1.7%). This suggests that Mallow has a significant portion of its population in the middle-aged group, which could imply a stable, possibly family-oriented community with many residents in their prime working years.

Figure 4.1 shows the population change figures by age cohort for period between 2016 and 2022 within the study area. The five age cohorts that recorded a decrease were the 0-4-year-olds (-23.3%), 5-9-year-olds (-9.4%), 25-29-year-olds (-14.9%), 30-34-year-olds (-15%) and 35-39-year-olds (-20.1%). The top four age cohorts by population increase were the 50-54-year-olds (+35.9%), 45-49-year-olds (+34.5%), 15-19-year-olds (+33.6%), and the 85-and-over-year-olds (+33.2%).

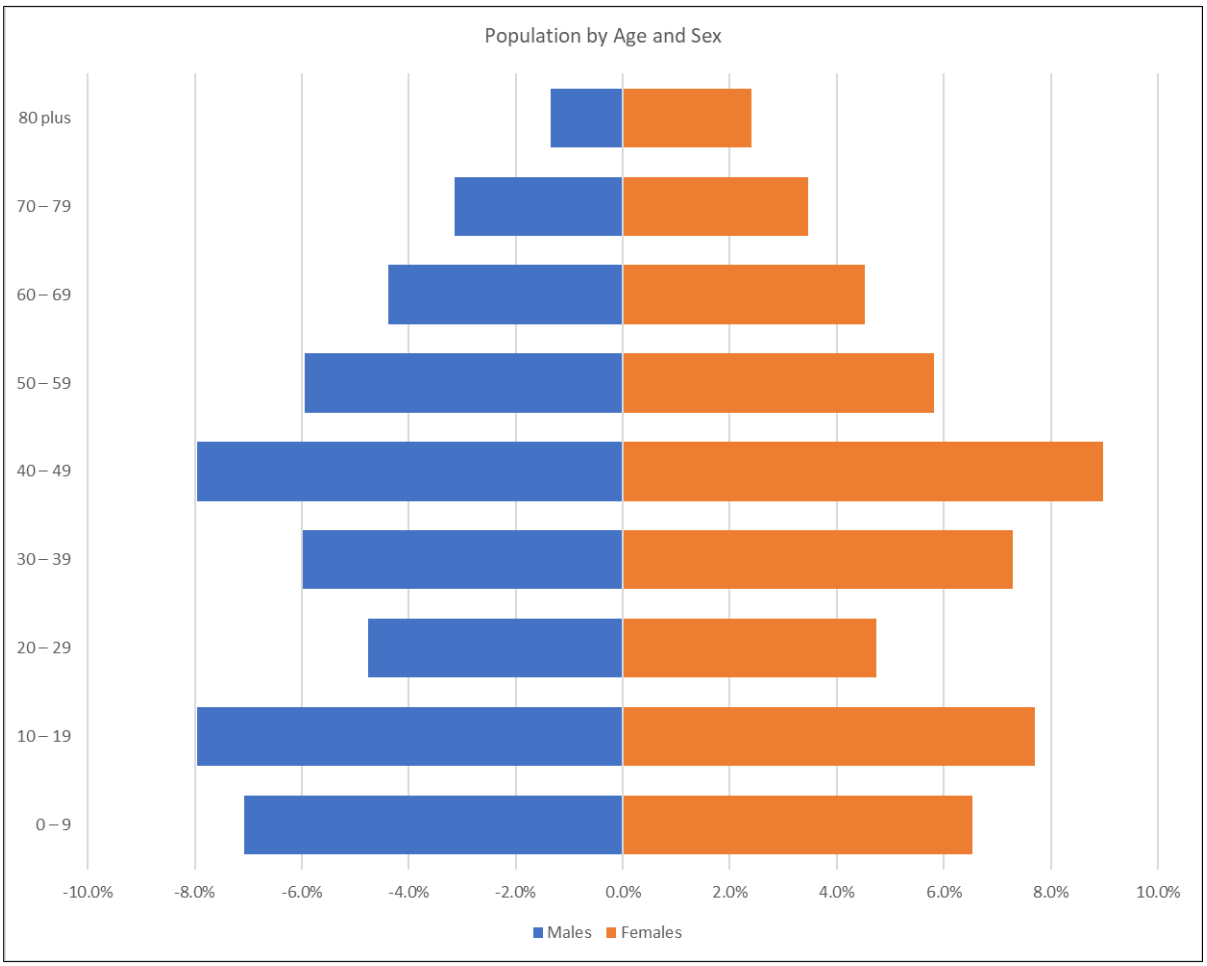


Figure 4.1 Study Area Population by Age and Sex (Source: CSO, 2024)

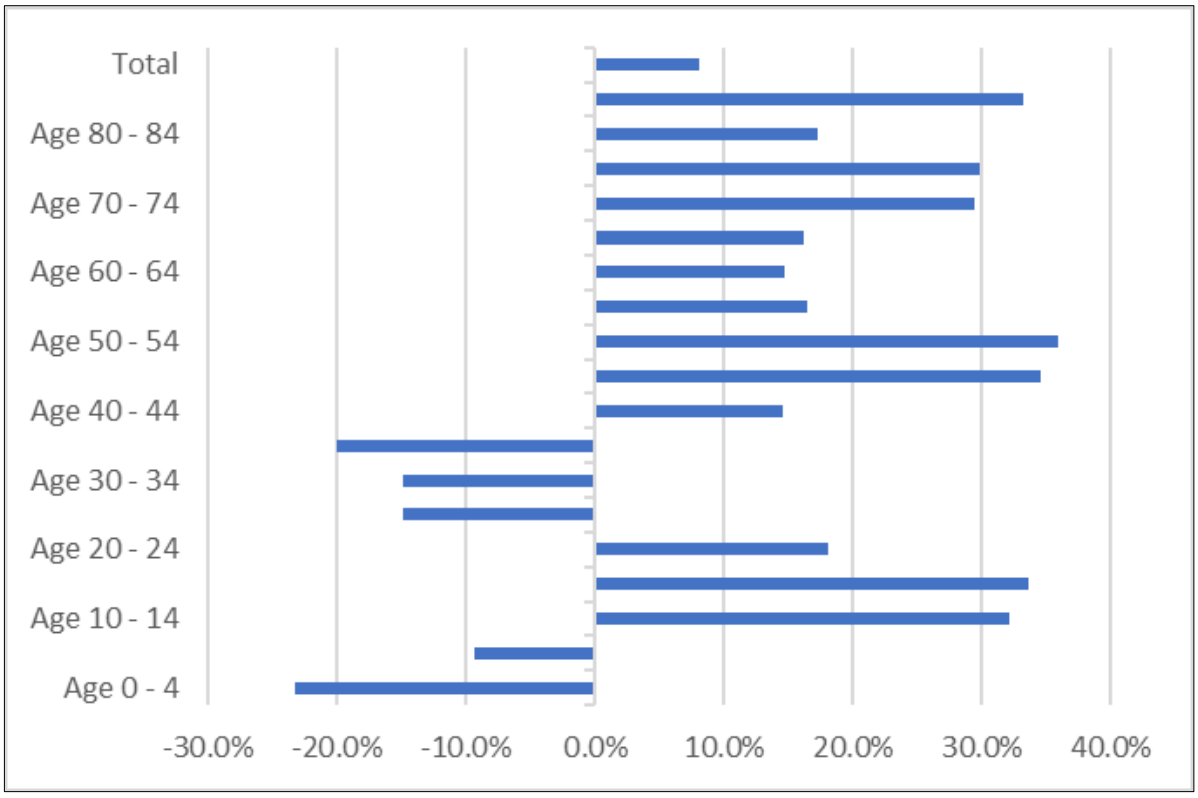


Figure 4.2 Study Area Population Change 2016 - 2022 (Source: CSO 2024)

The bar chart provided in Figure 4.2 illustrates the percentage change in the population of Mallow between 2016 and 2022 across various age groups. A significant age group increases can be seen in the 70-74-years-old cohort. This age group shows the largest increase, close to 40%, suggesting a significant aging population, possibly due to people retiring to the area or improved longevity. The 40-44-year olds and 20-24-year olds saw considerable increases in population, with the 40-44 age group increasing by around 30% and the 20-24 age group showing a similar increase. This may indicate that Mallow is attracting individuals in their early adulthood (possibly for educational or job opportunities) as well as middle-aged individuals, potentially families or people in the prime of their careers.

A Significant Age Group Decreases is noted for the 0-4-year-olds and the 30-34-year-olds. The 0-4 age group experienced a significant decline of approximately 20-30%, indicating fewer births or a decline in the number of young families moving to or remaining in Mallow. The 30-34 age group also shows a notable decrease, which could imply out-migration of this demographic, possibly for employment opportunities elsewhere or due to lifestyle preferences.

The significant increase in the 70-74 age group highlights that Mallow's population is aging, with more people entering retirement age. This could have implications for local healthcare services, housing needs, and community support systems. The decline in the 0-4 age group may indicate fewer young families, which could affect future school enrolments and demand for child-focused services.

The growth in the 20-24 age group suggests that Mallow might be attracting younger adults, possibly due to local educational institutions, job opportunities, or affordable living conditions.

The population of Mallow between 2016 and 2022 shows a clear trend towards an aging population with a significant rise in the 70-74 age group. At the same time, the town is seeing a decrease in its

youngest residents, suggesting a potential challenge in sustaining long-term population growth if younger families are not retained or attracted. The growth in younger adults (20-24) and middle-aged groups (40-44) could provide some balance, but the overall trend suggests a need for strategic planning to address these demographic shifts.

4.6.1.2 Health

A disability profile has been reviewed for the study area of Mallow. The bar chart below shows that 82% of the population consider themselves to be in very good or good health, as 51.1% are in very good health and 31% are in good health. Only 11.2% reported themselves as being of fair (9.7%), bad (1.5%) or very bad health (0.2%).

The overall health of Mallow's population is good, with over 80% rating their health as either "very good" or "good"; however, this has decreased by -2.9% since the 2016 census, but the same can be seen under the 'very bad' health assessment, which has decreased by -21.6% between 2016 and 2022 census. The disability rate and number of individuals with "fair" health suggest that a portion of the population, especially among females, may have ongoing health issues or disabilities.

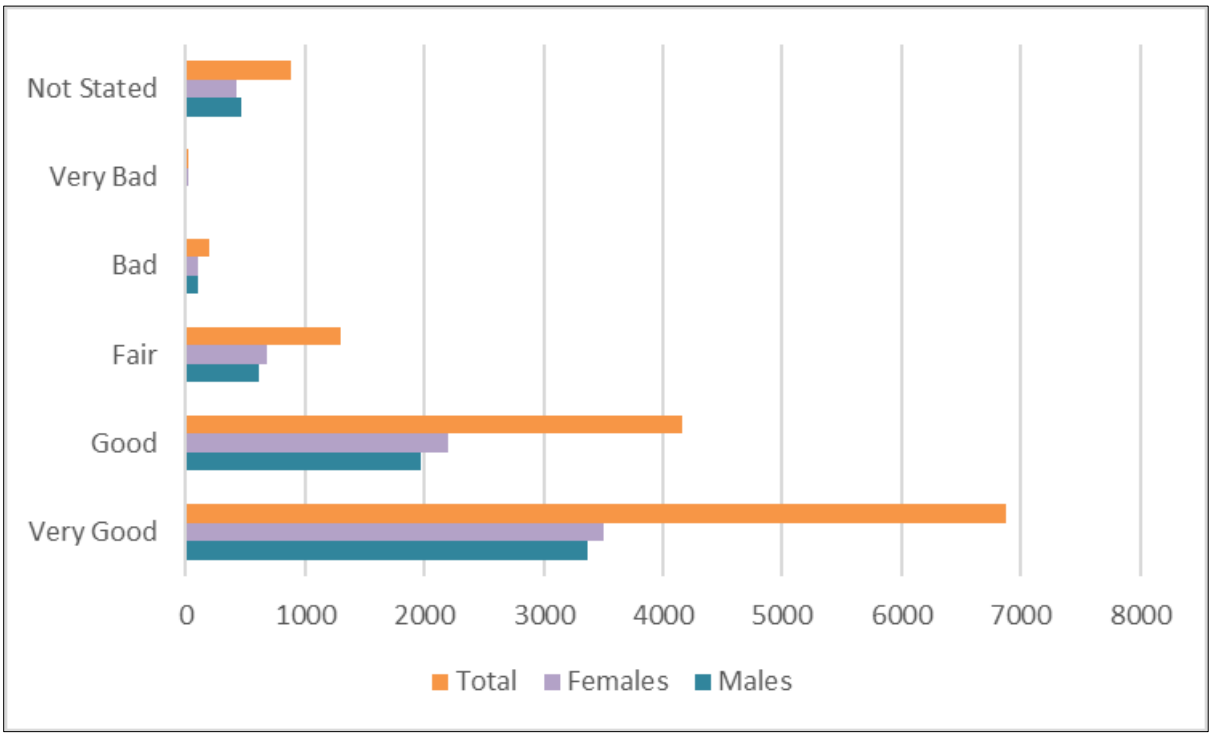


Figure 4.3 Overall Health of Mallows Population (Source: CSO 2024)

4.6.1.3 Household Size

In 2022 a total of 4,886 households lived in the study area of Mallow, with the average household size being 2.7. The average household size in Cork County Council is 2.72 people, which is slightly higher than the national average of 2.74 people according to Census 2022. While the number of households in Mallow increased by 5.14%, the average household size has remained the same.

Table 4.1 Proportion of Households by Size (Source: CSO 2023)

Households	Study Area	County Cork	Ireland

1 person households	23.6%	22.9%	23.1%
2 person households	28.3%	27.6%	29.0%
3 person households	18.3%	17.2%	17.9%
4 person households	16.8%	18.0%	16.9%
5 person households	9.1%	10.1%	8.9%
6 person households	2.6%	3.1%	3.0%
7 person households	0.9%	0.7%	0.8%
8+ persons households	0.6%	0.3%	0.4%
Total households	100.0%	100.0%	100.0%

The study area of Mallow (23.6%) shows that there is a slightly higher proportion of 1-person households compared to County Cork (22.9%) and Ireland (23.1%). This could suggest a relatively higher number of single-person residences, potentially due to elderly individuals living alone, young professionals, or single adults. Mallow's proportion of 2-person households (28.3%) is slightly higher than County Cork (27.6%) but lower than Ireland (29.0%), suggesting that Mallow may have a balanced presence of couples or small family units without children or with grown children who have left home. Mallow's percentage of 3- and 4-person households (18.3% and 16.8%) is higher than both County Cork (17.2% and 18.0%) and Ireland (but it's almost on par with the national average of (17.9% and 16.9%). This suggests that Mallow has fewer medium-sized families (typically two parents and two children) compared to County Cork but is generally aligned with the national trend.

It can be concluded that Mallow has a slightly higher percentage of 1- and 2-person households compared to County Cork, indicating a tendency towards smaller households, possibly due to a higher presence of singles, couples, or elderly people living alone. However, the percentage of 3-person households is slightly above both the county and national averages, indicating that small families (often one child) are more common in Mallow, while the lower percentage of 4-person households compared to County Cork suggests that Mallow may have fewer traditional nuclear families (with two children) than the surrounding region, although the percentage is close to the national figure.

Mallow has fewer larger households (5 or more persons) than County Cork but is aligned with the national averages. However, Mallow shows a relatively higher proportion of very large households (7 and 8+ persons) compared to the county and national averages, though these represent a small part of the population.

Mallow has a higher proportion of single-person households and a higher concentration of small families compared to County Cork. However, the town also exhibits a noticeable presence of larger families, with a relatively higher percentage of households with 7 and 8+ persons. This suggests a mix of household structures, possibly influenced by both the aging population and a presence of larger, settled family units in the town. The town's household distribution suggests that Mallow's community may be more varied in terms of family size than some other parts of the county or country.

4.6.1.4 Household Type

The Census Mapping provides details on the household types, the occupancy status of households, and the household sizes within the Mallow (Cork) ED, which are provided in the tables below.

The 2022 Census provides household type information which demonstrated that 92% of households in Mallow live in houses and bungalows, while only 5.7% of households are in apartments. The number of people living in a house or bungalow has increased by 8.8% since the 2016 census. In Cork County 96.3% of persons are living in house or a bungalow as per the census, which is similar to the trend seen in Mallow. The number of persons living in a house, or a bungalow are also higher than what has been recorded in Ireland overall, which is 89.7%. Apartment living increased by 20% since the 2016 census. The 5.7% persons living in apartment in Mallow is a higher proportion than what has been recorded in Cork County, with 3.5% of persons living in apartments, but is lower than the 10.1% percent of people living in apartment in Ireland overall, as per the 2022 census.

In terms of occupancy, 89.1% of dwellings were occupied on census night, an increase of 5.1% since the 2016 census. The recorded number of households who are temporary absent on census night in Mallow shows a decrease of -53.8% between the 2016 and the 2022 census, with 1.3% temporarily absent in 2022. These figures are similar to what has been record for County Cork and Ireland, which show an absence of 1.5% and 1.6% respectively. It concludes that 9.4% of dwellings in Mallow were considered vacant, which has decreased by -7.7% since the 2016 census; however, the rate of dwelling vacancy is still slightly higher in Mallow (9.4%) than County Cork (8%) and Ireland (7.7%). In Mallow 0.2% of dwelling are unoccupied holiday homes. There has been no change between 2016 and 2022 census regarding holiday home occupancy in Mallow.

Table 4.2 Household Type. Source: Mallow (Cork) CSO 2022

House Type	Households %	Persons %	County Cork	Ireland
House/Bungalow	91.9%	94.3%	96.3%	89.7%
Flat/Apartment	8.0%	5.7%	3.5%	10.1%
Bed-Sit	0.0%	0.0%	0.0%	0.1%
Caravan/Mobile home	0.0%	0.1%	0.2%	0.2%
Total	100%	100%	100%	100%

Table 4.3 Occupancy Status. Source: Mallow (Cork) CSO 2022

Status	Households	Households %	County Cork	Ireland
Occupied	4873	89.1%	85.7%	87.4%
Temporarily absent	72	1.3%	1.5%	1.6%
Unoccupied holiday homes	10	0.2%	4.8%	3.2%
Other vacant dwellings	512	9.4%	8.0%	7.7%
Total	5467	100%	100.0%	100.0%

In terms of household sizes, the information shows that 2 person households are the most common in Mallow recorded at 28.3%, followed closely by 1 person households making up 23.6% and 4 person households at 18.3%. This follows a similar pattern in County Cork with 27.6% representing 2 person households, and 22.9% for 1 person households. The census for the country shows 29% of 2 person households and 23.1% of 1 person households.

Table 4.4 Household Sizes. Source Mallow (Cork) CSO 2022

Household Size	Households %	Persons %	County Cork	Ireland
1 person households	23.6%	8.6%	22.9%	23.1%
2 person households	28.3%	20.7%	27.6%	29.0%
3 person households	18.3%	20.0%	17.2%	17.9%
4 person households	16.8%	24.5%	18.0%	16.9%
5 person households	9.1%	16.6%	10.1%	8.9%
6 person households	2.6%	5.6%	3.1%	3.0%
7 person households	0.9%	2.2%	0.7%	0.8%
8 or more persons households	0.6%	1.7%	0.3%	0.4%
Total households	100%	100%	100.0%	100.0%

Occupancy types in Mallow are highest for owned outright, at 30.6% which has increased by 8.8% since 2016. The percentage of homes owned outright in Mallow is similar to the county (41.7%) and Ireland (28.9%). Dwellings owned with mortgage or loan in Mallow stands at 25.1%, which has decreased since the 2016 census by -4.5%. Third highest type of occupancy is noted to be from a private landlord, recorded at 20.7% which has increased by 0.5% since 2016.

Table 4.5 Occupancy Types. Source Mallow (Cork) CSO 2022

Households by Type of Occupancy	Households	Households %	County Cork	Ireland
Owned with mortgage or loan	1223	25.1%	30.9%	28.9%
Owned outright	1490	30.6%	41.7%	37.0%
Rented from private landlord	1009	20.7%	14.1%	18.0%
Rented from Local Authority	747	15.4%	6.2%	8.3%
Rented from voluntary/co-operative housing body	145	3.0%	1.3%	1.6%
Occupied free of rent	75	1.5%	2.2%	1.7%
Not stated	175	3.6%	3.7%	4.4%
Total	4864	100%	100.0%	100.0%

4.6.2 Employment

The Labour Force Survey provides details at a national level relating to employment and unemployment. The survey for Quarter 2 of 2024 demonstrates that the persons in employment has increased by 4.38% since Quarter 2 of 2023; however, the persons unemployed has also increased by 8.25% over the same period.

Table 4.6 Labour Force Participation and Unemployment Rates

	Q2 2023	Q2 2024	% Change
Unemployed persons aged 15-74 years	121,200	131,200	+8.25%
Unemployment Rate (%) (15- 74 years)	4.4%	4.6%	+0.2%
Persons in Labour Force	2,764,200	2,885,400	+4.38%
Labour Force Participation Rate (%) (15 years and over)	65.7%	66%	+0.3%

Based on the 2022 Census, 52.3% of the population of Mallow were at work, which is a 14.8% increase from the 2016 census. Employment figures for the County (56.8%) and Ireland (56.1%) are higher than what has been seen in Mallow. In addition, the Census concludes that 11.3% of Mallows population at the time of the Census were students, demonstrating a 22.2% increase since the 2016 census and 15.4% were retired which has also increased by 16.1%. Only 4.3% of the Mallow population were temporarily unemployed at the time of the census, which overall has decreased since 2016 by -42.6%.

Table 4.7 Economic Status. Source Mallow (Cork) ED, CSO 2022

Economic Status	Total	Total %	County Cork	Ireland
At work	5473	52.3%	56.8%	56.1%
Looking for first regular job	119	1.1%	0.6%	0.8%
Short term unemployed	167	1.6%	3.1%	4.3%
Long term unemployed	285	2.7%	10.9%	11.1%
Student	1184	11.3%	7.4%	6.6%
Looking after home/family	777	7.4%	16.0%	15.9%
Retired	1611	15.4%	4.4%	4.6%
Unable to work due to permanent sickness or disability	771	7.4%	0.7%	0.7%
Other	84	0.8%	100.0%	100.0%
Total	10471	100%	56.8%	56.1%

Based on the 2022 census, 27.1% of the population in Mallow were employed in managerial and technical roles which has increased by 21.5% since the 2016 census; however, this percentage is lower than the 10% in County Cork and 9.3% in Ireland. The 2022 census shows that 16.1% of the work force in Mallow were in non-manual work which has decreased by -2.5% compared to 2016 and these numbers are generally in line with the population of Cork and Ireland overall. Semi-skilled manual workers represented 12.5%, which has increased by 7.5% compared to 2016. This statistic is slightly higher than County Cork (12.1%) and Ireland (11.2%). The census shows that 6.3% of Mallows working population were in employed as professional workers with an increase of 21.5% since the 2016 census. The percentage in Mallow is lower than County Cork (10%) and Ireland (9.3%).

The second highest statistics in Mallow is the *All Others Gainfully Occupied and Unknown* at 20.7%, which is significantly higher than the 12.8% for Cork, and 16.6% for Ireland. In addition, there has been a 3.3% increase for this category since the 2016 Census.

Table 4.8 Socio-Economic Status. Source: Mallow (Cork) ED, CSO 2022

Status	Total	Total %	Cork County	Ireland
Professional workers	849	6.3%	10.0%	9.3%
Managerial and technical	3648	27.1%	32.2%	30.7%
Non-manual	2167	16.1%	15.8%	16.2%
Skilled manual	1878	14.0%	14.4%	12.9%
Semi-skilled	1678	12.5%	12.1%	11.2%
Unskilled	454	3.4%	2.7%	3.1%
All others gainfully occupied and unknown	2782	20.7%	12.8%	16.6%
Total	13456	100%	100.0%	100.0%

4.6.2.1 Travel Trends

The commute time to work, school or college for the majority of Mallow Population was less than 15 minutes, according to the 2022 census. This suggests that the majority of the population are working, attending school or college locally. The data shows that 15.8% of the population had a commute time between 30 minutes and 45 minutes, while 8.2% spent 45 minutes to 1 hour commuting. Compared to the 2016 Census, the percentage of commuters who travel for under 15 minutes has decreased by -8.2% while the 30 to 45 minutes, and 45 to 1 hour journeys have increased by 18.9% and 5.4% respectively, indicating that people are seeking work opportunities in areas outside of Mallow.

The most popular mode of travel is by private car, which represents 37.5% of travelling to work, and college or creche. Walking to work or creche is the second most common mode of travel with overall 15.8% residents of Mallow choosing to walk.

In terms of public transport, 1.3% use the train from Mallow to travel to work, while the bus is favoured by those travelling to college or creche, which stands at 2.6%, while only 0.5% use this mode of travel for work. All modes of travel show to have increased between 2016 and 2022 with the most significant change noted in the *Working from Home* category, which shows an increase of 335.8% between the 2016 and 2022 Census. This is also a higher percentage than what is seen in County Cork (4.7%) but falls similar to the percentage for Ireland (7.4%).

Table 4.9 Population Aged 5 Years+ by Means of Travel to Work or School.

Journey Time	Commuters	Commuters %	Cork County	Ireland
Under 15 mins	2798	33.7%	32.9%	32.9%
1/4 hour - under 1/2 hour	1894	22.8%	26.1%	26.1%
1/2 hour - under 3/4 hour	1312	15.8%	19.0%	19.0%
3/4 hour - under 1 hour	683	8.2%	6.9%	6.9%
1 hour - under 1 1/2 hours	611	7.4%	6.0%	6.0%
1 1/2 hours and over	153	1.8%	1.6%	1.6%
Not stated	858	10.3%	7.6%	7.6%
Total	8309	100%	100.0%	100.0%

Table 4.10 Mode of Transport. Source: Mallow (Cork) ED, CSO 2022

Mode of Transport	Work %	College or Childcare %	Total %	Cork County	Ireland
On Foot	5.5%	9.8%	15.3%	8.9%	12.6%
Bicycle	0.4%	0.2%	0.6%	0.6%	2.7%
Bus minibus or coach	0.5%	2.6%	3.2%	7.2%	9.0%
Train DART or LUAS	1.3%	1.0%	2.3%	0.7%	2.4%
Motorcycle or scooter	0.1%	0.0%	0.1%	0.1%	0.3%
Car Driver	35.7%	1.8%	37.5%	40.8%	34.7%
Car passenger	3.1%	21.7%	24.8%	23.6%	19.1%
Van	3.5%	0.1%	3.6%	5.1%	4.1%
Other (incl. lorry)	0.3%	0.0%	0.3%	0.5%	0.4%

Work mainly at or from home	4.8%	0.2%	5.0%	7.8%	7.4%
Not stated	3.8%	3.4%	7.2%	4.7%	7.4%
Total	59.1%	40.9%	100%	100.0%	100.0%

4.7 The 'Do nothing' Scenario

If the development were not to proceed there would be no immediate impact on the existing population, economic activity, or community services and facilities in the town. However, if the development does not occur there will be a shortfall in housing supply in the area which may negatively impact the continued sustainable growth of the town.

The site is zoned for residential development and the provision of housing on the subject site will support the core strategy and objectives of the Cork County Development Plan. If the development does not occur the zoning and objectives of the local planning policy will not be realised in the short term.

The site is also zoned for Green Infrastructure and the provision of adding to the existing parklands of Mallow Castle Park will support the core strategy and objectives of the Cork County Council Development Plan. If the development does not occur the zoning and objectives of the local planning policy will not be realised in the short term.

The impacts on land use are therefore envisaged to be negative to neutral for the 'do-nothing' scenario.

4.8 Identification of Principal Potential Receptors

In identifying potential impacts and receptors, consideration was given to the proposed residential scheme and the identified receiving environment. The principal potential receptors that will be affected by the development proposal have identified in the following sections:

- Residential Areas in Proximity;
- Community Facilities and Services, including schools and creches;
- Local Amenity;
- Economic Activities.

There are several existing residential properties which have the potential to be impacted by the development, specifically the residents of:

- Dwellings on Saint Joseph's Road and Castle Crest;
- Kingfort Avenue and Earls Square
- The dwelling on Castle Crest

4.8.1 Local Residents

There are several existing residents surround the proposed site which have the potential to be impacted by the development. Using data from Google Street Map and the Eircode Finder the estimated number of residential buildings in the study area amount to 126. Based on the Census data

discussed through this report, the total number of persons living in the study area totalled 13,456 in 2022. Therefore, great care should be taken to minimise the potential adverse impacts of the proposed development during the various development stages.

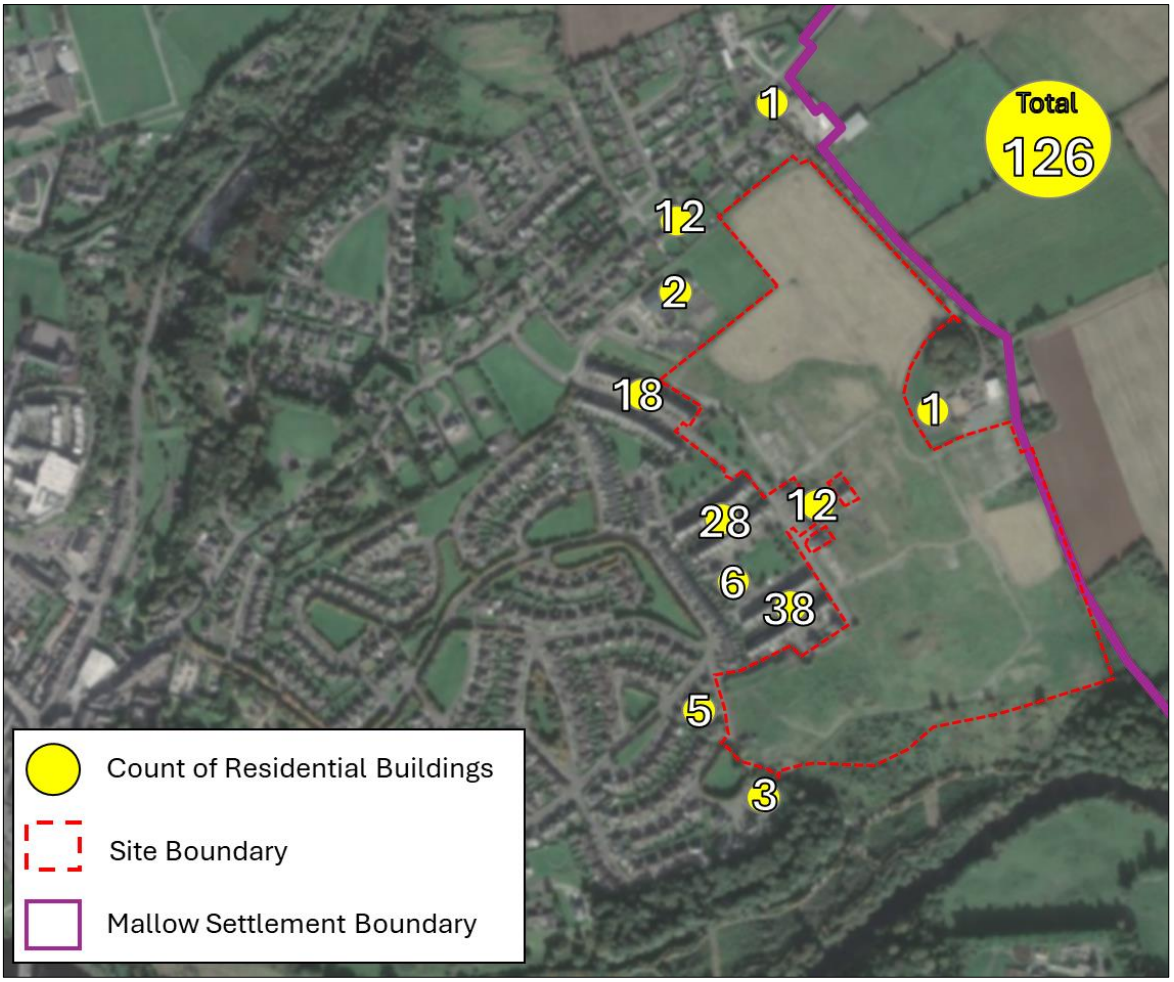


Figure 4.4 Count of Residential Buildings with the Study Area (Google Maps, 2024)

4.8.2 Community Facilities and Services

Mallow has an abundance of community facilities and services within the town, which are identified as potential receptors. Such services include pharmacies, post offices, dentists, banks, gyms, sport playing pitches, a community centre, as well as a selection of local convenience/comparison retail stores.

With regard to childcare facilities, the Tusla 2023 register shows that there is a total of 31 pre-schools and creches in Mallow. However, out of the 31 preschools, only 8 childcare facilities were identified within Mallow Town and the study area. The closest existing childcare facilities to the proposed development include Naionra Thomais Daibhis (750 m from the proposed development), Dina's Den Breakfast and Afterschool (1 km from the proposed development), and Le Cheile Family Resource Centre (1.2 km from the proposed development).

It is important to note that the travel times and distances were determined based on the distance and average journey times provided by Google Maps.

Table 4.11 List of Childcare Facilities in Mallow.

No.	Childcare Facility	Distance	Walk	Cycle	Drive
1.	Respond Early Years Service, Oakfield Close	1.9 km	24 mins	7 mins	6 mins
2.	ABC's and 123's Preschool	1.8 km	22 mins	7 mins	6 mins
3.	Naionra Thomais Daibhis	750 m	10 mins	2 mins	2 mins
4.	Dina's Den Breakfast and Afterschool	1.0 km	11 mins	4 mins	3 mins
5.	Le Cheile Family Resource Centre (Mallow) Ltd	1.2 km	15 mins	5 mins	4 mins
6.	Rising Stars Childcare	1.5 km	18 mins	5 mins	5 mins
7.	Bright Star Montessori Preschool	1.9 km	24 mins	7 mins	7 mins
8.	Serendipity Childcare and Montessori	1.8 km	16 mins	6 mins	5 mins

Table 4.12 List of Primary Schools in Mallow.

No.	Primary School	Distance	Walk	Cycle	Drive
1.	Convent Girls Senior National School	2.1 km	30 mins	09 mins	07 mins
2.	St. Patricks B.N.S.	1.5 km	21 mins	06 mins	05 mins
3,	Scoil Íosagáin Catholic infant School	2.2 km	31 mins	09 mins	07 mins
4.	Scoil Ghobnatan	2.0 km	26 mins	07 mins	06 mins
5.	Mallow Community National School	400 m	06 mins	01 min	01 min

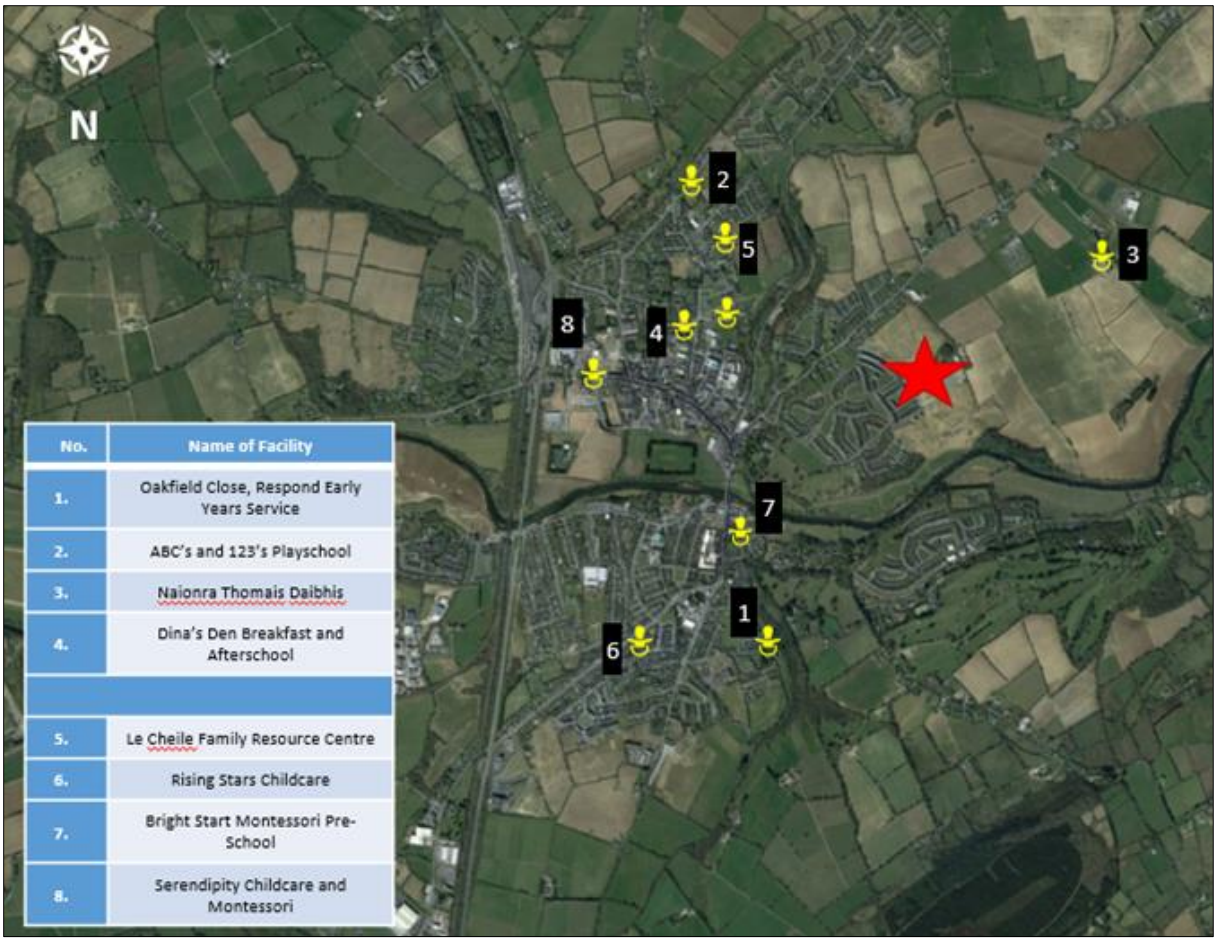
Table 4.13 List of Post Primary Schools in Mallow

No.	Post-Primary School	Distance	Walk	Cycle	Drive
1.	Patrician Academy	1.7 km	23 mins	07 mins	06 mins
2.	St. Mary's Secondary School	2.0 km	28 mins	08 mins	07 mins
3.	Davis College	2.6 km	35 mins	10 mins	07 mins

The capacity of the childcare facilities within the study area can be seen in the Table below. This table was informed by contacting individual facilities by phone and email on two occasions. This allowed the author to obtain the total capacity of each facility. Where this data was not acquired by direct contact, the capacity was estimated by using the most up to date TUSLA report. The data has concluded that only one of the childcare providers have capacity for 10 children.

Table 4.14 Capacity of Childcare Facilities

No.	Name of Facility	Enrolments 2022/2023	Capacity	Available Places
1.	Oakfield Close, Respond Early Years Service	22	0	0
2.	ABC's and 123's Playschool	34	44	10
3.	Naionra Thomais Daibhis	132	0	0
4.	Dina's Den Breakfast and Afterschool	74	-	0
5.	Le Cheile Family Resource Centre	85	0	0
6.	Rising Stars Childcare	55	0	0
7.	Bright Start Montessori Pre-School	30	0	0
8.	Serendipity Childcare and Montessori	24	0	0
		Totals	44	10



No.	Name of Facility
1.	Oakfield Close, Respond Early Years Service
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4.	Dina's Den Breakfast and Afterschool
5.	Le Cheile Family Resource Centre
6.	Rising Stars Childcare
7.	Bright Start Montessori Pre-School
8.	Serendipity Childcare and Montessori

Figure 4.5 Childcare Facilities within the Study Area

4.9 Potential Significant Effects

4.9.1 Construction Phase

General construction activities and excavations may give rise to emissions to air or surface water and may generate noise and vibration. The details of the construction phase of the project are provided in in the Construction and Environmental Management Plan (CEMP) by Enviroguide Consulting. To summarize the development will be constructed and expected to be completed within 96 months in duration as follows:

- Phase 1A: 12 months
- Phase 1B: 12 months
- Phase 1C: 18 months
- Phase 2: 30 months
- Phase 3: 24 months

4.9.1.1 Population and Settlement Pattern

The construction phase is not likely to result in any changes to the settlement patterns as described in Section 4.6.

The potential impacts arising during the construction phase relate to short term impacts to quality of life, including visual impact/amenity, noise, air quality, and transport. Where relevant, these impacts have been considered in the relevant chapters of the EIAR and will be minimised or mitigated where appropriate. It is unlikely that these impacts will be of a scale to either encourage people to move from the area or discourage people from moving to the area.

The construction phase may result in short term negative impacts on the local population.

4.9.1.2 Economic Activity

The construction phase is anticipated to result in a temporary boost to the local economy as workers employed at the site can be expected to make use of local retail facilities and other services. If the application is successful, construction works will continue until the development is completed. Approximately 75 workers will be employed on site during the construction phase, and there will be positive economic externalities to industries that are complimentary to the construction sector. The loss of the agricultural lands is anticipated to have a neutral effect as the lands were under the ownership of the applicant.

It is anticipated that the construction phase of the project will result in likely positive short term moderate effects locally and within the wider Mallow area.

4.9.1.3 Land Use and Amenity

The project is in accordance with the statutory zoning objective. There will be no severance of lands or loss of rights of way as a result of the proposed development. In general, the construction phase impacts on local amenity and receptors identified in proximity will be mainly related to noise, air quality and traffic. These are assessed within the relevant chapters of this EIAR. The potential impact on local heritage is assessed further in Chapter 13 Cultural Heritage of this EIAR.

Site operatives will primarily use light vehicles, while Heavy Goods Vehicles (HGVs) will transport general construction materials like fill material, concrete, bricks to the site and remove excavated material for off-site disposal (please refer to Chapter 11 Traffic and Transport for further details). If earlier phases of the development are occupied there may be short term impacts because of construction traffic; however, on-going residents can be expected to become somewhat habituated to background levels of traffic and disturbance. In general, the impact of construction traffic is assessed as moderate negative, but short term.

The construction works may result in a short-term negative/neutral impact on receptors as identified in Section 4.8.

4.9.1.4 Community Facilities and Services

Due to the distance from the site and the facilities and the intended route for construction traffic, the impact during the construction phase is expected to be slight, neutral.

4.9.1.5 Health

As with any construction site, there will be potential risk to health and safety in terms of injury or death of construction personnel on-site due to the usage of large, mobile machinery as well as heavy equipment and materials.

Human health may be impacted on in a variety of ways and by several environmental receptors including water, biodiversity, climate, flooding, air, and major accidents, etc. Exposure to contaminants or pollutants can have serious implications for human health. Potential impacts on population and human health include inadequate water and wastewater infrastructure, contamination of soils, excessive noise, flooding due to non-control of surface water, poor air quality in areas where there are large volumes of traffic, and the health impacts associated with the storage of hazardous materials during the construction stage. These issues are addressed within the relevant discipline of the EIAR.

4.9.1.6 Cumulative

There is potential for the construction phase of the proposed development to overlap with the construction of other recently permitted applications in Mallow. However, due to the distances between the proposed development and these permitted developments, any cumulative impact during the construction phase is expected to be not significant.

4.9.2 Operational Phase

Due to the nature of the development, there will be few hazards associated with the operational phase of the project and therefore no potential significant negative impact in terms of health and safety.

4.9.2.1 Population

The proposed development will deliver 496 no. residential units including 94 no. units that will be provided for the purposes of Part V Social Housing.

Based on the national household size, the proposed development is expected to generate a population of 1,364 no. persons. The total estimate development yield for the proposed development containing 469 units of which 85 are 1-bedroom units, 124 are 2-bedroom units, 192 are 3-bedroom units, and 98 4-bedroom units is 1,123 no. persons, based on figures from the catchment. The development yield has been broken down into three population types and based on catchment based statistics;

- Children aged 0-4;
- Primary School Aged Population (5-12 year olds); and
- Post-Primary School Aged Population (aged 13-18 years old)

Table 4.15 Expected Population Yield by Age

Yield	Age Group 0-4	Age Group 5-12	Age Group 13-18	Age Group 18 +
Catchment Based Yield	41	179	126	1,018

The estimated yields based on the catchment figures show that the development and the surrounding study area of Mallow, will sufficiently meet the eventual demand for childcare, primary, and post-primary school services. The development is considered likely to result in significant, positive, long-term, impacts on population and settlement patterns in the area.

4.9.2.2 Schools

The proposed development will lead to an increase in the local population, generating additional demand for primary and post-primary education. Based on the estimated population yield, the number of school-aged children will rise. Schools like Mallow Community National School and St. Patrick's B.N.S., which are closest to the development, may experience increased enrolments, potentially requiring additional resources or capacity expansions.

The presence of schools within walking or cycling distance (less than 2.5 km) makes them well-positioned to accommodate future demand. The development's impact on schools is expected to be moderate and long-term.

4.9.2.3 Childcare Facilities

The operational phase of the development will see an increase in the demand for childcare facilities. The estimated number of pre-school-aged children is significant, and existing facilities are already close to full capacity, with only *ABC's and 123's* Playschool reporting available places. The proposed on-site crèche is a critical element of the development, as it will help alleviate the strain on local facilities by offering additional childcare capacity.

The inclusion of the crèche within the development will ensure that childcare needs are met within the immediate area, reducing pressure on existing facilities. This will have a positive long-term impact by balancing the supply and demand of childcare services within the community.

The location of childcare services within walking distance of the residential units encourages sustainable modes of travel, reducing traffic congestion around existing facilities. The crèche will serve both new and existing residents, contributing to local employment and improving access to early childhood education.

4.9.2.4 Household Type and Settlement Pattern

The proposed development will provide a variety of residential units, including 1, 2, 3, and 4-bedroom homes, which aligns well with the existing settlement pattern in Mallow. The diverse housing mix will cater to different household types, from single-person households to larger family units, reflecting the current demographic trends in the area.

The operational phase is expected to enhance the settlement pattern by providing much-needed housing in a range of sizes and tenures. The mix of unit sizes is designed to meet the demand from a broad spectrum of household types, including young professionals, families, and the elderly, supporting a balanced community structure.

This development will have a positive long-term impact on the settlement pattern by promoting sustainable population growth and encouraging diverse household compositions. The inclusion of green spaces, community amenities, and the crèche will further enhance the liveability of the area, making it an attractive place for both existing residents and newcomers. Additionally, the development's alignment with local zoning policies supports the strategic goals of sustainable urban expansion.

4.9.2.5 Economic Activity

There will be an economic benefit to local businesses during the operational phase. Residents will use local facilities and services, and it is anticipated that the additional population will result in increased business for the wider community and Mallow, and will have a positive, slight, long-term impact on the services including dentist clinics, pharmacies, banks, and various retail outlets.

4.9.2.6 Land Use and Local Amenity

The proposed development is in line with the specific site-zoning objective for residential development (refer to Chapter 2 of this EIAR) and will consist of residential units, a creche, an interpretive centre/café, and public open space. These open spaces include a greenway route through the site which connects to the large public park to the south.

This development will facilitate an appropriate, sustainable settlement pattern which will accommodate residential, community, leisure, and recreational facilities to satisfactorily match the anticipated level of population growth and household generation.

The impact on Natura 2000 sites and biodiversity is assessed in Chapter 13 of this EIAR and the impact on archaeological heritage is assessed in Chapter 14 of this EIAR.

The change of the land use from greenfield/agricultural to primarily residential will permanently change the views currently enjoyed by adjacent properties and road users. This impact is visual and is dealt with in Chapter 10 Landscape and Visual impact.

4.9.2.7 Community Facilities and Services

The proposed development is located within a well-serviced area in terms of community facilities and services. These include healthcare, sports and recreation, community centres, and retail, which will directly support the population increase resulting from the development**.**

The healthcare facilities in the catchment area are well-distributed. Given that the existing population is well-served by healthcare providers, including a primary care centre, the additional demand generated by the estimated 1,364 residents of the new development is unlikely to strain these services. The operational phase is expected to have a neutral to slightly positive impact on healthcare facilities. The additional population will create increased usage, but the current capacity of healthcare providers should absorb this increase. The development will also contribute positively to the local economy, encouraging the retention of healthcare professionals in the area.

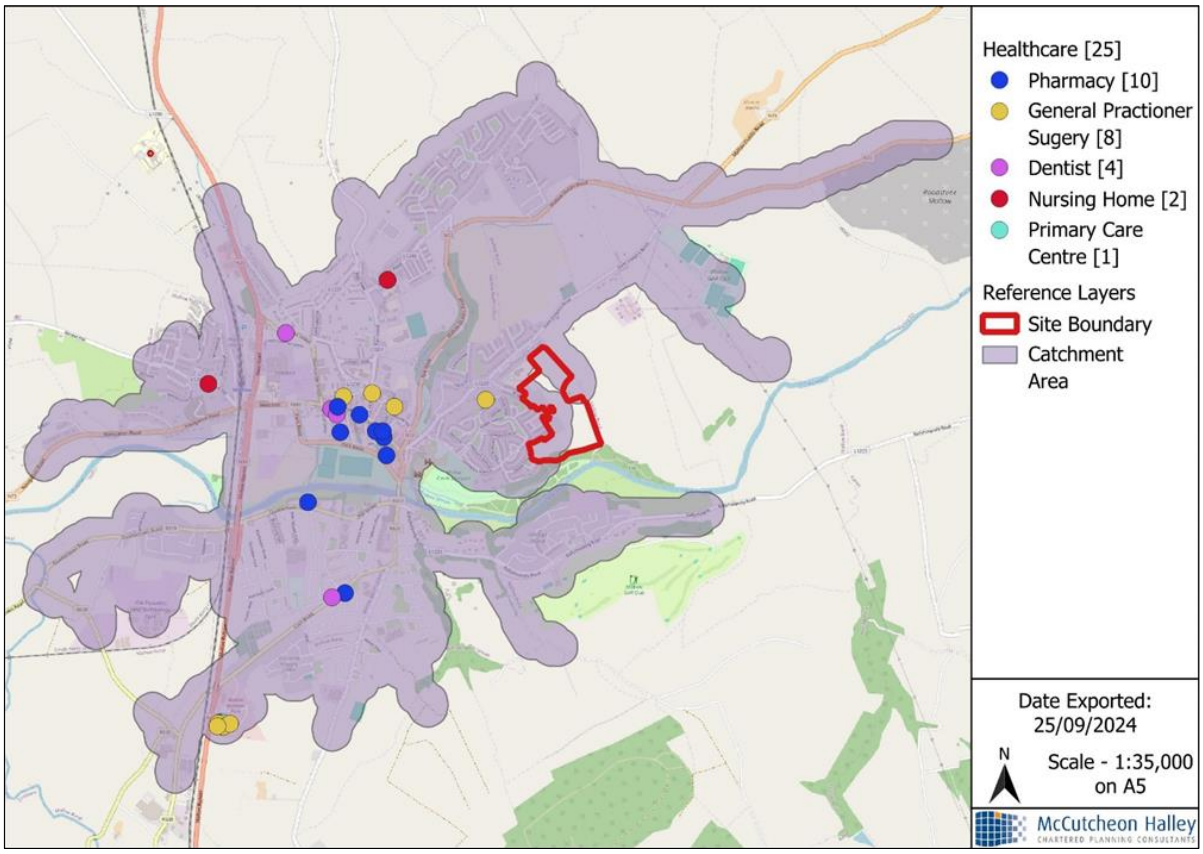

Figure 4.6 Healthcare Facilities (Source: Google Maps, 2023; Health Service Executive, 2023; Nursing Home Ireland, 2023; The Pharmaceutical Society of Ireland, 2023)

The study area contains 50 sports and recreation facilities, including parks, pitches, gyms, and children's play areas. Mallow Castle Park and Mallow Town Park are key recreation areas, located within walking distance of the development. The proximity of these amenities will provide future residents with a wide range of options for physical activity and outdoor recreation, encouraging a healthy lifestyle. The development itself includes green spaces and will be connected to existing recreational facilities via pedestrian and cycle routes. The integration of these amenities within the site will encourage residents to engage in physical activity, thereby promoting community well-being. The operational phase is expected to have a positive impact by enhancing the use of existing sports and recreation facilities. The development's green spaces and amenities will complement existing recreational offerings, providing additional opportunities for outdoor activities and fostering community interaction.

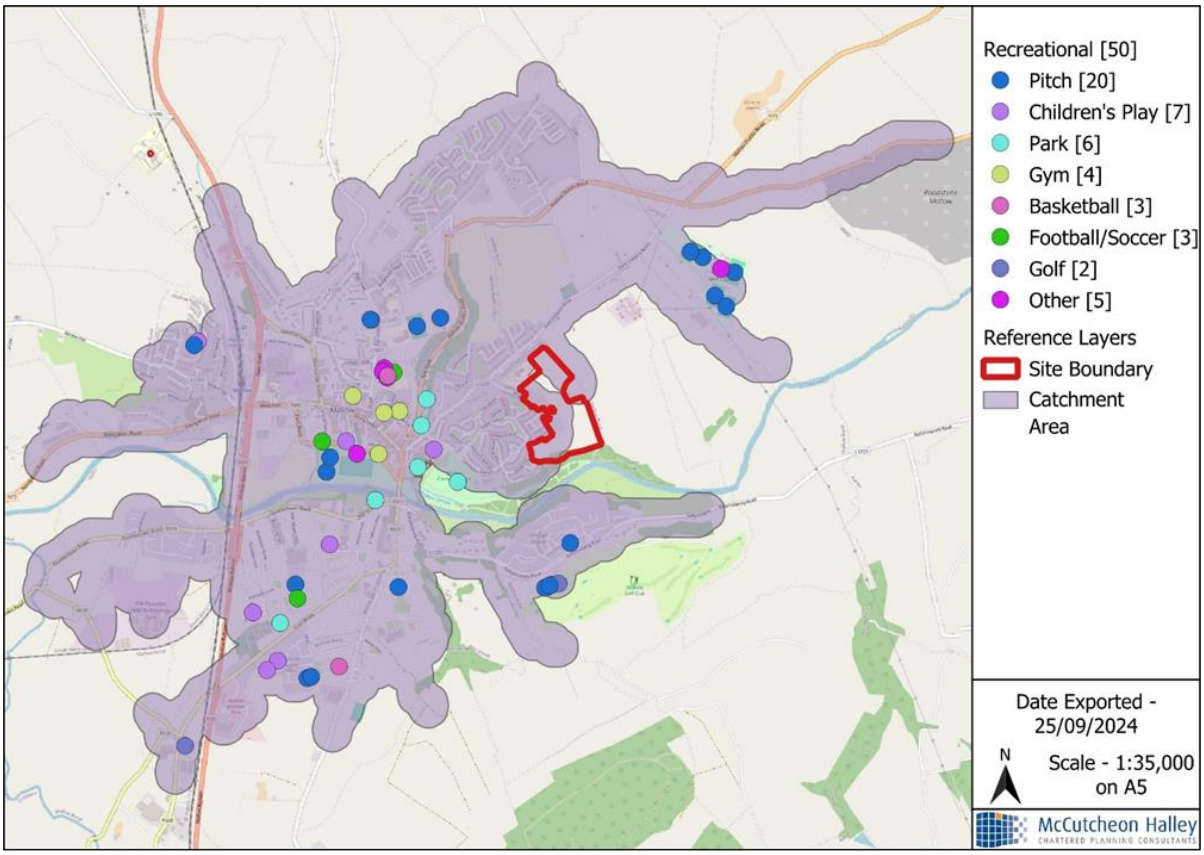

Figure 4.7 Recreational Facilities (Sources: Google Maps, 2024; Open Street Map, 2023; Sport Ireland, 2023)

The development site is located near several community and cultural facilities, including churches, community centres, and libraries. The Mallow Community Youth Centre, the Big Blue Cube community centre, and Mallow Library are some key facilities available to residents. The proposed development includes a community room within the crèche building, which will offer additional space for local residents to host events and activities, complementing the existing community infrastructure. The operational phase is expected to have a positive long-term impact by contributing to the range of community facilities available in Mallow. The inclusion of a community room in the development will serve both new and existing residents, enhancing local engagement and cultural opportunities.

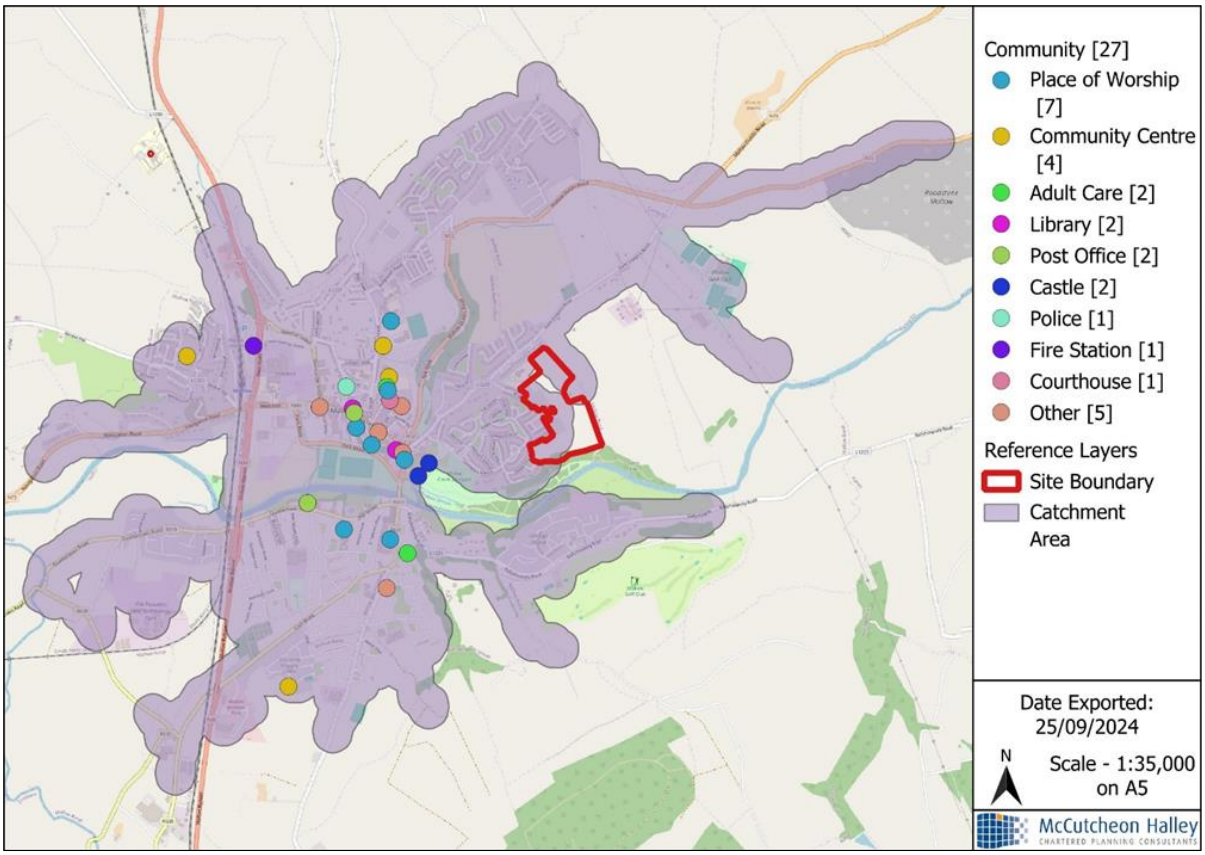

Figure 4.8 Community Facilities (Sources: Open Street Maps, 2023)

With 86 retail and convenience facilities located within the catchment area, including supermarkets, restaurants, cafés, and convenience stores, the new development will be well-serviced by local businesses. The additional population from the development will likely increase footfall in local shops and services, providing an economic boost to these businesses. The operational phase is expected to have a positive economic impact on local retail and convenience services by increasing demand for these facilities. This will strengthen local businesses and contribute to the vibrancy of the town centre.

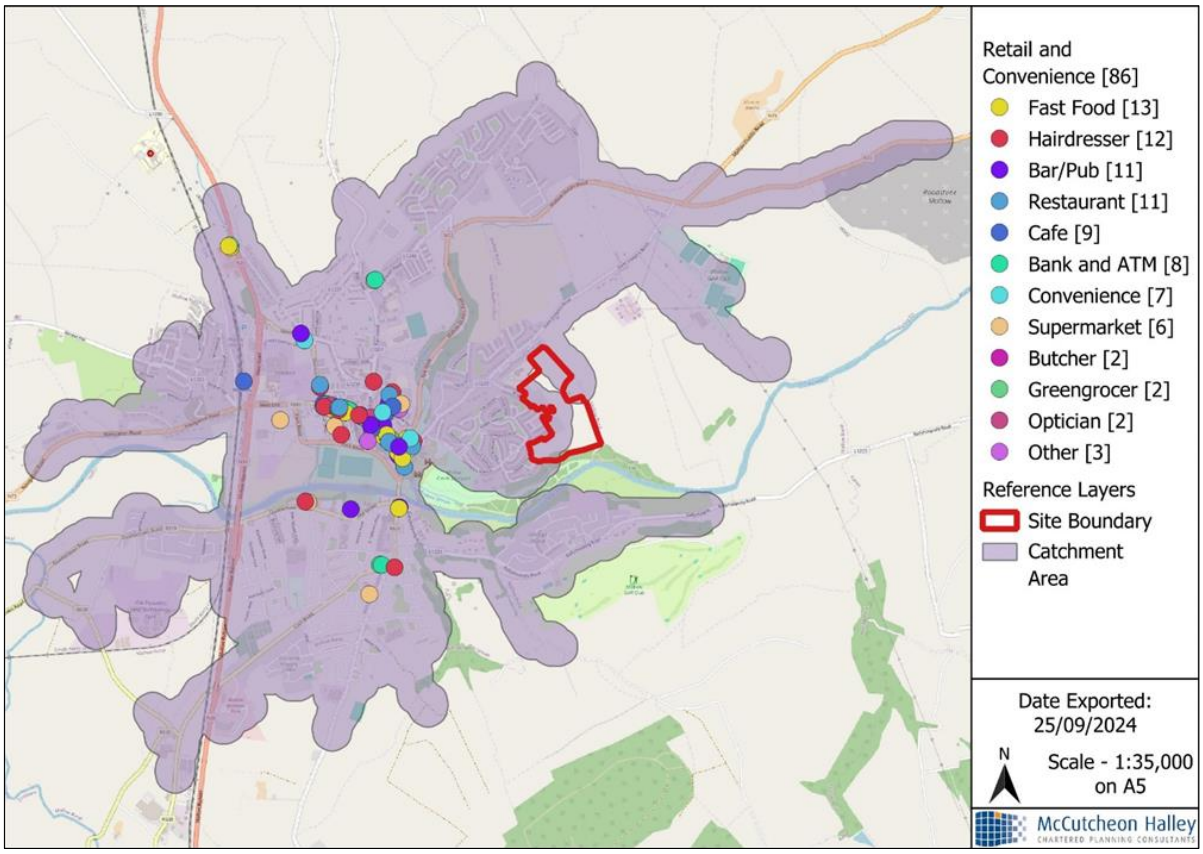

Figure 4.9 Retail Facilities (Sources: Google Maps, 2023; Open Street Maps, 2023)

The catchment area has a number of public transport facilities (4 in total) and the development is well-connected to Mallow's bus routes and train station. This proximity to public transport will encourage residents to use sustainable travel options, reducing reliance on private vehicles. The inclusion of cycle paths and pedestrian routes in the development will further support sustainable commuting options. The operational phase will have a neutral to positive impact on public transport usage. While the development itself will not place a significant strain on the existing transport system, it will promote sustainable travel through its design, helping to reduce traffic congestion in the area.

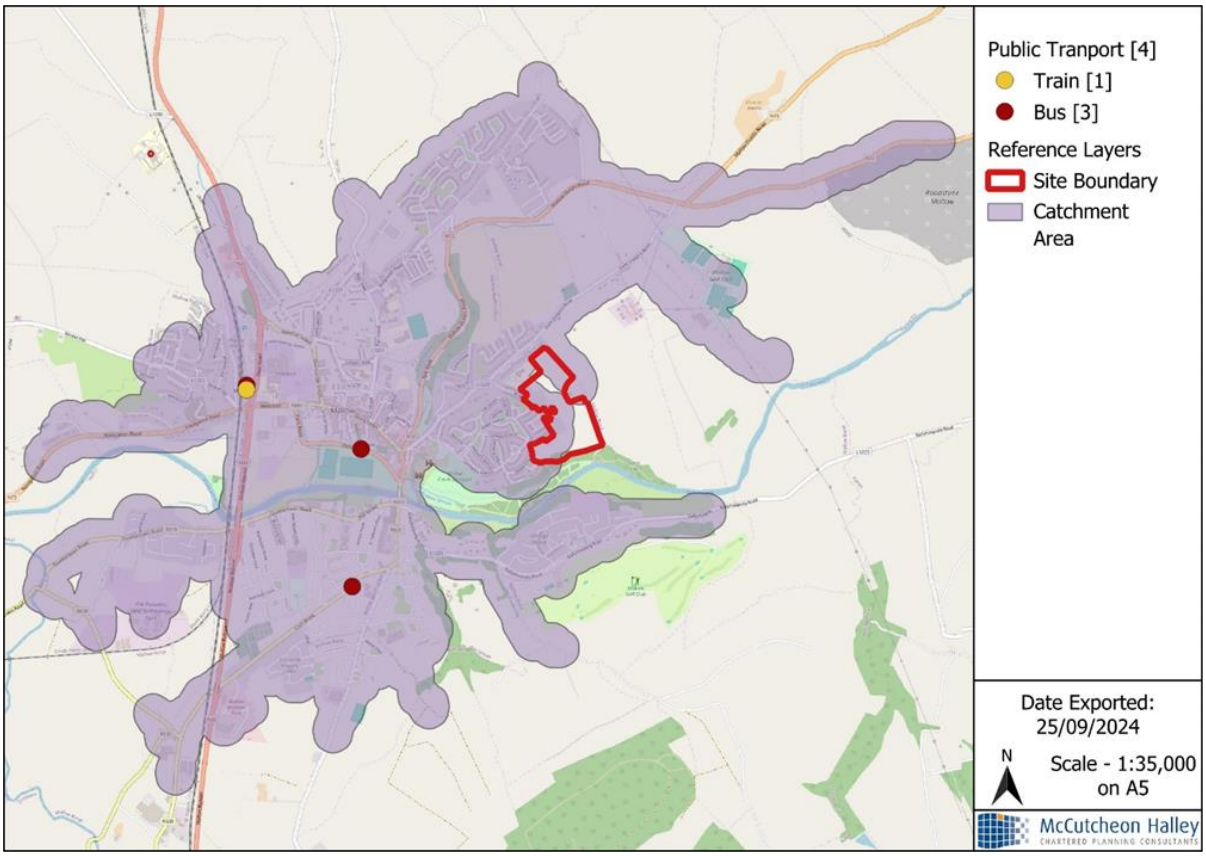

Figure 4.10 Public Transport Facilities (Sources: Transport for Ireland, 2023)

Community facilities identified in Section 4.8 of this chapter are expected to benefit from the increased population in particular clubs and community centres, gyms and services. Any potential impacts are anticipated to be long term, neutral and not significant.

4.9.2.8 Health

The baseline data for the catchment indicates that the general population is in a slightly lower percentage representing very good health (51.1%) than the state of health in County Cork (57%) and Ireland (53.2). The proposed development will not result in any significant negative impacts to the health and wellbeing of the existing population. In particular, the design of the scheme ensures that both the current and future residents of the local environment will benefit from the proposed amenities.

The potential impacts on cycling and pedestrians will be positive, given the additional infrastructure provided. A lack of adequate recreation or amenity facilities has the potential to negatively impact human mental and / or physical health. The proposed layout provides for excellent public amenity and recreational facilities.

The provision of these amenity facilities within the proposed development will be of benefit to future residents and existing residents in the local environs. The operational phase of the proposed development, in terms of recreation and amenity facilities will, therefore, have a permanent significant positive impact on Human Health.

4.9.3 Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period or concentrated in a location. Cumulative effects can occur where a proposed development results in impacts that, when considered in combination with impacts of other proposed or permitted plans and projects may result in a cumulative effect.

As noted above there is potential for the construction phase of the proposed development to overlap with the construction of recently permitted developments in Mallow (as listed in Chapter 1 of this EIAR) which would increase the potential impacts on human health and population. During the operational phase, the cumulative impact of these applications is expected to be slight, long-term impact and positive by providing additional homes, childcare facilities, community spaces, and public open spaces for the local population.

4.10 Mitigation

4.10.1 Construction Phase Mitigation

Health and safety risks are the primary concern during the construction phase. These will be managed in accordance with Safety, Health, and Welfare at Work (Construction) Regulations, 2013. The design of the proposed development will be subject to safety design reviews to ensure that all requirements of the project are safe. A project supervisor for construction stage (PSCS) will be appointed and a contractor safety management program will be implemented to identify potential hazards associated with the proposed works. When issues are identified, corrective actions will be implemented to amend design issues prior to the issuance of final design for construction.

Temporary contractor facilities and areas under construction will be fenced off from the public with adequate warning signs of the risks associated with entry to these facilities. Entry to these areas will be restricted and they will be kept secure when construction is not taking place. Site lighting and camera security may be used to secure the site, and any lighting will be set up with consideration of the adjoining property.

Measures to ensure public safety, with respect to construction traffic and the construction phase have been included in the be included in the Construction and Environment Management Plan (CEMP) and outline Construction Traffic Management Plan (OCTMP) submitted with the application. A final CEMP and CTMP will be agreed with the Planning Authority prior to commencement of development.

Mitigation measures have been proposed by other disciplines within this EIAR. A summary of these measures is provided in Chapter 16 Summary of Mitigation Measures and Monitoring.

4.10.2 Operational Phase Mitigation

Measures to avoid potential negative impacts on Population and Human Health have been fully considered in the design of the project and are integrated into the final layout and design. Compliance with the layout and design will be a condition of the permitted development. As such no mitigation measures are required.

Mitigation measures have been proposed by other disciplines within this EIAR. A summary of these measures is provided in Chapter 16 Summary of Mitigation Measures and Monitoring.

4.10.3 Cumulative Mitigation

No cumulative mitigation measures are required.

4.11 Residual Impact Assessment

4.11.1 Construction Phase

The proposed mitigation measures above and those included in the CEMP will minimise the impacts on the population and human health during the construction phase of development. Any residual impacts are expected to be slight to imperceptible.

It is anticipated that the construction phase will have a positive overall economic benefit for the area.

Strict adherence to the mitigation measures recommended within this EIAR will ensure that there will be no negative residual impacts or effects on the Population and Human Health from the construction of the proposed scheme.

4.11.2 Operational Phase

It is anticipated that the proposed development will release significant positive overall economic and social benefit for the local community and the wider. Indeed, the delivery of much needed housing will have a positive effect for the local area.

4.11.3 Cumulative Impact

The proposed development, in combination with the recently permitted development in Mallow will have a cumulative positive impact on the area.

4.12 Monitoring

No specific monitoring is proposed. In general, monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission. It is anticipated that monitoring of compliance with Health & Safety requirements will be undertaken by the Project Supervisor for the Construction Process (PSCP).

4.13 Worst Case Scenario

In the event that all mitigation measures fail to hinder potential negative impacts, the possibility of an increase of traffic within the surrounding roads and junctions of the site can occur. Further, without these mitigation measures in place, noise caused by the construction of the proposed scheme may increase and can cause a disturbance to any residential dwellings and educational institutions in close proximity to the site. Further, when mitigation measures are not considered, there is the possibility of the impact on dust that can be carried throughout the site. Dust can expand beyond the site and create

adverse effects on the neighbouring environment, including the neighbouring stream along the northwest of the subject site, residential dwellings, schools, as well as businesses within the study area. However, it is imperative that mitigation measures are implemented to ensure that the worst-case scenario does not occur. When considering the mitigation measures that will be in place, the event of a worst-case scenario is deemed to be unlikely.

4.14 Significant Interactions

4.14.1 Land and Soil

During construction works offsite removal of surplus soil will be required. The necessary mitigation measures will be implemented to address any nuisance issues associated with dust dispersion during this time. No public health issues associated with the land, soil, geology conditions at the site have been identified for the Construction Phase of the proposed development. Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase that will be protective of site workers.

4.14.2 Hydrology and Hydrogeology

No public health issues associated with the water (hydrology and hydrogeology) conditions at the proposed development site have been identified for the Construction Phase or Operational Phase of the proposed development.

Appropriate industry standards and health and safety legislative requirements will be implemented during the construction phase that will be protective of site workers.

4.14.3 Air Quality and Climate

Interactions between Air Quality and Population and Human Health have been considered as the Operational Phase has the potential to cause health issues as a result of impacts on air quality from dust nuisances and potential traffic derived pollutants. However, the mitigation measures employed at the proposed development will ensure that all impacts are compliant with ambient air quality standards and human health will not be affected. Furthermore, traffic related pollutants have been assessed and determined as not significant, therefore, air quality impact from the proposed development are not expected to have a significant impact on population and human health.

4.14.4 Noise and Vibration

The impact assessment of noise and vibration has concluded that additional noise associated with the operation of on-site machinery will be intermittent and will not create any major negative impacts beyond the site boundary. Mitigation and monitoring measures will be incorporated to further reduce the potential for noise generation form the proposed development.

4.14.5 Landscape and Visual

During the Construction Phase there will be visual changes associated with removal of some vegetation and emerging plant and machinery. During the Operational Phase there will be permanent

visual changes to the landscape which may impact the residential dwellings surrounding the proposed development. A full impact assessment has been carried out in Chapter 10 Landscape and Visual Impact to quantify this impact.

4.14.6 Material Assets: Traffic and Transport

There can be a significant interaction between population and human health and traffic. This is due to traffic-related pollutants that may arise. In the current assessment, traffic derived pollutants which may affect Air Quality and thus Population and Human Health have been deemed as not significant.

4.14.7 Material Assets: Service Infrastructure and Utilities

The improper removal, handling, and storage of hazardous waste could negatively impact on the health of construction workers. Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health.

4.15 References & Sources

- Cork County Council Development Plan 2022
- The Provision of Schools and the Planning System - A Code of Practice for Planning Authorities (2008), The Department of Education and Science, and the Department of the Environment, Heritage and Local Government
- Central Statistics Office (CSO) Census 2016 Data.
- Central Statistics Office (CSO) Census 2022 Data.
- Primary School Enrolment Figures. Available at: https://www.gov.ie/en/collection/primary-schools/
- Post Primary School Enrolment Figures. Available at: https://www.gov.ie/en/collection/post-primary-schools/
- Pobal Maps Portal. Available at: https://maps.pobal.ie/

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 5

Land, Soil, & Geology

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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5 Soils & Geology

5.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the Proposed Development on the receiving land, soils and geology and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Land, soils, and geological characteristics of the receiving environment at the Site.
- Potential impacts that the Proposed Development may have on land, soils and geology including "worst case" scenario assessment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse impacts related to the Proposed Development.
- Evaluate the significance of any residual impacts.

This chapter of the EIAR should be read in conjunction with Chapter 4 Population and Human Health, Chapter 6 Hydrology and Hydrogeology, Chapter 7 Air Quality, Chapter 10 Landscape and Visual Impact, Chapter 11 Material Assets: Traffic & Transport, Chapter 12 Material Assets: Service infrastructure & Utilities and Chapter 13 Biodiversity of the EIAR and other information provided by the Applicant pertaining to the design proposals for the Proposed Development.

5.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Gareth Carroll, a Principal Consultant of Enviroguide Consulting.

Gareth Carroll holds a BA in Mathematics and a BEng in Civil, Structural and Environmental Engineering from Trinity College Dublin. Gareth Carroll, a Chartered Environmentalist with the Institute of Environmental Sciences (CEnv) and over 11 years' experience as an Environmental Consultant, has carried out environmental assessments for a range of project types and geological and hydrogeological site settings and been involved in the preparation of EIARs for the following projects:

- Large-Scale Residential Development at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18.
- Large-Scale Residential Development at White Car Park Site (Site A) at Blanchardstown Town Centre, Coolmine, Dublin 15.
- Strategic Housing Development at Rathgowan, Mullingar, Co. Westmeath.

5.3 Proposed Development

The Proposed Development will comprise the construction of 469 No. residential units, a creche, an interpretive centre / café, and all associated site development works.

The full description of the Proposed Development is outlined in Chapter 2 Site Location & Project Description of this EIAR.

The Site Layout for the Proposed Development is presented in Figure 2.3 of this EIAR.

5.3.1 Aspects Relevant to this Assessment

The Proposed Development will include the following components which are of particular relevance with respect to land, soils and geology.

5.3.1.1 Construction Phase

The Construction Phase of the Proposed Development will include:

- Building foundations will consist of strip foundations with mesh reinforcing.
- There will be no requirement for piling.
- Stripping of existing topsoil to a maximum depth of 0.3 meters below ground level (mbGL).
- Excavation for the construction of building foundations, roadways, drainage and utility infrastructure to depths of up to 3.19mbGL.
- Based on the preliminary cut & fill analysis (Kubla Ltd., 2024), the construction the Proposed Development will require the excavation of 51366m^3 of soil (17,189m^3 topsoil and 34,177m^3 subsoil). It is intended to reuse approximately 15,869m^3 of suitable excavated subsoil for landscaping and engineering use. However, it is estimated that approximately 35,497m^3 of excavated soil (17,189m^3 topsoil and 18,308m^3 subsoil) will require removal offsite in accordance with all statutory legislation.
- It is anticipated that there will be no requirement for the excavation of bedrock during the construction phase of the proposed development.
- Temporary stockpiling of excavated material pending re-use onsite or export offsite.
- The importation of aggregate fill materials will also be required for the construction of the Proposed Development (e.g., granular material beneath road pavement, under floor slabs and for drainage and utility bedding / surrounds etc.).

5.3.1.2 Operational Phase

The Operational Phase of the Proposed Development consists of the typical activities in a mixed use residential and retail / commercial development and with the exception localised gardening works by residents, there will be no bulk excavation of soils or bedrock or infilling of waste.

The land use at the Site will change from undeveloped land to mixed use residential and retail/commercial with associated vehicular and pedestrian access, car parking and landscaping.

There will be no requirement for bulk storage of petroleum hydrocarbon-based fuels during the Operational Phase of the Proposed Development as the main operating system for heating will be air to water heat pump and further details are provided in Chapter 12 Material Assets: Service Infrastructure and Utilities of this EIAR.

5.4 Methodology

5.4.1 Relevant Legislation & Guidance

The methodology adopted for this assessment takes cognisance of the relevant guidelines in particular, the following:

- S.I. No. 92 of 2011- European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment including amendments S.I. No. 52 of 2014.
- S.I. No. 98 of 2008- European Parliament and of the Council on waste and repealing certain Directives.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide (IGI, 2002).
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).
- Cork County Council, 2022. Cork County Development Plan 2022-2028.

5.4.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with the Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An assessment and impact determination stage were carried out by Enviroguide to establish the project location, type and scale of the development, the baseline conditions, and the type of land, soils and geological environment, to establish the activities associated with the Proposed Development and to undertake an assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the Site and receiving environment.

The study area, for the purposes of assessing the baseline conditions for the Land, Soils and Geology Chapter of the EIAR, extends beyond the Site boundaries and includes potential receptors with which there may be a pathway to/from the Proposed Development and receptors that may be indirectly impacted by the Proposed Development. The extent of the wider study area was based on the IGI, 2013 Guidelines which recommend a minimum distance of 2.0km from the Site.

The desk study involved collecting all the relevant data for the Proposed Development Site and surrounding area including published information and details pertaining to the Proposed Development provided by the applicant and design team.

A Site walkover survey to establish the environmental Site setting and baseline conditions at the Proposed Development Site relevant to the land, soil and geology environment was undertaken by Enviroguide on the 11th of December 2023 and the 15th of July 2024.

The Element 1 stage of the assessment was completed by Enviroguide and included the review of the following sources of information:

- Environmental Protection Agency (EPA) webmapping 2024 (EPA, 2024).
- Geological Survey of Ireland (GSI) Datasets Public Viewer and Groundwater webmapping, 2024 (GSI, 2024).
- Google Earth Mapping and Imagery, 2024 (Google Earth, 2024).
- Ordnance Survey Ireland (OSI) webmapping, 2024 (OSI, 2024).
- National Parks and Wildlife Services (NPWS) webmapping, 2024 (NPWS, 2024).
- Teagasc webmapping, 2024 (Teagasc, 2024).
- Information provided by the Applicant pertaining to the design proposals for the Proposed Development.
- Intrusive ground investigations including trial pitting was undertaken by Priority Geotechnical Ltd. (PGL) in February 2024. The results of the site investigations were used to identify and assess the existing ground conditions and geological environment at the site. The trial pit logs are included in Volume 3 Appendix 5.1 of this EIAR.

Element 2: Based on a review of the information compiled and reviewed in Element 1, it was determined that there was sufficient information including site investigation data regarding the Proposed Development and the subsurface and geological conditions at the Site to inform the impact assessment of the Proposed Development Site on the receiving land, soil, and geology environment.

Element 3: Evaluation of Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 of the assessment were considered in relation to the construction phase and operational phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Land, Soil and Geology sections of the EIAR in this Chapter which includes all the associated figures and documents.

5.4.3 Description of Importance of the Receiving Environment

The Transport Infrastructure Ireland (TII) criteria for rating of the importance of geological features at the Site as documented in the National Roads Authority Guidelines (NRA, 2009), are summarised in Table 5.1.

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter of the EIAR is described in Table 5.1.

Table 5. 1 Criteria for Rating Site Importance of Geological Features (Source: IGI, 2013)

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance, or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance, or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil onsite with previous heavy industrial usage. Large recent landfill Site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance, or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	Contaminated soil onsite with previous light industrial usage. Small recent landfill Site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance, or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent Site for construction and demolition wastes. Small historical and/or recent landfill Site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

5.4.4 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter is described in Table 5.2 as per EPA,2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Table 5. 2 Assessment of Potential Terminology and Methodology (Source: EPA, 2024)

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
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
Reversible	Effects that can be undone, for example through remediation or restoration

5.5 Difficulties Encountered

There were no difficulties were encountered in the preparation of this Chapter of the EIAR.

5.6 Baseline Environment

5.6.1 Site Location and Surrounding Land Use

The Site of the Proposed Development is located at Castle Park, Castlelands (townland), Mallow, Co. Cork. The Site is accessed via the Castle Park residential estate along Kingsfort Avenue, off St. Joseph's Road.

The area surrounding the Site is characterised by a mix of land uses. The Site is bound to the west by the Castle Park residential estate, to the north by Scoil Aonghusa Community National School and residential dwellings located off St. Joseph's Road, to the east by agricultural lands and to the south

by a public park located along the River Blackwater which is located approximately 0.08km south/ southeast of the Site.

The location of the Site is presented in Figure 5.1.

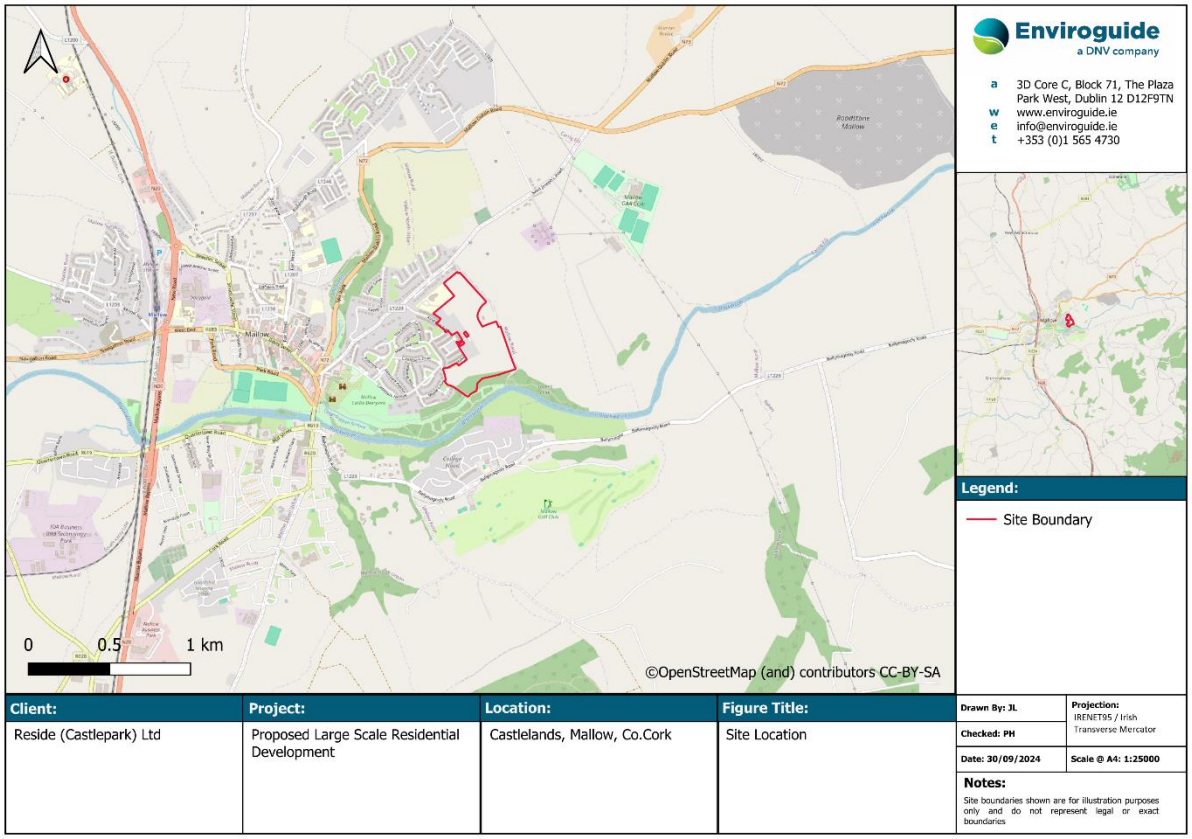

Figure 5.1 Site Location

5.6.2 Current and Historical Land Use

The Site is approximately 18.2 hectares (ha) and comprises undeveloped lands which were cleared as part of the construction works of the previously permitted schemes at the Site (Planning Ref. 0755006 and 0655035). It is noted that these previously permitted schemes at the Site were not fully developed before the expiry of the permissions.

Minor clearance works were also carried out in August 2022 to facilitate the undertaking of a topographical survey of the Site. The clearance activities on site were extremely minor in nature and related to the clearance of localised scrub (young sally/willows) and the removal of stockpiles of rubble and other construction material located on the southern boundary of the site which had been left there from the original phase of development.

Extensive areas within the Site have been historically used as construction compounds related to development of the previously permitted schemes. There are a number of temporary hardstands and construction roads crossing the Site and the subsoil is exposed in large areas of the Site.

The existing Site layout is presented in Figure 5.2.

The following land zoning and zoning objective, set out in the Cork County Development Plan 2022-2028 is applicable to the Site:

- 'Residential (RE)' which 'are intended primarily for housing development but may also include a range of other uses, particularly those that have the potential to foster the development of new residential communities.

Therefore, the Proposed Development is considered to meet the zoning objectives of the Cork County Development Plan 2022-2028.

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2024) and Google Earth (Google Earth, 2024) were reviewed and key observations onsite and offsite are summarised in Table 5.3.

Table 5. 3 Historical Land Use

Date	Information Source	Site Description
1837-1842	OSI Map 6 inch	**Onsite:** The Site is comprised of undeveloped grasslands divided by field boundaries. A walkway is identified from west to east through the central portion of the Site. **Offsite:** A ring fort is identified along the eastern boundary of the Site. There is a small building structure identified at the eastern boundary of the Site. The surrounding lands are predominantly open fields divided by field boundaries. The town of Mallow is located to the west of the Site. The Blackwater River is identified approximately 0.08km south of the Site at its closest point.
1888-1913	OSI 25 Inch	**Onsite:** No significant changes. **Offsite:** A new building structure is identified at the eastern boundary of the Site. A flood plain is identified along the northern bank of the Blackwater River which is located approximately 0.08km south of the Site.
1995	OSI Aerial Photograph	**Onsite:** No significant changes. **Offsite:** A residential dwelling is identified at the eastern boundary of the Site. There are also a number of residential dwellings identified along the northern boundary of the Site. There is an increase in residential and commercial development to the west and southwest of the Site.
1996-2000	OSI Aerial Photograph	**Onsite:** No significant changes. **Offsite:** A new building structure is identified adjacent to the residential dwelling previously identified along the eastern boundary of the Site. The Castlelands Mallow residential estate immediately west of the Site is under construction. There is further residential and commercial development to the north, west and southwest of the Site.
2001-2005	OSI Aerial Photograph	**Onsite:** There is ground disturbance works and temporary construction compounds identified across the Site. It is understood that the Site was stripped as part of the construction works of the previously permitted schemes at the Site. **Offsite:** The Castlelands Mallow residential estate immediately west of the Site remains under construction.
2006-20012	OSI Aerial Photograph	**Onsite:** The temporary construction compounds are no longer identified across the Site. Some access roads and hardstanding areas remain. **Offsite:** The construction of the Castlelands Mallow residential estate immediately west of the Site is completed.

Date	Information Source	Site Description
2013-2018	OSI Aerial Photograph	**Onsite:** No significant changes **Offsite:** No significant changes
2023	Google Earth	**On Site:** No significant changes. **Off Site:** No significant changes.

Figure 5.2 Existing Site Layout

5.6.3 Topography

The topography of the Site slopes southwards towards the Blackwater River. With ground elevations ranging from 87.5 meters above Ordnance Datum (mOD) in the north of the Site to 43mOD to the south of the Site.

The topographical survey of the Site is presented in Figure 5.3 (DOSA, 2024a).

Figure 5.3 Site Topography (DOSA, 2024a)

5.6.4 Soils

The soils beneath the majority of the Site have been mapped by the GSI (GSI, 2024) as deep well drained mineral (mainly acidic) Acid Brown Earths and Brown Podzolics derived from mainly non-calcareous parent materials (IFS Soil Code: AminDW). While the soils beneath the central portion of the Site and along the southern boundary of the Site have been mapped by the GSI (GSI, 2024) as shallow well drained mineral (mainly basic) Renzinas and Lithosols derived from mainly calcareous parent materials (IFS Soil Code: BminSW).

The GSI (GSI, 2024) mapped soils at the Site are presented in Figure 5.4.

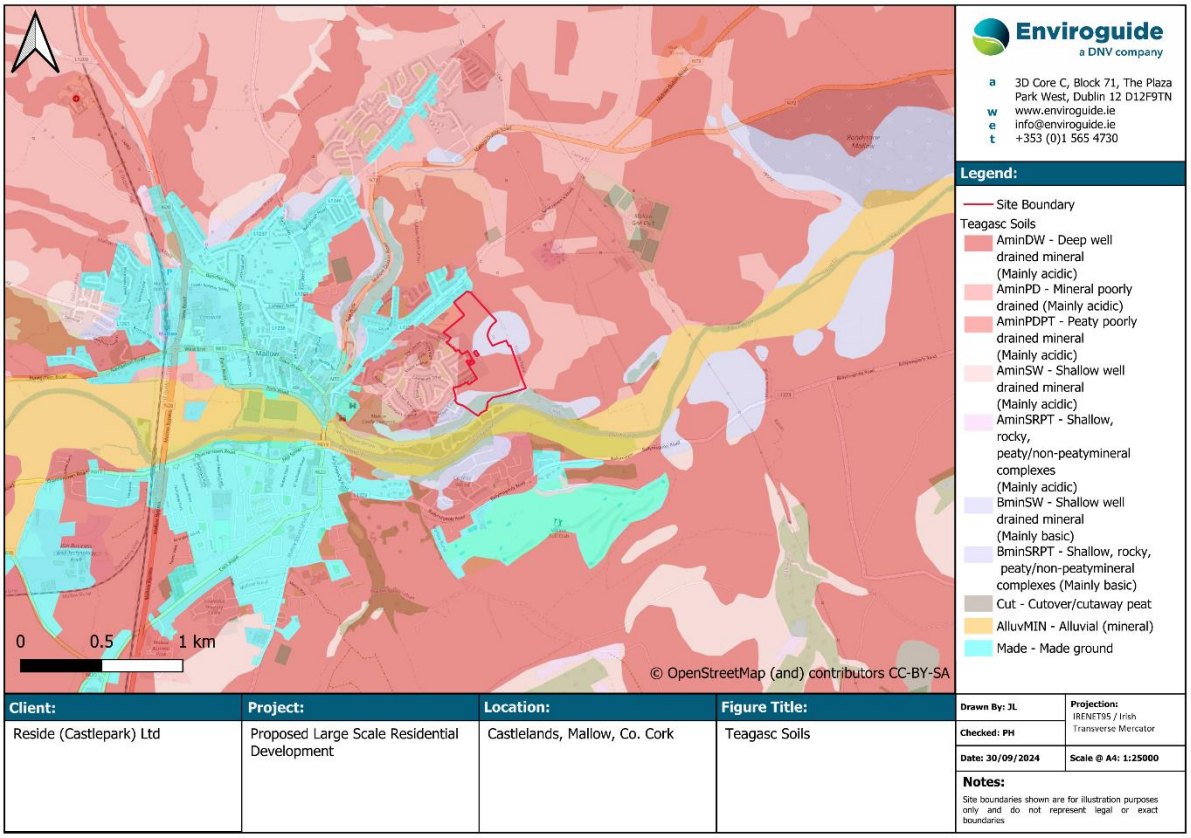

Figure 5.4 Teagasc Soils

5.6.5 Quaternary Geology

The quaternary sediments beneath the majority of the Site are mapped by the GSI (GSI, 2024) as till derived from Namurian sandstones and shales (TNSSs). While the quaternary sediments beneath the central portion of the Site and along the southern boundary of the Site are mapped by the GSI (GSI, 2024) as bedrock outcrop or subcrop (Rck).

The GSI (GSI, 2024) mapped quaternary geology at the Site is presented in Figure 5.5.

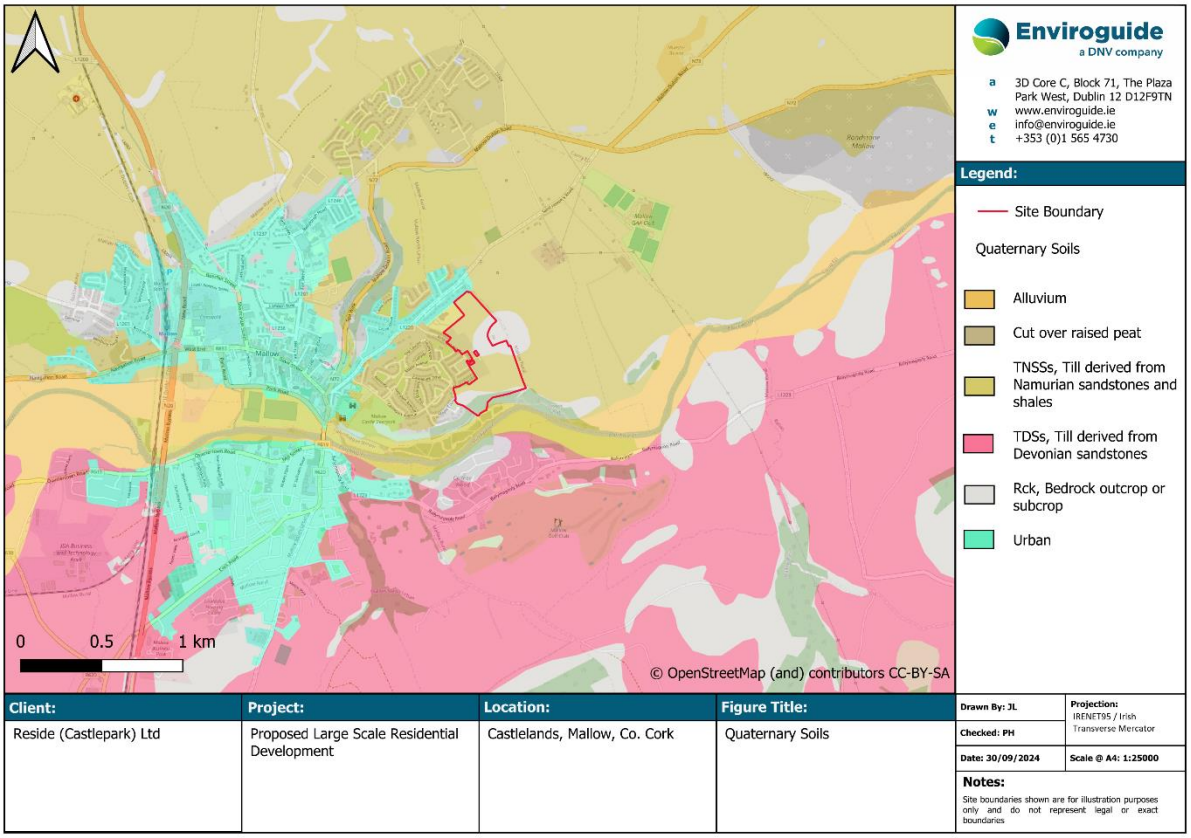

Figure 5.5 Quaternary Geology

5.6.6 Quaternary Geomorphology

The Blackwater River and the South Caherduggan River, which are located approximately 0.08km south and 0.40km west of the Site respectively, are identified by the GSI (GSI, 2024) as undifferentiated meltwater channels.

There are also a number of streamlined bedrock landforms, oriented southwest to northeast, identified within the vicinity of the Site, the closest of which is located 0.16km east of the Site.

5.6.7 Bedrock Geology

The bedrock beneath the majority of the Site is mapped by the GSI (GSI, 2024) as the Waulsortian Limestones (New Code: CDWAUL) which is described as massive, unbedded lime-mudstone. While the bedrock beneath the northern portion of the Site is mapped by the GSI (GSI, 2024) as the Hazelwood Limestone Formation (New Code: CDHAZE) which is described as pale-grey massive mud-grade limestone.

While there is no bedrock outcrops mapped by the GSI (GSI, 2024) within the Site boundary, there are a number of bedrock outcrops mapped within a 2km radius of the Site, the closest of which is located approximately 0.03km south of the Site.

The GSI (GSI, 2024) bedrock geology map is presented in Figure 5.6.

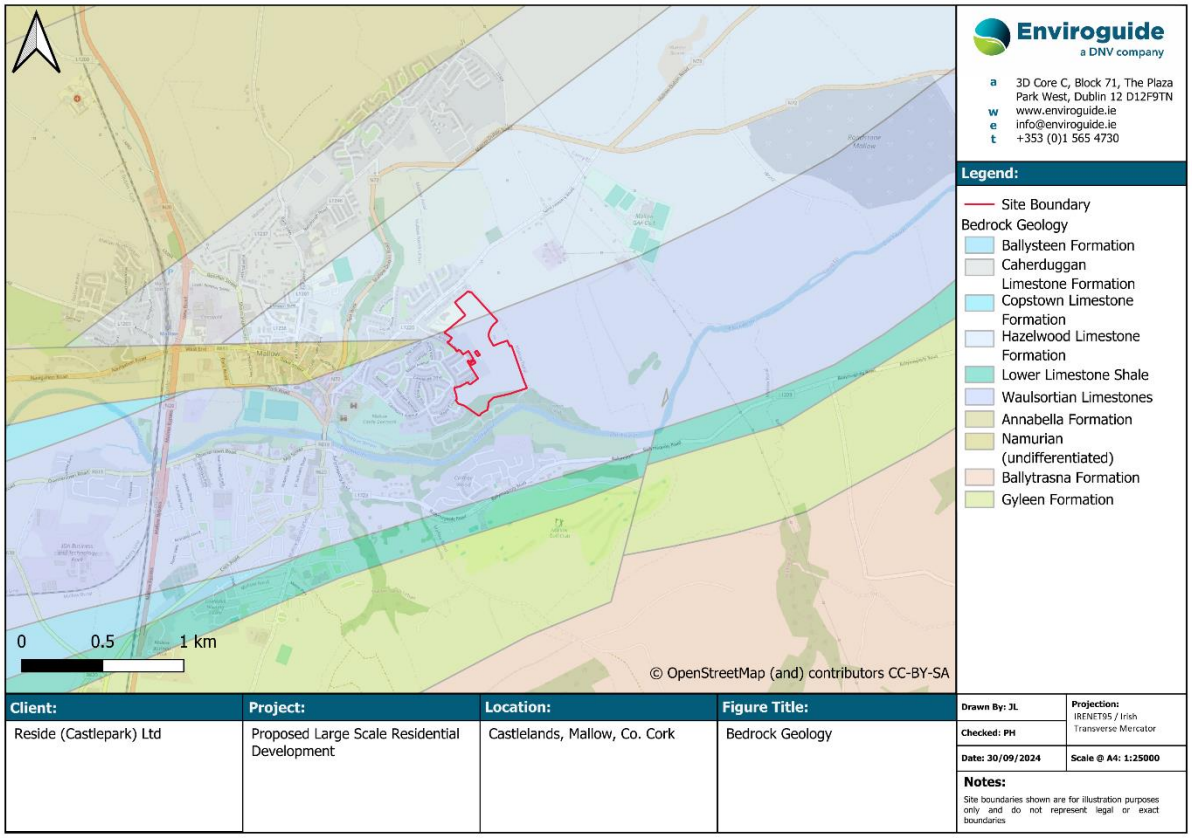

Figure 5.6 Bedrock Geology

5.6.8 Site Investigation

The soils and geology encountered during the site investigation undertaken by PGL in February 2024 are summarised as follows. The trial pit logs are included in Volume 3 Appendix 5.1 of this EIAR.

- Yellowish brown, slightly gravelly sandy CLAY was encountered from ground level to depths ranging from 0.3mbGL (SA02) to 1.7mbGL (SA03).
- At site investigation locations SA01 and SA02, the CLAY unit was observed to be underlain by brown, slightly clayey, slightly gravelly SAND to a maximum depth and final extent of excavation of 2.3mbGL (SA01).
- The CLAY unit was observed to be underlain by brown, clayey sandy GRAVEL at investigation location SA03 from 1.7mbGL to the final extent of excavation of 2.3mbGL.
- Bedrock was not encountered during the site investigation.

Groundwater was not encountered during the site investigation. Groundwater is assessed in Chapter 6 of this EIAR.

5.6.9 Geochemical Domain

The GSI along with the EPA have developed geochemically appropriate levels (GALs) for soil recovery facilities across Ireland specifically in relation to metals and metalloids in uncontaminated soil and stone (GSI, 2024). There are a total of seven defined domains across the country. The GSI (GSI, 2024) defined Geochemical Domains map indicates that the majority of the Site is located within Domain 1

which is characterised as *"Namurian shale and sandstone"*, while the central portion and southern boundary of the Site are located within Domain2 which is characterised as *"Carboniferous limestone, shale and related rocks".*

A summary of the metal's values for Domain 1 and Domain 2 are presented below in Table 5.4.

Table 5. 4 Geochemically Appropriate Levels for Domain 1 and Domain 2

Element	Units	Value	
		Domain 1	Domain 2
Arsenic	mg/kg	15.6	24.9
Cadmium	mg/kg	1.5	3.28
Chromium	mg/kg	51.5	50.3
Copper	mg/kg	51.2	63.5
Mercury	mg/kg	0.254	0.36
Nickel	mg/kg	47.8	61.9
Lead	mg/kg	48.3	86.1
Zinc	mg/kg	137.0	197.0

5.6.10 Radon

The Radon Risk Map of Ireland (EPA, 2024) shows a prediction of the number of the houses in any one area that are likely to have high radon levels. The map is based on an analysis of indoor radon measurements plus geological information including, bedrock type, quaternary geology, soil permeability and aquifer type.

The Site of the Proposed Development is mapped by the EPA (EPA, 2024) as being in an area where 'about 1 in 5 homes in this area is likely to have high radon levels'.

The EPA cite the reference level for radon as 200 Bq/m^3 and a High Radon Area where more than 10% of homes may have more than the reference level of radioactivity. As more than 10% of the houses in the area are mapped by the EPA as being over this reference level it indicates that the Site is considered a High Radon Area (EPA, 2024).

It is noted that north and mid Cork have one of the highest incidences of radon gas in the country (EPA, 2024).

5.6.11 Geohazards

Earthquakes are not likely to occur in the vicinity of the Site at a sufficient intensity to pose a risk for the Proposed Development.

The GSI database (GSI, 2024) indicated that the Site is located within an area of 'low' on the landslide susceptibility classification map.

While there is no karst features mapped by the GSI (GSI, 2024) at the Site itself, there is a spring (Karst Feature Name: Mallow Warm Spring) and a swallow hole recorded approximately 0.39km west and 1.48km northeast of the Site. It is noted that the spring is not located within the Waulsortian

Limestones or the Hazelwood Limestone Formation which are the bedrock formations beneath the Site.

5.6.12 Geological Heritage Sites

There are no geological heritage Sites mapped by the GSI (GSI, 2024) at the Site. However, there is an unaudited geological heritage Site, name the Lady's Well (a warm spring), mapped by the GSI (GSI, 2024) approximately 0.2km west of the Site. of within a 2km radius of the Site.

5.6.13 Economic Geology

The lands beneath the Site are mapped by the GSI (GSI, 2024) to have no mapped granular aggregate potential.

The bedrock beneath the Site has been identified by the GSI (GSI, 2024) as having a very high potential for crushed rock aggregate.

There is an active commercial quarry located approximately 2.3km northeast of the Proposed Development; Mallow Quarry, Lacknamina, Mallow, Co. Cork (Quarry No. C020). This quarry extracts and processes asphalt macadam, RMC, general fill, and agricultural lime to produce ready mix/bulk, blocks, asphalt/macadam plant, agricultural lime, and mortars (GSI, 2024).

While there are no historical pits and quarries mapped by the GSI (GSI, 2024) within the Site itself, there are a number of historical pits and quarries mapped within a 2km radius of the Site which are listed in Table 5.5.

Table 5. 5 Historic Pits and Quarries within a 2km Radius of the Site (Source: GSI, 2024)

Name/Type	Status	Distance from Proposed Development(km)	Location from Site
Quarry	Historic	0.34	West
Quarry	Historic	0.34	West
Quarry	Historic	0.69	West
Quarry	Historic	0.51	Northwest
Quarry	Historic	0.35	Northwest
Quarry	Historic	0.35	Northwest
Quarry	Historic	0.50	Northwest
Quarry	Historic	0.52	Southwest
Quarry	Historic	0.77	West
Quarry	Historic	0.70	Northwest
Quarry	Historic	0.76	Northwest
Quarry	Historic	0.81	Northwest
Quarry	Historic	0.6	North
Quarry	Historic	0.94	Northwest
Pit	Historic	1.29	Northwest
Quarry	Historic	1.26	North
Quarry	Historic	0.9	North
Quarry	Historic	1.41	North

Name/Type	Status	Distance from Proposed Development(km)	Location from Site
Quarry	Historic	1.77	Northeast
Quarry	Historic	1.85	Northeast
Quarry	Historic	1.9	Northeast
Quarry	Historic	1.34	Southwest
Quarry	Historic	1.71	Southwest
Quarry	Historic	1.83	Southwest
Quarry	Historic	1.66	Southwest
Quarry	Historic	1.95	Southwest

5.6.14 Importance of Baseline Environment

It is noted that, in accordance with the TII Guidance as documented by the NRA (NRA, 2009) and as outlined in Table 5.1, the soil underlying the Site of the Proposed Development would be rated as an attribute of 'low' geological importance given the presence of made ground and considering the subsoils are not mapped as containing a mineral resource. However, the bedrock underlying the Site of the Proposed Development would be rated as an attribute of 'high' geological importance considering the bedrock is mapped as having a very high potential for crushed rock.

5.7 The 'Do nothing' Scenario

The 'Do Nothing' scenario assesses the potential impact on the receiving land, soils, and geological environment if the Proposed Development did not proceed. It is considered that there would be no change or resulting impact on the nature of the Site with respect to land, soil and geology as the Site of the Proposed Development would remain as undeveloped land.

5.8 Potential Significant Effects

The procedure for determination of potential impacts on the receiving land, soils and geology is to identify potential receptors within the Site boundary and surrounding environment and use the information gathered during the desk study, the Site walkover undertaken in December 2023 and July 2024 and the PGL site investigation completed in February 2024 to assess the degree to which these receptors will be impacted upon in the absence of mitigation.

The potential impacts associated with the Construction Phase and Operational Phase of the Proposed Development are summarised below.

5.8.1 Construction Phase

5.8.1.1 Land Take and Land Use

The Site is approximately 18.2ha. The Proposed Development will require land take of approximately 12.7ha and will change from undeveloped lands to residential, interpretive centre/café, and creche use. The lands across the Site are zoned as 'Residential (RE)'. Therefore, the change in land use is in accordance with the zoning objectives as set out in the Cork County Development Plan 2022-2028

(CCC, 2022) and it is considered that there will be an unavoidable land take with loss of undeveloped land and soil with a 'negative', 'significant' and 'permanent' impact taking account of the surrounding land and zoning objectives.

5.8.1.2 Excavation and Removal of Soil and Subsoil

There will be unavoidable loss of in-situ soils and subsoils from the Site as result of landscape development and to achieve formation levels for the Proposed Development. It is proposed that excavated soil will be used to build up the Site to achieve the required ground levels for the Proposed Development. Excavation of bedrock is not anticipated.

The construction of the Proposed Development will require the excavation of 51,366m^3 of soil (17,189m^3 topsoil and 34,177m^3 subsoil) to depths of up to 3.19mbGL to achieve formation levels, for building foundations and for drainage and infrastructure. It is intended to reuse approximately 15,869m^3 of suitable excavated subsoil for engineering fill and landscaping, however it is anticipated that approximately 35,497m3 of excavated soil (17,189m3 topsoil and 18,308m3 subsoil) will be surplus to development and will require removal offsite. The soils underlying the Site are considered to have 'low' importance. Accordingly, there will be a 'negative' 'slight' and 'permanent' impact on the underlying soils at the Site.

Based on the preliminary cut & fill analysis (Kubla Ltd., 2024), the construction the Proposed Development will require the excavation of 51,366m^3 of soil (17,189m^3 topsoil and 34,177m^3 subsoil). It is intended to reuse approximately 15,869m^3 of suitable excavated subsoil for landscaping and engineering use. However, it is estimated that approximately 35,497m^3 of excavated soil (17,189m^3 topsoil and 18,308m^3 subsoil) will require removal offsite in accordance with all statutory legislation

The removal of surplus soil offsite will be undertaken in accordance with applicable statutory requirements. This may include where suitable, removal as by-products that meet the legislative requirements of Article 27 of the European Communities (Waste Directive) Regulations, 2011 (as amended). The potential impact with removal offsite of surplus soil and other material as wastes is assessed in Chapter 11 Material Assets: Traffic and Transport.

5.8.1.3 Soil Quality and Contamination

The Site currently comprises undeveloped lands which were stripped as part of the construction works of the previously permitted schemes at the Site (Planning Ref. 0755006 and 0655035) and includes some localised areas of made ground (i.e., temporary hardstanding areas and construction roads). The excavation and re-use of soil onsite will be subject to control procedures which will include soil quality testing to ensure suitability for use onsite and in accordance with engineering and environmental specification for the Proposed Development. Therefore, the reuse of soils onsite will result in a 'neutral', 'imperceptible' and 'permanent' impact on the quality of shallow soils underlying the site.

There is a potential risk associated with the use of cementitious materials during construction of subsurface structures (such as foundations) on the underlying soil and geology at the Proposed Development. It is considered that this may result in a 'negative', 'moderate' and 'long-term' impact on existing quality of soil within a localised area underlying the Proposed Development.

The potential accidental release of deleterious materials including fuels and other materials being used onsite, through the failure of secondary containment or a materials' handling accident on the Proposed Development could potentially result in a 'negative', 'moderate to significant', 'long-term' impact on the receiving soil and geology depending on the nature of the incident.

5.8.1.4 Dust Generation

There is a potential for creation of windblown dust generation from the temporary stockpiling of materials onsite. There will be some exhaust emissions generated from use of excavators, HGVs (heavy goods vehicles) and vibrating rollers during the Construction Phase of the Proposed Development. An assessment of the potential impact of the Proposed Development with regard to the generation of dust is addressed in Chapter 7 Air Quality of this EIAR.

5.8.1.5 Soil Structure

The excavation and re-use of soil at the Site will result in the exposure of the materials to various elements including weather and construction traffic. The temporary stockpiling of soils and subsoils pending reuse onsite will have a potential 'negative,' slight' and 'long term' impact' on the natural strength of the materials.

5.8.1.6 Importation of Fill Materials

The Proposed Development will require the importation of aggregates for the construction of roads and utility infrastructure. The potential impacts may include loss of attribute and changes in the geological regime at the source Site. It is anticipated that the required aggregates identified for importation onsite will be 'indirect' and have a 'neutral,' 'imperceptible' and 'permanent' impact on the source Site taking account of the fact that the statutory consent process would have required the necessary environmental impacts to be assessed and mitigated as appropriate at the source Site.

5.8.2 Operational Phase

During the Operational Phase of the Proposed Development there is a limited potential for any direct adverse impact on the receiving land, soil and geological environment taking account of the proposed design measures.

The design and construction of the Proposed Development in accordance with current Building regulations will ensure that the Site will be suitable for use for Operational Phase as a residential development with an interpretive centre/café and creche taking account of the geological Site setting.

5.8.3 Cumulative Effects

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or offsite projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

A search of planning applications located within the vicinity of the Proposed Development was conducted using online planning resources including the National Planning Applications Database

(MyPlan.ie) and Cork County Council's online planning database. Any planning application listed as granted, application registered or application pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on land, soils and geology. The larger-scale developments identified within the vicinity of the Site of the Proposed Development and considered for potential cumulative effects are listed in Table 5.6

Table 5. 6 Planning Applications in the Vicinity of Site

Planning Reference	Location	Development description	Status
226156	Scoil Aonghusa CNS, Kingfort Avenue, Castlepark Village, Castlelands, Mallow, Co. Cork	Permission for construction of a single storey extension to existing school (Scoil Aonghusa CNS) incorporating a special educational needs base and associated facilities, alterations to northeast and northwest elevations of existing school and all associated Site works including the construction of a soft fall play area and retaining wall with fencing.	Permission Granted
224676	Old Course, Spaglen, Mallow, Co. Cork	The construction of a residential development of 96 no. dwelling units and all associated Site development works. The Proposed Development consists of the construction of 24 no. 4-bed semi-detached houses, 30 no. 3-bed semi-detached houses, 16 no. 3-bed townhouses, 14 no. 2-bedtownhouses and 6 no. 2-bed duplex units, 4 no. 2-bed apartment units and 2 no. 1-bed apartments units contained in 3 no. 3 storey apartment blocks. Vehicular access to the Proposed Development will be via the existing entrance from the L-1207. The Proposed Development also includes open space, landscaping, bicycle parking facilities, bin stores, public lighting, and all ancillary Site development works. A Natura Impact Statement (NIS) has been prepared and will be submitted to the planning authority with the application. The NIS will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the offices of the planning authority.	Permission Granted
235197	"Clonmore", Ballyviniter Lower, Mallow, Co. Cork	Application for 1) The construction of 108 no. dwelling houses, consisting of 3 no. 4 bed detached, 2 no. 3 bed detached, 68 no. 4 bed semi-detached, 32 no. 3 bed semi-detached and 3no. 3 bed terraced houses. These houses area to be assessed through the existing completed part of the housing development; 2) A crèche of 380 sqm of single/two storey construction, also accessed from the existing completed part of the	Permission Granted

Planning Reference	Location	Development description	Status
		housing development, including 11 carparking spaces and associated works; 3) the provision of a 1.2m diameter culvert within this development. This leads to an open water course which is to be provided in lieu of the existing pipe works along the western boundary of the Site; 4) all associated Site development works. Extension of Duration to Permission granted under Planning Ref. No. 16/6949, ABP-301221-18.	
226225	Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork	The construction of 52 no. residential units comprising of 12 no. 3 bed units, 18 no. 2 bed units and 22 no. 1 bed units [a mix of 3 bed townhouses, 1 & 2 bed maisonettes and 1, 2 & 3 bed own-door apartments]. The unit's range in height from 2 to 3 storeys. Permission is also sought for the construction of 3 no. commercial units [Beauty Salon/Coffee Shop/Café and Newsagents] as well as a multi-purpose/ community space at ground floor level. The development also includes landscaping, drainage, boundary treatments, 96 no. bicycle parking spaces, 57 no. car parking spaces, bin storage, play area, planting/screening and all associated Site development works at Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork. A Natura impact statement will be submitted to the planning authority with this application. The Natura impact statement will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the office of the relevant planning authority.	Permission Granted
312640; ABP-312640-22	Anabella, Mallow, Co. Cork.	Permission application for the construction of 299 no. residential units (185 no. houses, 114 no. apartments) creche and associated Site works	Permission Granted
244243; ABP-320525-24	Spa Glen, Mallow, Co. Cork	Permission for following Large Scale Residential Development (LRD) comprising the demolition of the existing farmhouse/buildings and the construction of 186 no. residential units, 1 no creche and all associated ancillary development works including the signalisation of the N72/L5331 junction to provide improved sightline visibility, amendments to part of the existing hedgerow along the N72 to improve sightline visibility, 2 no. vehicular access points, 1 no. toucan and 3 no. uncontrolled pedestrian and cycle crossing points on the L5331, footpaths, parking, drainage, landscaping/amenity areas and	Permission Granted

Planning Reference	Location	Development description	Status
		the undergrounding of existing 38KV overhead electricity lines. A Natura Impact Statement is submitted to the planning authority with this application	
235952; ABP 301429-18, amended by ABP 311986-21.	Hazel Brooke, Spaglen (townland), Mallow, Cork	Extension of Duration application for the construction of a strategic housing development comprising of 148 no. residential units, a creche, the provision of landscaping and amenity area to include 3 no. local play areas and 3 no. neighbourhood play areas and all associated ancillary development to include the provision of improved pedestrian facilities including the installation of dropped kerbs and tactile paving, new pedestrian crossings and the realignment and improvement of the spa road junction and footpaths to the west, lighting, drainage, boundary treatments and bicycle & carparking and bin storage. Extension of Duration to Permission granted under Planning Ref. No. ABP Ref 301429-18 (as amended by ABP 311986-21).	Permission Granted
245530	Annabella, Mallow, Co. Cork	Permission for the construction of a creche facility to serve the adjacent permitted residential development (Cork County Council Ref. 15/6119 (extended under Ref. No. 20/6130) and all associated ancillary site development works including vehicular access, parking, footpaths, landscaping and amenity areas at Annabella (townland), Mallow, Co. Cork. The proposed creche will replace the creche previously permitted under Cork County Council Ref. 16/6023 (extended under ref. 22/6434).	Decision Pending Further Information

5.8.3.1 Excavation and Removal of Soil and Subsoil

Excavated soil and subsoil during the Construction Phase of the Proposed Development could potentially be directed to the same receiving waste facilities for recovery / disposal as excavated materials from other developments detailed in Table 5.6 and within the wider Cork area. All surplus soils and subsoils from the Site will be removed offsite in accordance with all statutory legislation. Accordingly, it is considered that any cumulative impact on lands, soils and geology associated with the Proposed Development will be 'neutral', 'imperceptible' and 'permanent'.

5.8.3.2 Import of Aggregates and Materials

The importation of aggregates to the Proposed Development may be sourced from the same borrow site as other permitted developments listed above. However, contract and procurement procedures will ensure that all aggregates and fill material originating from quarry sources that will be required for construction are sourced from reputable authorised suppliers operating in a sustainable manner and in accordance with the necessary statutory consents. Therefore, regardless of the number of other

projects and developments using aggregates from the same source sites, there will be an 'indirect', 'neutral', 'imperceptible' and 'permanent' impact on the geological environmental at the source site.

There are no other cumulative impacts associated with land, soil and geology associated with the Construction Phase and Operational Phase of the Proposed Development.

5.9 Mitigation and Monitoring

The mitigation measures as outlined below, will ensure that there will be no significant impact on the receiving land, soil and geology.

5.9.1 Construction Phase Mitigation

Enviroguide Consulting have prepared a Construction Environmental Management Plan (CEMP) (Enviroguide Consulting, 2024a) and a preliminary Resource Waste Management Plan (RWMP) (Enviroguide Consulting, 2024b) for the Construction Phase of the Proposed Development. Following appointment, the contractor will be required to implement the measures set out CEMP and RWMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001).

The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development.

5.9.1.1 Import of Aggregates and Materials

Contract and procurement procedures will ensure that all imported aggregates and materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. The importation of aggregates and materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite.

5.9.1.2 Airborne Dust Generation

Excavated soils will be carefully managed and maintained in order to minimise potential impact on soil quality and soil structure. Handling of soils will be undertaken in accordance with documented procures outlined in the CEMP (Enviroguide Consulting, 2024a) that will be set out in order to protect ground and minimise airborne dust. The normal measures required to prevent airborne dust emissions and associated nuisance arising from Site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. This may require additional wetting at the point of dust release, dampening down during dry weather and wheel cleaning for any vehicles leaving the Site. Potential

impacts and avoidance and mitigation measures associated with generation of dust are addressed in Chapter 7 Air Quality of this EIAR.

5.9.1.3 Reuse of Soil

Soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject assessment of the suitability of for use in accordance with engineering and environmental specification for the Proposed Development.

5.9.1.4 Management and Control of Soils and Stockpiles

Segregation and storage of soils for re-use onsite or removal offsite and waste for disposal offsite will be segregated and temporary stored onsite pending removal or for reuse onsite in accordance with the measures outlined in the CEMP (Enviroguide Consulting, 2024a).

Where possible, stockpiling of soils and subsoils onsite will be avoided. However, in the event that stockpiling is required, stockpiled materials, pending reuse onsite, will be located away from the location of any sensitive receptors (watercourses and drains). In accordance with Inland Fisheries Ireland guidelines, stockpiles will not be allowed within 50m of the open water where sufficient working areas are available within the Site boundary.

The re-use of suitable cut material onsite for the Proposed Development (i.e., landscaping, raising levels or engineering fill) will be undertaken in accordance with the engineered design of the Proposed Development. Surplus or unsuitable soils will be removed offsite.

Surplus material, not suitable for reuse onsite, will be segregated, and stockpiled appropriately for removal offsite. For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery Site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows:

- A suitable temporary storage area shall be identified and designated. Storage areas must be on flat ground located as far as feasible from any existing surface water drains and the River Blackwater (a minimum set back of 50m from watercourses will be maintained).
- Stockpiles will not be located near Site boundaries.
- All stockpiles shall be assigned a stockpile number.
- Material identified for reuse on Site, off Site and waste materials will be individually segregated and all segregation, storage and stockpiling locations will be clearly delineated on the Site drawings.
- Soil stockpiles will be sealed to prevent run-off from the stockpiled material and/or the generation of dust either via revegetation of stockpiles or where this is not possible via geotextile (e.g., hessian).
- Silt fencing / bunding will be installed around the stockpile to ensure no soils and sediments are washed out overland to the existing surface water networks, or directly into River Blackwater. The silt fencing / bunding will be monitored daily by the appointed contractor and silt will be removed as required.
- Material identified for reuse on Site, off Site and waste materials will be individually segregated.

- Any waste that will be temporarily stored / stockpiled will be stored on impermeable surface high-grade polythene sheeting, hardstand areas or skips to prevent cross- contamination of the soil/subsoil below and covered with impermeable sheeting.
- Stockpiles will be graded to a <1:4 profile. Topsoil and subsoils will be stored separately. Stockpiles of mineral soils and peat (in the unlikely event that peat soils are encountered) will be <2m and <1m respectively. Stockpiles will be covered with plastic sheeting during wet weather to prevent run-off of silt. Excavated material will be used for backfill where possible. Surplus material will be removed from Site.
- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the Site.
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust.

Any waste generated from construction activities, including concrete, asphalt and soil stockpiles, will be managed in accordance with the procedures outlined in the CEMP (Enviroguide Consulting, 2024a), and the RWMP (Enviroguide Consulting, 2024b) and will be stored onsite in such a manner as to:

- Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/odour 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.
- Prevent hazards to Site workers and the general public during Construction Phase (largely noise, vibration and dust.

5.9.1.5 Soil Structure

The extent of the required work area and the bulk excavation at the Site will be minimised where appropriate to prevent unnecessary excavation of soil and tracking over soil and subsoil outside of the excavation work areas as a result of compaction and rutting from construction traffic.

Dedicated internal haul routes will be established and maintained by the contractor to prevent tracking over unprotected soils. The following criteria for the siting of haul routes must be adhered to:

- The length of haul routes on the site shall be minimised.
- The contour of the natural ground shall be followed as much as possible.
- The slope of haul routes shall not exceed 15%.
- Haul routes shall be constructed using permeable material, laid on geotextile.
- Trenchless gravel banks shall be used to filter runoff, and where possible existing vegetation along the perimeter of the haul routes shall be retained to provide an effective buffer against sediment leaving the area.
- Haul routes shall be at least 10m from a watercourse and shall be isolated from any watercourses with silt fencing.

Exclusion zones will be established where soft landscaping is proposed in particular along Site boundaries which are outside of the excavation areas to ensure soil structure is maintained.

5.9.1.6 Export of Resource (Soil and Subsoil) and Waste

All surplus materials and any waste will be removed offsite in accordance with the requirements outlined in the CEMP (Enviroguide Consulting, 2024a) and the RWMP (Enviroguide Consulting, 2024b) and will be managed in accordance with all legal obligations. It will be the contractor's responsibility to either; obtain a waste collection permit or, to engage specialist waste service contractors who will possess the requisite authorisations, for the collection and movement of waste offsite.

The re-use of soil and subsoil offsite will be undertaken in accordance with all statutory requirements and obligations including where appropriate re-use as by-product in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 (SI No. 126 of 2011) as amended.

Any surplus material not suitable for re-use as a by-product and other waste materials arising from the Construction Phase will be removed offsite by an authorised contractor and sent to the appropriately authorised (licensed/permitted) receiving waste facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility Sites will have been adequately assessed and mitigated as part of the statutory consent procedures.

Any waste soils will be transported under a valid waste collection permit issued under the Waste Management (Collection Permit) Regulations 2007, as amended and will be delivered to an appropriately authorised waste management facility.

Materials and waste will be documented prior to leaving the Site. All information will be entered into a waste management register kept on the Site.

Vehicles transporting material with potential for dust emissions to an offsite location shall be enclosed or covered with a tarpaulin at all times to restrict the escape of dust.

Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary. The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road by construction/ delivery vehicles. All vehicles exiting the Site will make use of a wheel wash facility where appropriate, prior to exiting onto public roads.

5.9.1.7 Concrete Works

The cementitious grout and other concrete works during the Construction Phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the Contractor and in accordance with the CEMP (Enviroguide Consulting, 2024a) and relevant industry standards.

Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater.

All ready-mixed concrete will be delivered to the Site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal

offsite in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite.

A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge.

5.9.1.8 Handling of Fuels, Chemicals and Materials

Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (Enviroguide Consulting, 2024a), in a designated area of the Site away from any watercourses and drains (at least 50 m from a spring or borehole and 10 m from a watercourse or drain where not possible to carry out such activities offsite).

Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas (Enviroguide Consulting, 2024a). These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan (Enviroguide Consulting, 2024a).

As outlined in the CEMP (Enviroguide Consulting, 2024a), spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the Site will also be equipped with its own spill kit.

5.9.1.9 Emergency Procedures

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. Residual soil will be tested to validate that all potentially contaminated

material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.

- All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages.
- All construction works staff onsite will be fully trained on the use of equipment.

This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the Construction Phase of the Proposed Development.

5.9.1.10 Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the Construction Phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor.

Any connection to the public foul drainage network during the Construction Phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by UE.

5.9.1.11 Monitoring

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
- Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measure that are protective of water quality are fully implemented and effective.
- Materials management and waste audits will be carried out at regular intervals to monitor the following:
    - Management of soils onsite and for removal offsite.
    - Record keeping.
    - Traceability of all materials, surplus soil and other waste removed from the Site.
    - Ensure records are maintained of material acceptance at the end destination.

5.9.2 Operational Phase Mitigation

There is no requirement for mitigation measures for the Operational Phase taking account of the design measures for the Proposed Development.

5.9.3 Cumulative Mitigation

There is no requirement for mitigation measures to address potential cumulative impacts taking account of the design measures for the Proposed Development.

5.10 Residual Impact Assessment

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

5.10.1 Construction Phase

The predicted impacts of the Construction Phase of the Proposed Development are described in Table 5.7 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

Overall, there is no significant residual impacts on land, soils and geology anticipated regarding the Construction Phase of the Proposed Development.

Table 5. 7 Residual Impacts (Construction Phase)

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Construction of the Proposed Development	Land Take and Land Use	The Proposed Development will require land take of approximately 12.7ha and will change from undeveloped lands to mixed residential and retail / commercial land use.	Negative	Significant	Permanent	Direct	Unavoidable and no mitigation. The Proposed Development will develop lands in line with the land zoning as set out in the Cork County Council Development Plan 2022-2028.	Significant
Excavation of In-situ Soils	Soils	There will be an unavoidable loss of 51,366m^3 of excavated topsoil and subsoil through excavation works to achieve the formation levels for the Proposed Development including building foundations, roadways, parking, drainage	Negative	Slight	Permanent	Direct	None required. It is intended to reuse approximately 15,869m^3 of suitable excavated subsoil for engineering fill and landscaping.	Slight

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
		infrastructure and landscaping.					The removal of all surplus soil will be undertaken in accordance with applicable statutory requirements.	
Removal of Surplus Soil	Land, Soil and Geology at Receiving Facility	Excavated soil and subsoil during the Construction Phase of the Proposed Development could potentially be directed to the same receiving waste facilities for recovery / disposal as excavated materials from other developments.	Neutral	Imperceptible	Permanent	Cumulative	None required. All surplus soils and subsoils from the Site will be removed offsite in accordance with all statutory legislation.	Imperceptible
Use of Cementitious Materials	Soils and Subsoils	Potential release of cementitious material during construction works for foundations, pavements and infrastructure to the land, soil, and geological environment.	Negative	Moderate	Long Term	Direct	Where cast-in-place concrete is required, all work will be carried out to avoid any contamination of the receiving land, soil and geological environment through the use of appropriate	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
							design and methods implemented by the appointed Contractor and in accordance with the CEMP and relevant industry standards	
Accidental Release of Deleterious Materials (e.g., Fuels or Other Hazardous Materials Being Used Onsite).	Soils, Subsoils and Bedrock	Potential (albeit low) for uncontrolled release of deleterious materials including fuels and other materials being used onsite, through the failure of secondary and tertiary containment or a materials handling accident, to the land, soil, and geological environment.	Negative	Moderate to Significant	Long Term	Direct / Worst Case	Refuelling of plant and storage of any deleterious materials including fuels will be undertaken in accordance with the requirements and procedures outlined in the CEMP.	Imperceptible
Stockpiling of Excavated Soil and Subsoils	Soil Structure	The temporary stockpiling of excavated soils will result in exposure of the materials to various elements including weather.	Negative	Slight	Long-term	Direct	The segregation and stockpiling of soil and stone at the Site pending reuse or removal offsite will be carefully managed and maintained in	Slight

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
							order to minimise potential impact on soil quality.	
Import of Required Soil, Subsoil and Aggregates	Land, Soil and Geology at the Source Site	The Proposed Development will require the importation of aggregates for the construction of roads and utility infrastructure. The potential impacts may include loss of attribute and changes in geological setting at the source Site.	Negative	Slight	Permanent	Indirect	Only certified materials from authorised sources will be used.	Imperceptible.

5.10.2 Operational Phase

There will be no direct or indirect impact on the receiving land, soils and geological environment associated with the Operational Phase of the Proposed Development.

5.10.3 Cumulative Impact

There will be no cumulative impact on the receiving land, soils and geological environment associated with the Construction Phase and Operational Phase of the Proposed Development.

5.11 Risk of Major Accidents or Disasters

Earthquakes are not likely to occur in the vicinity of the subject Site at a sufficient intensity to pose a risk for the Proposed Development. The GSI database indicates the subject Site is located within an area of 'Low' susceptibility to landslides. Thus, the impacts of landslides to the Proposed Development are considered 'neutral' 'imperceptible' and 'permanent'.

There is no karst features recorded within the Site boundary. However, the potential presence of karst could result in potential ground stability issues with a potential for a "negative" "moderate" and "permanent" impact. Appropriate geotechnical design avoidance and reductive measures will be incorporated in the design to prevent any potential impacts associated with karst. Detailed design will be specified by an appropriately qualified geotechnical engineer for the construction of foundations at the Site to ensure that ground conditions are engineered and controlled appropriately and therefore the potential impacts of karts features on the Proposed Development are considered 'neutral' 'imperceptible' and 'permanent'.

The EPA maps the majority of the Proposed Development Site within an area where 'about 1 in 5 homes' are likely to have high radon levels. Therefore, the Site is considered to be located within a High Radon Area. The design and specification for all buildings will be in accordance with current Building Regulations and therefore any potential issues associated with radon will be addressed and avoided. Therefore, the potential risks associated with radon at the site is considered 'neutral' 'imperceptible' and 'permanent'.

All aggregates imported to the site for use in the Proposed Development will be subject to strict quality control procedures in accordance with the design specification and relevant Building Regulations therefore avoiding any potential issues with pyrite in aggregates. Therefore, the impacts of imported aggregates for use in the Proposed Development is considered 'neutral' 'imperceptible' and 'permanent'.

5.12 Significant Interactions

5.12.1 Population and Human Health

An assessment of the potential impact of the Proposed Development on human health is included in Chapter 4 of this EIAR. There is a potential risk of dust generated from excavation and stockpiling of soil during the Construction Phase of the Proposed Development posing a human health risk in the

absence of standard avoidance and mitigation measures which will be implemented to be protective of human health.

Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase of the Proposed Development that will be protective of Site workers.

5.12.2 Biodiversity

An assessment of the potential impacts of the Proposed Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna which may be impacted a result of the excavation and importation of materials to the Site are included in Chapter 13 of this EIAR. It also provides an assessment of the impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

5.12.3 Hydrology and Hydrogeology

An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is included in Chapter 6 of this EIAR. In the absence of avoidance, remedial and mitigation measures, there is a potential for sediment from excavated soils entering runoff and discharging into the Blackwater River and local drainage within the Castlelands Park estate during the Construction Phase of the Proposed Development. Procedures for the protection of receiving water environment are set out in Chapter 6 of this EIAR.

5.12.4 Air Quality and Climate

The excavation of soils across the Site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust) during the Construction Phase of the Proposed Development. An assessment of the potential impact of the Proposed Development on air quality is included in Chapter 7 of this EIAR.

5.12.5 Landscape and Visual

During the Construction Phase and into the Operational Phase of the Proposed Development, the Site landscape will undergo a change from undeveloped lands to residential with associated landscaping. An assessment of the potential impact of the Proposed Development on the receiving landscape is included in in Chapter 10 of this EIAR.

5.12.6 Material Assets: Traffic and Transport

Where possible, it is intended to retain and re-use the excavated soil and subsoil on the Site for engineering fill and landscaping. However, it is anticipated that approximately 26,899.58m^3 of excavated soil (17,189.14m^3 topsoil and 9,710.44m^3 subsoil) will require removal offsite. There is also a requirement to import aggregates during the Construction Phase of the Proposed Development. The assessment of the potential impact of the Proposed Development is included in Chapter 11 of this EIAR.

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Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 6

Hydrology and Hydrogeology

Ocotober 2024

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CHARTERED PLANNING CONSULTANTS

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6.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the Proposed Development on the receiving hydrology and hydrogeology and sets out any required mitigation measures where appropriate.

The principal objectives of this chapter are to identify:

- Hydrological and hydrogeological characteristics of the receiving environment at the Site.
- Potential impacts that the Proposed Development may have on the receiving water environment including "worst case" scenario assessment.
- Potential constraints that the environmental attributes may place on the Proposed Development.
- Required mitigation measures which may be necessary to minimise any adverse impacts related to the Proposed Development.
- Evaluate the significance of any residual impacts.

This chapter of the EIAR should be read in conjunction with Chapter 4 Population and Human Health, Chapter 5 Land, Soils & Geology, Chapter 12 Material Assets: Service Infrastructure & Utilities and Chapter 13 Biodiversity of the EIAR and other information provided by the Applicant pertaining to the design proposals for the Proposed Development.

6.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Gareth Carroll, a Principal Consultant at Enviroguide Consulting.

Gareth Carroll holds a BA in Mathematics and a BEng in Civil, Structural and Environmental Engineering from Trinity College Dublin. Gareth isa Chartered Environmentalist with the Institute of Environmental Sciences (CEnv) and has over 11 years' experience as an Environmental Consultant. He has carried out environmental assessments for a range of project types and geological and hydrogeological site settings and been involved in the preparation of EIARs for the following projects:

- Large-Scale Residential Development at Wayside, Enniskerry Road and Glenamuck Road, Kilternan, Dublin 18.
- Large-Scale Residential Development at White Car Park Site (Site A) at Blanchardstown Town Centre, Coolmine, Dublin 15.
- Strategic Housing Development at Rathgowan, Mullingar, Co. Westmeath.

6.3 Proposed Development

The Proposed Development will comprise the construction of 469 No. residential units, a creche, an interpretive centre / café, and all associated site development works.

The full description of the Proposed Development is outlined in Chapter 2 Site Location & Project Description of this EIAR.

The Site Layout for the Proposed Development is presented in Chapter 2 Site Location & Project Description, Figure 2-1 of this EIAR.

6.3.1 Aspects Relevant to this Assessment

The Proposed Development will include the following components which are of particular relevance with respect to hydrology and hydrogeology.

6.3.1.1 Construction Phase

The Construction Phase of the Proposed Development will include:

- Building foundations will consist of strip foundations with mesh reinforcing.
- There will be no requirement for piling.
- Stripping of existing topsoil to a maximum depth of 0.3 meters below ground level (mbGL).
- Excavation for the construction of building foundations, roadways, drainage and utility infrastructure to depths of up to 3.19 mbGL.
- Based on the preliminary cut & fill analysis (Kubla Ltd., 2024), the construction the Proposed Development will require the excavation of 51, 366m^3 of soil (17,189m^3 topsoil and 34,177m^3 subsoil). It is intended to reuse approximately 15,869m^3 of suitable excavated subsoil for landscaping and engineering use. However, it is estimated that approximately 35,497m^3 of excavated soil (17,189m^3 topsoil and 18,308m^3 subsoil) will require removal offsite in accordance with all statutory legislation.
- It is anticipated that there will be no requirement for the excavation of bedrock during the construction phase of the proposed development.
- It is anticipated that excavations for construction of the Proposed Development will be above groundwater, however there may be a requirement for management of surface water (rainwater) where encountered within excavations during groundworks.
- Temporary stockpiling of excavated material pending re-use onsite or export offsite.
- Within the Site where possible, existing ditches, trees and hedgerows will be maintained.
- Construction of new surface water drainage designed in accordance with the principles and objectives of Sustainable Drainage Systems (SuDS) and the Greater Dublin Sustainable Drainage System (GDSDS) and the requirements of Cork County Council.
- Construction of new foul drainage and mains water connections in accordance with Uisce Éireann (UÉ) Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03), UE's Code of Practice for Water Infrastructure (IW-CDS-5020-03).

6.3.1.2 Operational Phase

6.3.1.2.1 Surface Water Drainage

As outlined in the Infrastructure Report (Denis O'Sullivan & Associates Consulting Engineers (DOSA), 2024a submitted with the planning application) and the Surface Water Management Plan (DOSA, 2024b also submitted with the planning application), surface water at the Proposed Development will be managed in accordance with the principals and objectives of Sustainable Drainage Systems (SuDS) and the Greater Dublin Sustainable Drainage System (GDSDS) to treat and attenuate water prior to discharging offsite.

The Proposed Development has been divided into three (3No.) catchment areas (Catchment No.1, Catchment No.2 and Catchment No.3). Surface water from the Site's road network, driveways and building roofs in each catchment of the Proposed Development will be directed through a petrol interceptor and attenuation tank before discharging at greenfield runoff rates (Catchment No.1: 35.3l/s, Catchment No.2: 5.7l/s and Catchment No.3: 3.5l/s) to the existing surface water drainage network located in the adjoining Castle Park residential estate to the west of the Site (DOSA, 2024a and DOSA, 2024b).

Surface water from the Proposed Development will ultimately outfall to the Blackwater River approximately 0.08km south of the Site. It is noted that there are no new proposed outfalls to the Blackwater [Munster] River.

The surface water drainage for the Proposed Development has been designed to cater for surface water runoff from all hard surfaces including roadways, carparks, and roofs, and will adequately accommodate the 1 in 100 year rainfall event plus 20% to account for the effects of climate change (DOSA, 2024a and DOSA, 2024b).

The following attenuation and SuDS measures will be incorporated into the Proposed Development as detailed in the Infrastructure Report (DOSA, 2024a) and the Surface Water Management Plan (DOSA, 2024b):

- Permeable paving to reduce the overall impermeable area of the Proposed Development.
- Rainwater harvesting to catch runoff from the rear sloping side of the dwelling.
- Infiltration basins within green spaces to store runoff on the surface and infiltrate it gradually into the ground
- Filter drains comprising perforated collection pipes and permeable material to treat, convey and attenuate runoff and facilitate additional infiltration to ground where the ground conditions allow.
- Tree pits to collect and store runoff and providing treatment via filtration and phytoremediation.
- Detention basins to attenuate surface water and restrict the outflows from the Proposed Development to greenfield runoff rates.
- Hydrobrakes, or similar approved, at the surface water outfalls of the surface water catchment (i.e., Catchment No.1, Catchment No.2 and Catchment No.3) to further restrict the outflows from the Proposed Development to greenfield runoff rates. The hydrobrakes will be fitted with a pull cord bypass and penstock valve installed on the inlet to the manhole for maintenance purposes.
- Petrol interceptors (Conder Bypass Separator Types or similar approved) provided upstream of the attenuation tanks / detention basins for each surface water catchment (i.e., Catchment No.1, Catchment No.2 and Catchment No.3) to treat potential hydrocarbon contaminants entrained in surface water runoff from trafficked areas of the Site.
- Within the Site where possible, existing ditches, trees and hedgerows are to be maintained. Incorporating these existing drainage features into the proposed overall SuDS strategy would provide for greater storage volume capacity within the site and will assist in the conveyance and treatment of the generated surface water runoff. The retention of existing trees and hedgerows will also assist in the reduction of surface water runoff by evapotranspiration. Any existing ditches that are to be retained, particularly along the existing field boundaries shall

be cleaned out and assessed during the construction of the development. All ditches and existing drainage features being retained shall be incorporated into the proposed overall surface water network for the overall Site.

- Swales to treat, convey and attenuate surface water runoff and facilitate additional infiltration to ground where the ground conditions allow.

The proposed surface water drainage and schematic SuDS design is appended to the Surface Water Management Plan (DOSA, 2024b; Drawing No.'s 6621-2027, 6621-2028 and 6621-2029).

6.3.1.2.2 Foul Water

As outlined in the Infrastructure Report (DOSA, 2024a submitted with the planning application), foul water from the Proposed Development will discharge to the existing UÉ foul sewer, located in the adjacent Castle Park residential estate to the west of the Site. The UÉ CoF letter dated the 25th of September 2024 (UÉ COF Reference: CDS22002703) confirms that the wastewater connection is feasible without infrastructure upgrade by UÉ (refer to Appendix A of the Infrastructure Report submitted with the planning application (DOSA, 2024a)).

It is noted that the existing Castlelands estate has not yet been taken in charge and the applicant is the owner of all roads, common areas and service networks within the existing Castlelands estate. The Applicant has the relevant control and authority to undertake any infrastructure upgrades which may be identified by Uisce Éireann as part of the connection application. The Applicant is in a position to obtain all necessary quality assurances, wayleaves, easements, confirmation of capacity and permissions with regard to infrastructure connections to the development (DOSA, 2024a).

All works will be in accordance with Uisce Éireann Code of Practice for Wastewater Supply and the Wastewater Infrastructure Standard Details (Document Number: IW-CDS-5030-01).

Foul water from the Proposed Development will be treated at the Mallow WWTP (EPA Licence No. D0052-01) before ultimately discharging to Blackwater [Munster] River (EU Code: IE_SW_18B021720).

The proposed foul water drainage design is appended to the Infrastructure Report (DOSA, 2024a; Drawing No.'s 6621-2020, 6621-2021 and 6621-2022).

6.3.1.2.3 Water Supply

As detailed in the Infrastructure Report (DOSA, 2024a included with the planning application), water supply to the Proposed Development will be from the existing UÉ watermain, located in the adjacent Castle Park residential estate to the west of the Site, in accordance with the requirements from the UE CoF letter dated the 25th of September 2024 (UE COF Reference: CDS22002703). The UÉ CoF letter states that the water supply connection is feasible without infrastructure upgrade by UÉ.

It is noted that as with the foul sewer, the Applicant has the relevant control and authority to undertake any infrastructure upgrades which may be identified by Uisce Eireann as part of the connection application. The Applicant is in a position to obtain all necessary quality assurances, wayleaves, easements, confirmation of capacity and permissions with regard to infrastructure connections to the development (DOSA, 2024a).

All works will be in accordance with Uisce Éireann Code of Practice for Water Supply and the Water Infrastructure Standard Details (Document Number: IW-CDS-5020-01).

The proposed water supply network design is appended to the Infrastructure Report (DOSA, 2024a; Drawing No.'s 6621-2030, 6621-2031 and 6621-2032).

6.4 Methodology

6.4.1 Relevant Legislation & Guidance

The methodology adopted for the assessment has regard to the relevant guidelines and legislation including:

- Council Directive 2006/118/EEC, 2006. On the protection of groundwater against pollution and deterioration. European Parliament and the Council of European Communities.
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy with amendments 2455/2001/EC, 2008/32/EC and 2008/105/EC (Water Framework Directive (WFD)).
- European Commission, 2022. WFD Reporting Guidance 2022. Final Draft V4.
- Local Government, October 2021. No. 1.1977. Local Government (Water Pollution (Amendment) Act.
- Local Government, October 2007. No. 30.2007. Water Services Act 2007.
- Local Government, July 1990. No. 21.1990. Local Government (Water Pollution) (Amendment) Act, 1990.
- Local Government, March 1977. No. 01/1977. Local Government (Water Pollution) Act, 1977 with amendments.
- S.I. No. 722/2003 – European Communities (Water Policy) with amendment S.I. No. 413/2005.
- S.I. No. 489/2011 – European communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011.
- S.I. No. 122/2010 – European Communities (Assessment and Management of flood Risks) Regulations 2010 including amendment S.I. No. 495/2015.
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019.
- S.I. No. 9 of 2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 including amendments S.I. No. 149 of 2012 and S.I. No. 366 of 201.
- WFD Working Group, 2005. Guidance on the Assessment of the Impact of Groundwater Abstractions (WFD, 2005).
- Cork County Council, 2022. Cork County Development Plan 2022-2028.

Other guidance used in the assessment of potential impacts on the receiving water environment are referenced where relevant in this EIAR Chapter and include:

- Construction Industry Research and Information Association, 2001. Control of Water Pollution from Construction Sites (CIRIA – C532).
- Construction Industry Research and Information Association, 2015. Environmental Good Practice on Site Guide (CIRIA – C741).
- Construction Industry Research and Information Association, 2016. Groundwater Control: Design and Practice (CIRIA – C750).

- Department of the Environment, Heritage and Local Government, Environmental Protection Agency and Geological Survey of Ireland, 1999. Groundwater Protection Schemes (DEHLG/EPA/GSI, 1999).
- Department of the Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, 2009);
- Department of Housing, Planning and Local Government, August 2018. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHPLG, 2018).
- Environmental Protection Agency, 2014. Guidance on the Authorisation of Direct Discharges to Groundwater.
- Environmental Protection Agency, 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.
- Environmental Protection Agency, 2013. Storage and Transfer of Materials for Scheduled Activities.
- Environmental Protection Agency, May 2022. Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

6.4.2 Phased Approach

A phased approach was adopted for this EIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An initial assessment and impact determination stage was carried out by Enviroguide to establish the project location, type and scale of the Proposed Development, the baseline conditions, and the type of hydrological and hydrogeological environment, to establish the activities associated with the Proposed Development and to undertake an initial assessment and impact determination. This element of the assessment also included developing the Conceptual Site Model (CSM) for the Site and receiving environment.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Site. The study area, for the purposes of assessing the baseline conditions for the Hydrology and Hydrogeology Chapter of this EIAR, extends beyond the Site boundaries and includes a 2.0km radius of the Proposed Development Site and potential receptors outside of this radius that are potentially hydraulically connected with the Site were also considered. The extent of the wider study area was based on the Institute of Geologists of Ireland (IGI) Guidelines (IGI, 2013) that recommends a minimum distance of 2.0km radius from the Site. The purpose of this increased search radius was to ensure that any potential hydrogeological / hydrological connections to sensitive receptors including habitats were identified.

The desk study involved collecting all the relevant data for the Site and surrounding area including published information and details pertaining to the Proposed Development provided by the Applicant and design team.

A Site walkover survey to establish the environmental Site setting and baseline conditions at the Site relevant to the hydrological and hydrogeological environment was undertaken by Enviroguide on the 11th December 2023 and the 15th of July 2024.

The Element 1 stage of the assessment was completed by Enviroguide and included the review of the following sources of information:

- Environmental Protection Agency (EPA) web mapping (EPA, 2024).
- Geological Survey Ireland (GSI) Datasets Public Viewer and Groundwater web mapping (EPA, 2024).
- National Parks and Wildlife Services (NPWS) web mapping (NPWS, 2024).
- Ordnance Survey Ireland (OSI) web mapping (OSI, 2024).
- Water Framework Directive Ireland (WFD) web mapping (WFD, 2024).
- Teagasc web mapping (Teagasc, 2024).
- Office of Public Works (OPW) database on historic flooding and the Catchment Flood Risk Assessment and Management (CFRAM) maps (OPW, 2024).
- Information provided by the Applicant pertaining to the design proposals for the Proposed Development.
    - Intrusive ground investigations including trial pitting and infiltration tests was undertaken by Priority Geotechnical Ltd. (PGL) in February 2024. The results of the site investigations were used to identify and assess the existing ground conditions and hydrogeological subsurface features at the Site. The trial pit logs and results for infiltrations tests are included in Volume 3 Appendix 6.1 of this EIAR.

Element 2: Involves direct and indirect Site investigation and studies stage where necessary to refine the CSM developed as part of Element 1 and evaluate the potential impacts associated with the Proposed Development. Based on a review of the information compiled and reviewed in Element 1, it was determined that there was sufficient information including site investigation data regarding the Proposed Development and the subsurface hydrogeological conditions at the Site to inform the impact assessment of the Proposed Development Site on the receiving hydrological and hydrogeological environment at the Site.

Element 3: Evaluation of mitigation measures, residual impacts and final impact assessment were based on the outcome of the information gathered in Element 1 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 of the assessment were considered in relation to the Construction and Phase and Operational Phase of the Proposed Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Hydrology and Hydrogeology sections of the EIAR in this Chapter which includes all the associated figures and documents.

6.4.3 Description of Importance of Receiving Environment

The National Roads Authority (NRA) criteria for estimation of the importance of hydrogeological features at the Site during the Environmental Impact Assessment (EIA) stage, as documented by IGI (IGI, 2013) are summarised in **Error! Reference source not found.**.

Table 6.1 Criteria for Rating Site Importance of Hydrological Features

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by European Union (EU) legislation e.g., SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland, or surface water body. ecosystem protected by national legislation – e.g., NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality. or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

6.4.4 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter are described in Table 6.2 as per EPA,2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Table 6.2 Assessment of Potential Impacts Terminology and Methodology

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.

Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
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
Reversible	Effects that can be undone, for example through remediation or restoration

6.5 Difficulties Encountered

No difficulties were encountered in the preparation of this chapter of the EIAR.

6.6 Baseline Environment

6.6.1 Site Location and Surrounding Land Use

The Site of the Proposed Development is located at Castle Park, Castlelands (townland), Mallow, Co. Cork. The Site is accessed via the Castle Park residential estate along Kingsfort Avenue, off St. Joseph's Road.

The area surrounding the Site is characterised by a mix of land uses. The Site is bound to the west by the Castle Park residential estate, to the north by Scoil Aonghusa Community National School and residential dwellings located off St. Joseph's Road, to the east by agricultural lands and to the south by a public park located along the River Blackwater which is located approximately 0.08km south / southeast of the Site.

The location of the Site is presented in Figure 6-1.

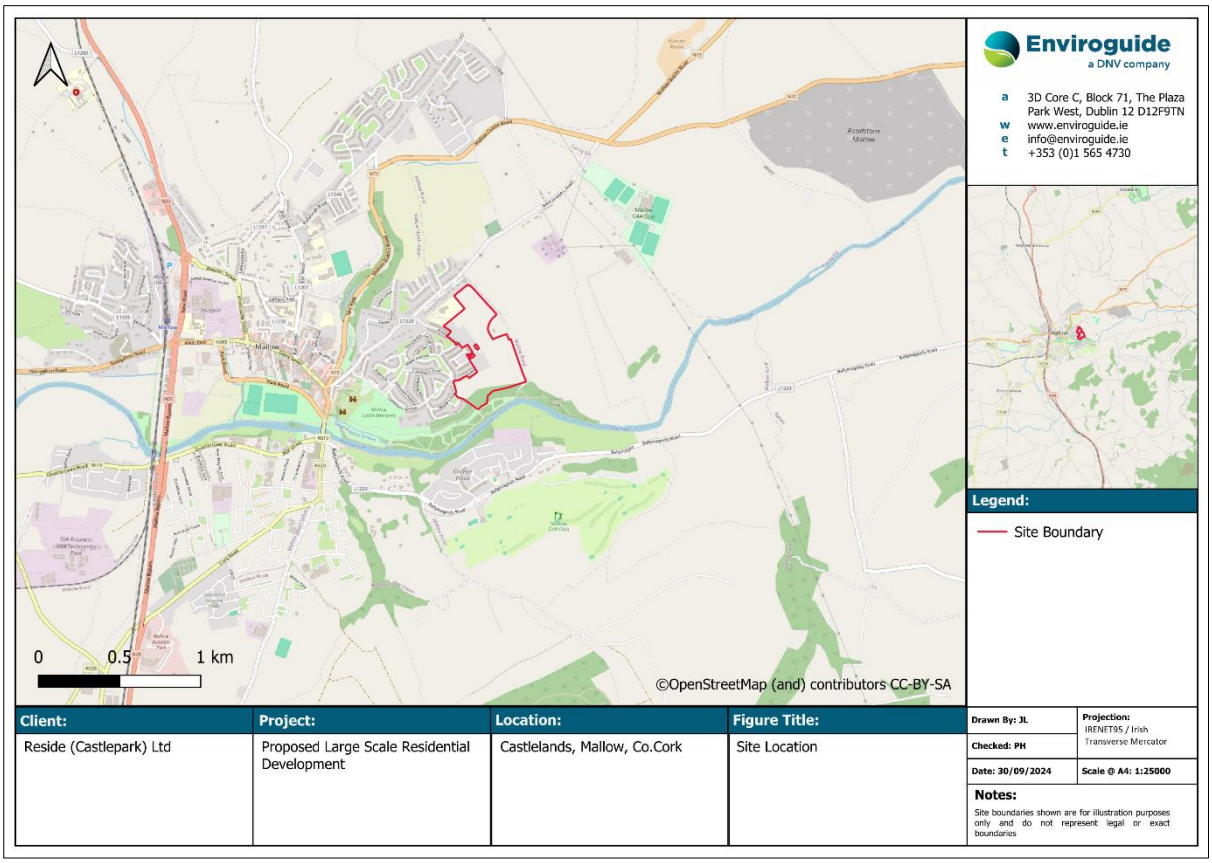

Figure 6-1 Site Location

6.6.2 Current Land Use

The Site is approximately 18.2 hectares (ha) and comprises undeveloped lands which were cleared as part of the construction works of the previously permitted schemes at the Site (Planning Ref. 0755006 and 0655035). It is noted that these previously permitted schemes at the Site were not fully developed before the expiry of the permissions.

Minor clearance works were also carried out in August 2022 to facilitate the undertaking of a topographical survey of the Site. The clearance activities on site were extremely minor in nature and related to the clearance of localised scrub (young sally/willows) and the removal of stockpiles of rubble and other construction material located on the southern boundary of the site which had been left there from the original phase of development.

Extensive areas within the Site have been historically used as construction compounds related to development of the previously permitted schemes. There are a number of temporary hardstands and construction roads crossing the Site and the subsoil is exposed in large areas of the Site.

The existing Site layout is presented in Figure 6-2.

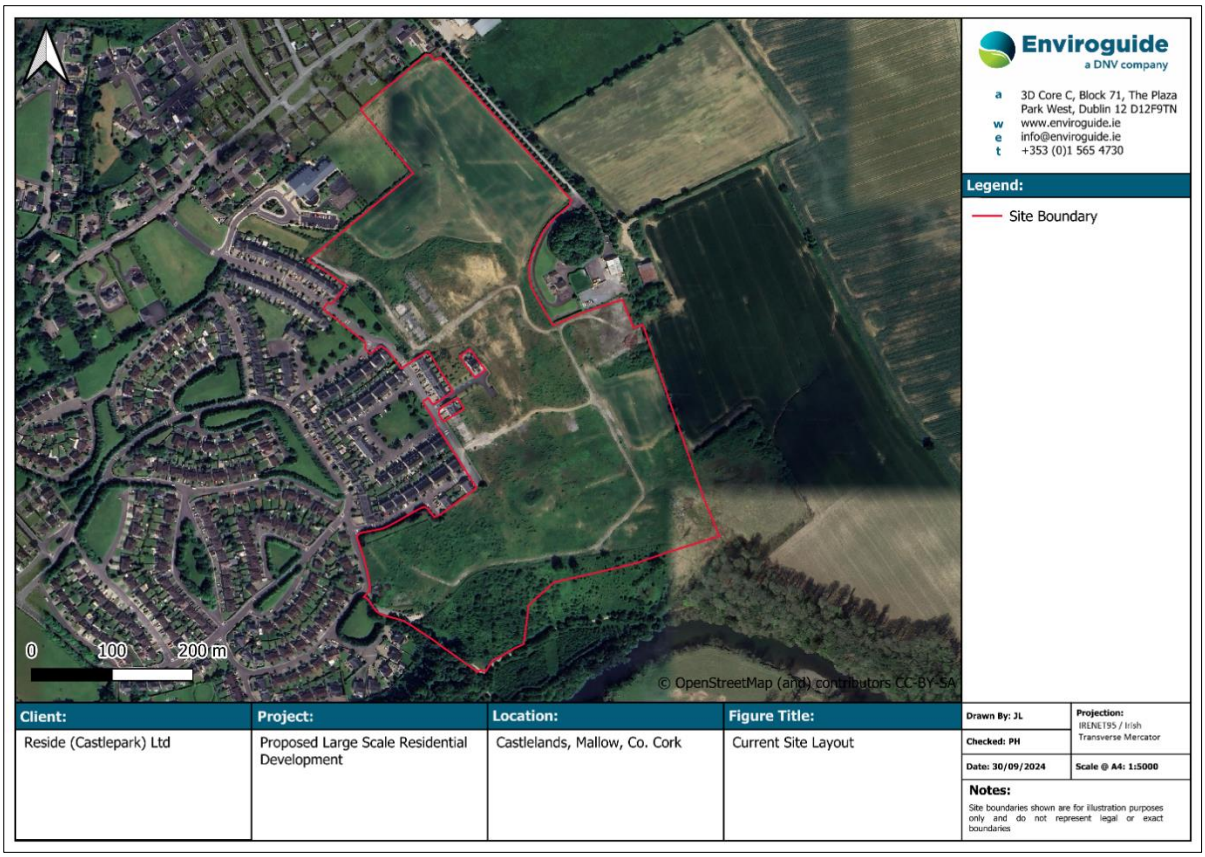

Figure 6-2 Existing Site Layout

6.6.3 Topography

The topography of the Site slopes southwards towards the Blackwater River. With ground elevations ranging from 87.5 meters above Ordnance Datum (mOD) in the north of the Site to 43mOD to the south of the Site.

The topographical survey of the Site is presented in Figure 6-3 (DOSA, 2024a).

Figure 6-3 Site Topography (DOSA, 2024a)

6.6.4 Soil and Geology

The soils and geology at the subject Site are described and assessed in Chapter 5 Land, Soils & Geology of this EIAR and summarised as follows:

- The soils beneath the majority of the Site have been mapped by the GSI (GSI, 2024) as deep well drained mineral (mainly acidic) Acid Brown Earths and Brown Podzolics derived from mainly non-calcareous parent materials (IFS Soil Code: AminDW). While the soils beneath the central portion of the Site and along the southern boundary of the Site have been mapped by the GSI (GSI, 2024) as Shallow well drained mineral (mainly basic) Renzinas and Lithosols derived from mainly calcareous parent materials (IFS Soil Code: BminSW).
- The quaternary sediments beneath the majority of the Site are mapped by the GSI (GSI, 2024) as till derived from Namurian sandstones and shales (TNSSs). While the quaternary sediments beneath the central portion of the Site and along the southern boundary of the Site are mapped by the GSI (GSI, 2024) as bedrock outcrop or subcrop (Rck).
- The bedrock beneath the majority of the Site is mapped by the GSI (GSI, 2024) as the Waulsortian Limestones (New Code: CDWAUL) which is described as massive unbedded lime-mudstone. While the bedrock beneath the northern portion of the Site is mapped by the GSI (GSI, 2024) as the Hazelwood Limestone Formation (New Code: CDHAZE) which is described as pale-grey massive mud-grade limestone.
- While there are no bedrock outcrops mapped by the GSI (GSI, 2024) within the Site boundary, there are a number of bedrock outcrops mapped within a 2km radius of the Site, the closest of which is located approximately 0.03km south of the Site. It is noted that bedrock outcrops were identified at the Site during the Site walkover undertaken by Enviroguide Consulting on the 11th December 2023.
- While there are no karst features mapped by the GSI (GSI, 2024) at the Site itself, there is a spring (Karst Feature Name: Mallow Warm Spring) and a swallow hole recorded approximately 0.39km west and 1.48km northeast of the Site. It is noted that the spring is not located within the Waulsortian Limestones or the Hazelwood Limestone Formation which are the bedrock formations beneath the Site.

6.6.4.1 Site Investigation

The soils and geology encountered during the site investigation undertaken by PGL in February 2024 are summarised as follows. The trial pit logs are included in Volume 3 Appendix 6.1 of this EIAR.

- Yellowish brown, slightly gravelly sandy CLAY was encountered from ground level to depths ranging from 0.3mbGL (SA02) to 1.7mbGL (SA03).
- At site investigation locations SA01 and SA02, the CLAY unit was observed to be underlain by brown, slightly clayey, slightly gravelly SAND to a maximum depth and final extent of excavation of 2.3mbGL (SA01).
- The CLAY unit was observed to be underlain by brown, clayey sandy GRAVEL at investigation location SA03 from 1.7mbGL to the final extent of excavation of 2.3mbGL.
- Bedrock was not encountered during the site investigation.

Groundwater was not encountered during the site investigation.

6.6.5 Rainfall

Monthly rainfall data available for 1km x 1km grids (for the period 1991 to 2020) was sourced from Met Éireann (Met Éireann, 2024) and is presented in Table 6.3.

Table 6.3 Long Term Mean Monthly Rainfall Data

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
119	87	76	73	65	65	69	78	79	109	116	119	1054
Note: 1km x 1km Irish Grid Coordinated selected for the Site =X (Easting): 157000, Y (Northing): 099000												

The closest synoptic meteorological station to the Site, Cork Airport, is located approximately 32.75km south of the Site. A summary of the long-term average PE for the period 2021 to 2024 at Cork Airport station (Met Éireann, 2024) is presented in Table 6.4.

Table 6.4 Average Potential Evapotranspiration

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
12.8	20.1	32.1	52.5	71.2	81.7	81.3	69.1	46.1	24.7	13.8	10.9	516.3

6.6.6 Regional Hydrogeology

6.6.6.1 Groundwater Body

The EPA (EPA, 2024) maps the groundwater body (GWB) beneath the Site as the Mitchelstown GWB (EU Code: IE_SW_G_082). The GWB descriptor for the Mitchelstown GWB (GSI, 2024) notes that the Mitchelstown GWB occupies an area of 549m^2 across Co. Cork and Co. Limerick.

As documented in the GWB descriptor (GSI, 2024), the main recharge mechanisms in the Mitchelstown GWM is from both point recharge via swallow holes and collapse features in the karstified aquifer and diffuse recharge from rainwater percolating through the subsoil. The lack of surface drainage in several parts of the Mitchelstown GWB indicates that potential recharge readily percolates to the underlying groundwater. However, there are some low-lying areas with a high water table, where a proportion of the effective rainfall is rejected due to lack of storage space in the aquifer (GSI, 2024).

Groundwater discharges will be to large springs within the GWB and to the rivers and streams crossing the GWB. Due to the high level of interaction between groundwater and surface water in karstic aquifers, microbial pollution can travel very quickly from the surface into the groundwater system (GSI, 2024).

Groundwater flow occurs in the many faults and joints in the pure limestones which have been enlarged by karstification. Groundwater flow in the pure limestones occurs in an upper shallow highly karstified weathered zone in which groundwater moves quickly in rapid response to recharge. Below this is a deeper zone where there are two components to groundwater flow. Groundwater flows through interconnected, solutionally enlarged conduits and cave systems that are controlled by structural deformation. In addition, there is a more dispersed slow groundwater flow component in smaller fractures and joints outside the larger conduits (GSI, 2024).

Groundwater flow paths can be up to several kilometres long but may be significantly shorter in areas where the water table is very close to the surface. Regional groundwater flow will be away from the surrounding uplands towards the main rivers draining the valleys. Groundwater levels are generally shallow in the impure limestones (<10 mbGL), and commonly less than 3.0mbGL (GSI, 2024).

Local groundwater flows are determined by the local topography, and it is considered that the high ground to the north of the Site provides the driving head for groundwater flow. Therefore, groundwater flow in the vicinity of the Site is likely to be in a southerly direction towards the Blackwater [Munster] River.

6.6.6.2 Aquifer Classification

The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important and poor) and vulnerability (extreme, high, moderate or low). Resource value refers to the scale and production potential of the aquifer whilst vulnerability refers to the ease with which groundwater may be contaminated by human activities (vulnerability classification primarily based on the permeability and thickness of subsoils.

The underlying bedrock aquifer within the Rickardstown Formation beneath the Site is classified by the GSI (GSI, 2024) as a 'Regionally Important Aquifer - Karstified (diffuse) (Rkd)'.

Regionally important aquifers are capable of supplying regionally important abstractions (e.g. large public water supplies), or 'excellent' yields (>400 m^3/d). 'Karstification' is the process whereby limestone is slowly dissolved away by percolating waters. Karstification frequently results in the uneven distribution of permeability through the rock, and the development of distinctive karst landforms at the surface (e.g. swallow holes, caves, dry valleys), some of which provide direct access for recharge/surface water to enter the aquifer.

There are no gravel aquifers mapped at the site or within a 2km radius of the site (GSI, 2024).

The bedrock aquifer map is presented in Figure 6-4.

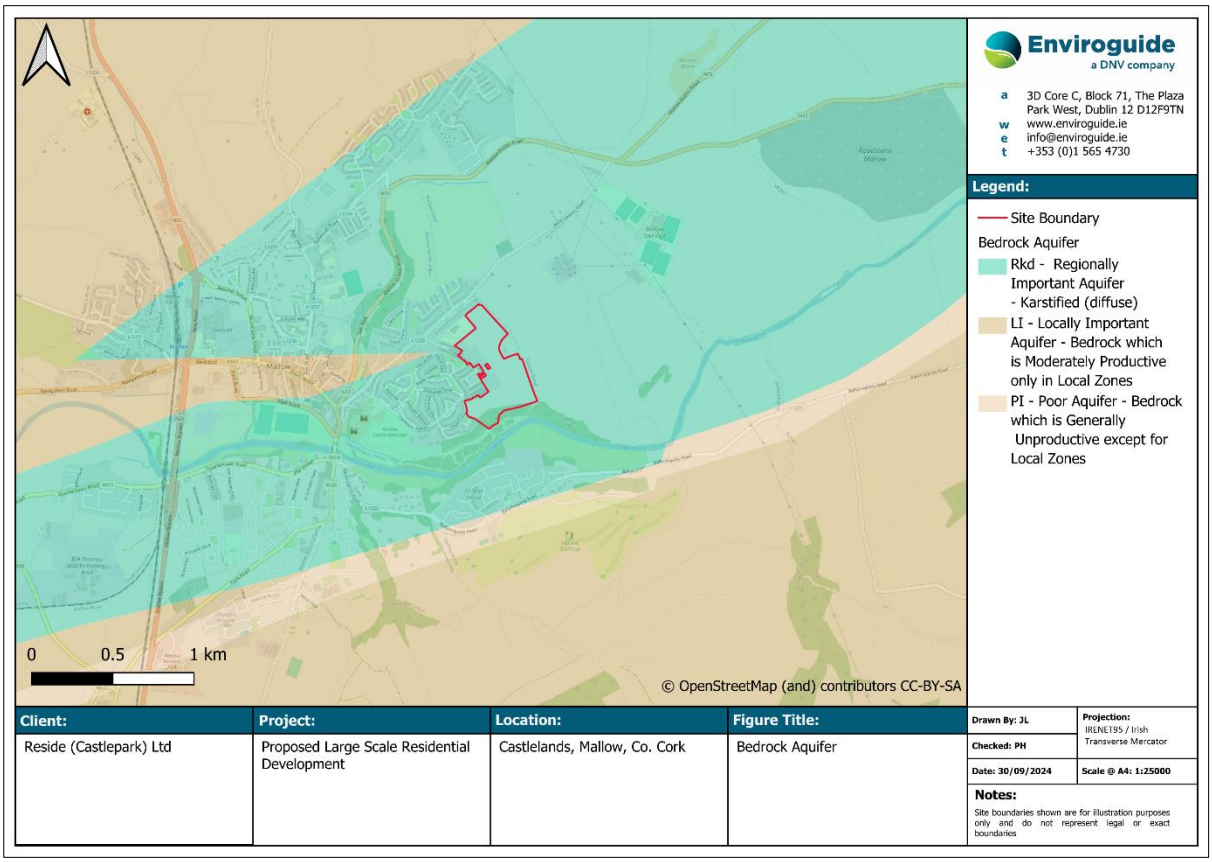

Figure 6-4 Bedrock Aquifer

6.6.6.3 Recharge

The GSI groundwater recharge map provides an estimate of the average amount of rainwater that percolates through the subsoils to the water table over a year. The map accounts for rainfall that percolates diffusely through soils and subsoils, it does not consider water that enters aquifers at points (e.g., at sinkholes) or along linear features (e.g., along sinking streams/rivers). Groundwater recharge amounts are estimated by considering soil drainage, subsoil permeability, thickness and type, the ability of the aquifer to accept the recharge, and rainfall.

The GSI (GSI, 2024) have calculated an average annual recharge of between 401mm/year and 569mm/year for the aquifer beneath the subject Site based on a recharge coefficient of between 60% and 85%. The high recharge potential is due to the presence of high permeability subsoil overlying the regionally important karstified bedrock aquifer (Rkd) and also the mapped areas of exposed bedrock outcrop or subcrop in the central and southern portions of the Site.

6.6.6.4 Groundwater Vulnerability

The vulnerability categories, and methods for determination, are presented in the Groundwater Protection Schemes publication (DEHLG/EPA/GSI, 1999) and summarised in Table 6.5. The publications state that 'as all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination.' Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more

slowly and in lower quantities. The travel time, attenuation capacity and quantity of contaminants are a function of the following natural geological and hydrogeological attributes of any area.

Table 6.5 Vulnerability Mapping Criteria

Subsoil Thickness	Hydrogeological Requirements				
	Diffuse Recharge			Point recharge	Unsaturated Zone
	Subsoil Permeability & Type			(Swallow holes, losing streams)	(sand & gravel aquifers only)
	High permeability (sand & gravel)	Moderate permeability (sandy subsoil)	Low permeability (clayey subsoil, clay, peat)		
0-3m	Extreme	0-3m	Extreme	Extreme (30m radius)	Extreme
3-5m	High	High	High	N/A	High
5-10m	High	High	Moderate	N/A	High
>10m	High	Moderate	Low	N/A	High
Notes: (i) N/A = not applicable (ii) Permeability classifications relate to the material characteristics as described by the subsoil description and classification method.					

The GSI has a assigned a groundwater vulnerability rating of 'Extreme' (E) and 'Rock at or Near Surface or Karst' (X) for the groundwater beneath the Site (GSI, 2024).

The anticipated depth to bedrock based on the 'Extreme' groundwater vulnerability rating is between 0.0mbGL and 3.0mbGL. While, groundwater was not encountered during the site investigation works which extended to 2.3mbGL (PGL, 2024), this algins with the karstic nature of the underlying bedrock aquifer and the GSI (GSI, 2024) mapping where areas of exposed bedrock outcrop or subcrop were observed in the central and southern portions of the Site.

The groundwater vulnerability rating map is provided in Figure 6-5.

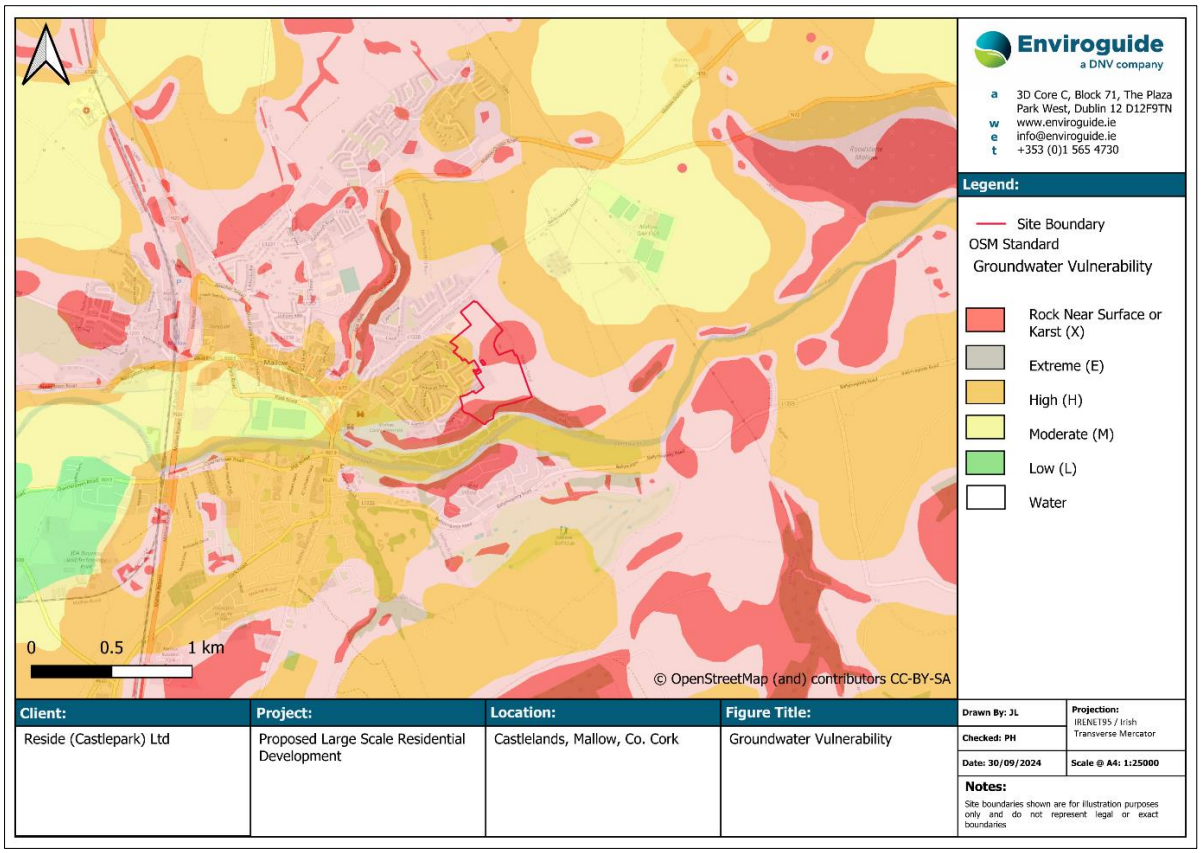

Figure 6-5 Groundwater Vulnerability

6.6.7 Site Hydrogeology

Groundwater was not encountered during trial pit excavations undertaken by PGL in February 2024 and which extended to a maximum depth of 2.3mbGL. The trial pit logs are included in Volume 3 Appendix 6.1 of this EIAR.

Infiltration tests were carried out at the three (3No.) site investigation locations (SA01 to SA03) in accordance with BRE digest 365 'Soakaway' design tests. An average infiltration rate of 1.57 x 10^{-4} m/s was calculated across the Site. The results indicate that the soil has a moderate permeability, allowing water to drain effectively from the ground surface to the underlying aquifer without causing prolonged surface water retention.

6.6.8 Hydrology

The Site is mapped by the EPA (EPA, 2024) as within the Blackwater (Munster) WFD Catchment (Catchment I.D.: 18), the Blackwater [Munster]_SC_090 WFD Sub-catchment (Sub-Catchment ID 18_21) and the Blackwater [Munster]_140 WFD River Sub-basin (EU Code: IE_SW_18B021720) (EPA, 2024).

The closest EPA mapped (EPA, 2024) surface waterbody to the Site is the Blackwater [Munster] River (River Waterbody Code: IE_SW_18B021720) located approximately 0.08km south of the Site. The Blackwater [Munster] River flows east before converging with the Upper Blackwater M Estuary transitional waterbody (EU Code: IE_SW_020_0500) approximately 57.76km downstream of the Site. Upper Blackwater M Estuary transitional waterbody flows initially east before turning south and

converging with the Lower Blackwater M Estuary / Youghal Harbour transitional waterbody (EU Code: IE_SW_020_0100) a further 18.15km downstream. The Lower Blackwater M Estuary / Youghal Harbour transitional waterbody flows, in a southerly direction, a further 13.6km downstream before discharging to the Youghal Bay coastal waterbody (EU Code: IE_SW_020_0000).

The EPA (EPA, 2024) records a number of other surface waterbodies within a 2km radius of the Site as presented in Figure 6-6.

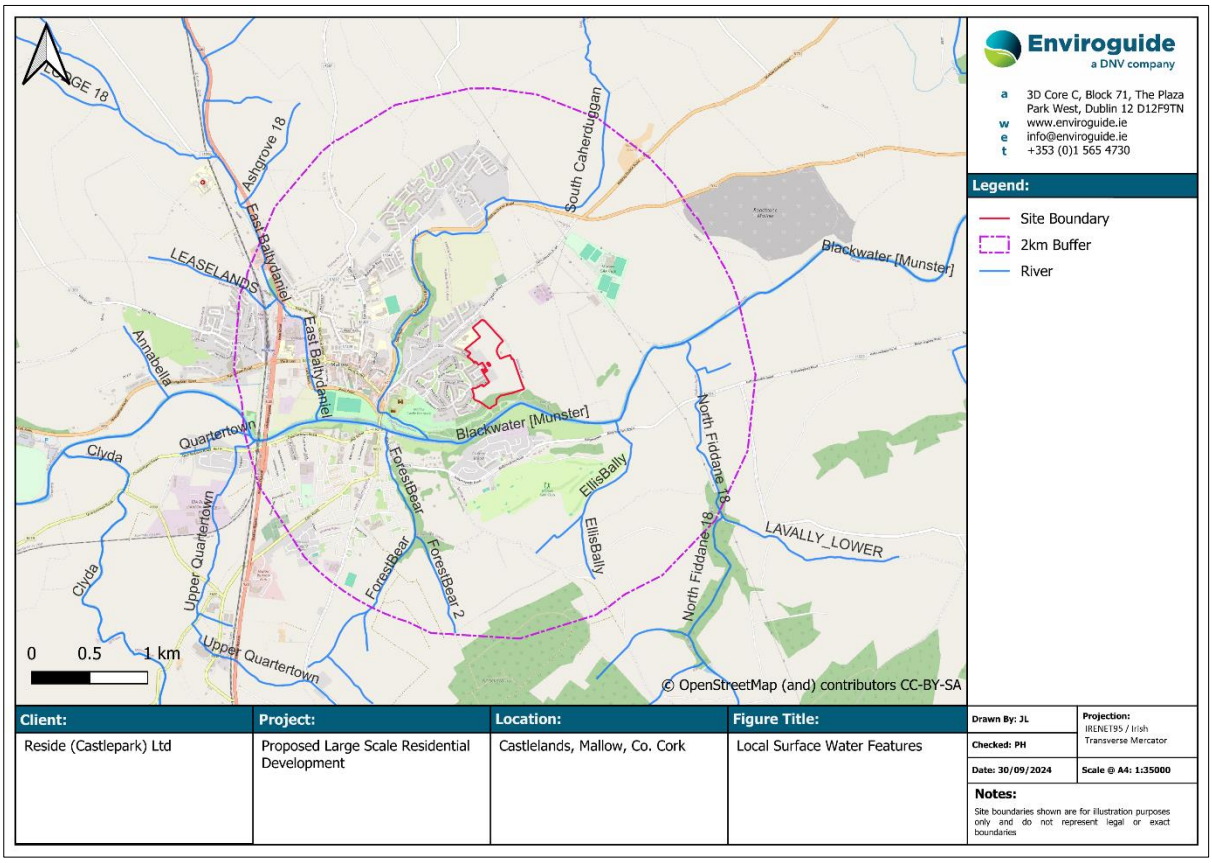

Figure 6-6 Surface Waterbodies Within 2.0 km of the Site

6.6.8.1 Site Drainage

There were no surface water courses, drains or sewers mapped or identified at the Site during the Site walkover undertaken by Enviroguide Consulting on the 11th December 2023 and the 15th of July 2024.

There is an existing surface water drainage network located in the adjoining Castle Park residential estate to the west of the Site. This surface water drainage network ultimately outfalls to the Blackwater River approximately 0.08km south of the Site (refer to Figure 6-7).

There is also an existing UÉ foul sewer located in the adjacent Castle Park residential estate to the west of the Site.

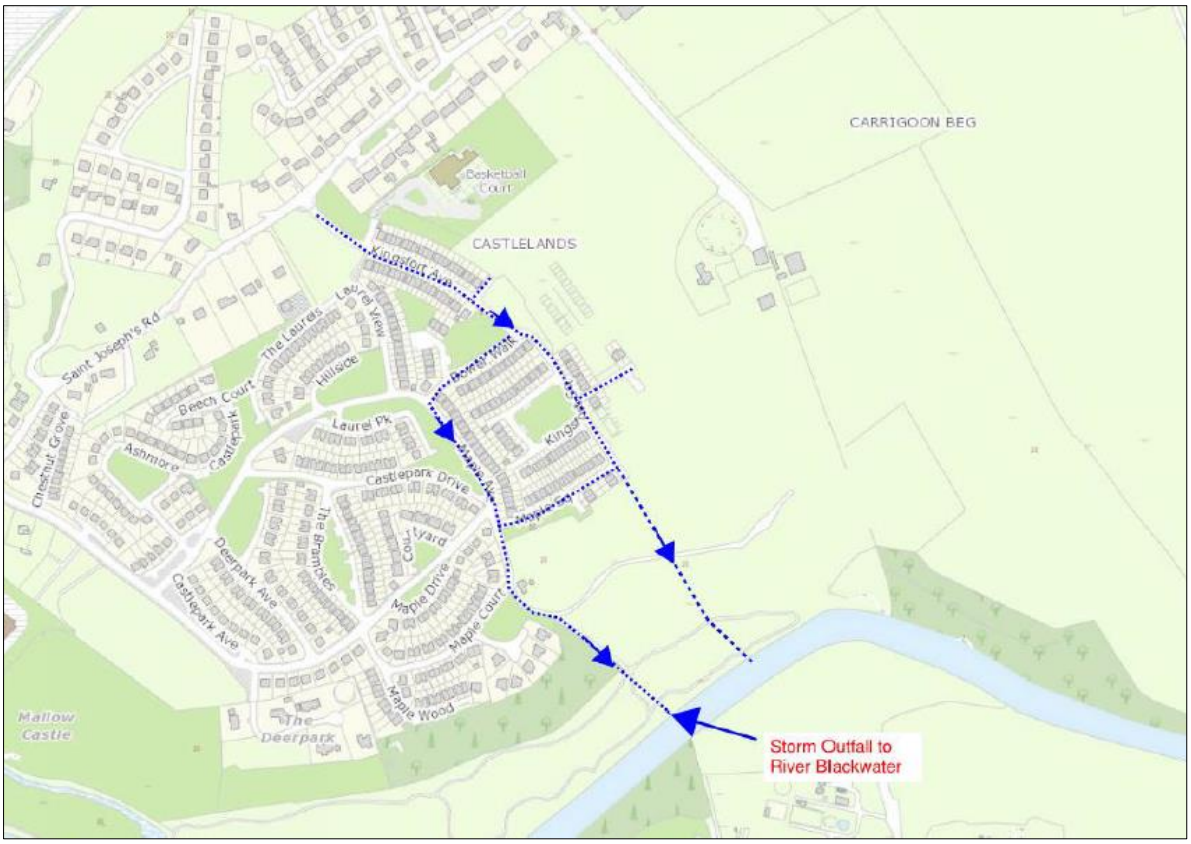

Figure 6-7 Existing Stormwater Drainage Network

6.6.9 Flooding

The site-specific flood risk assessment (SSFRA) developed for the site and proposed development, submitted with the planning application (Arup, 2024), evaluates the potential flood risks associated with fluvial, groundwater, coastal, and pluvial flooding.

The SSFRA (Arup, 2024) identifies that the majority of the proposed development site is located in Flood Zone C, an area with a low risk of flooding (less than 0.1% Annual Exceedance Probability - AEP). However, small parts of the site at the southern boundary are within Flood Zone A, an area with a high risk of flooding (more than 1% AEP). The proposed use for this area includes open space and footpaths, which are water-compatible uses and therefore appropriate for development in Flood Zone A. The extreme flood water level from the Blackwater River is 46.37m AOD for the 0.1% AEP. All highly and less vulnerable developments are proposed above this level, between 61.75m AOD and 85.15m AOD, making the risk of fluvial flooding to the proposed development low (Arup, 2024). Additionally, the assessment considers the impacts of climate change, allowing for a 10% increase in rainfall, a 20% increase in flood flow to rivers, and a 0.5m sea level rise, and concludes that there will be no change to the flood risk.

The proposed development is situated on a sloping greenfield site. St Joseph's Road, north of the site, lies on a ridge and forms the local high point. There are limited catchments upstream of the development site, meaning no overland flows from outside the proposed development would enter the site and cause a risk of pluvial flooding (Arup, 2024).

There is no groundwater level monitoring available within the site. Due to the karstified nature of the bedrock, the local groundwater flow direction may not reflect the topography. However, the regional groundwater flow direction is towards rivers, likely south towards the Blackwater River. The GSI groundwater flooding maps do not indicate a risk of flooding at the site. Considering these factors, the risk of groundwater flooding to the site is considered low (Arup, 2024).

The SSFRA (Arup, 2024) concludes that the proposed development is appropriate for the site. Given the design of the proposed development, including footpaths located within Flood Zone A that do not alter existing levels and are made from permeable materials, no mitigation is required.

6.6.10 Water Use and Drinking Water Source Protection

A review of the GSI wells and springs database (GSI, 2024) has identified forty-two (42No.) sources within a 2km radius of the Site (refer to Figure 6-8). These are summarised in Table 6.6 below.

Table 6.6 Groundwater Wells and Springs within a 2km Radius of the Site

Property	Review of Data
Type	▪ 40No. Boreholes. ▪ 1No. Spring. ▪ 1No. Dug Well.
Source Use	The source use for the forty-two (42No.) supplies are: ▪ 7No. Domestic Use. ▪ 22No. Public Supply Use. ▪ 13No. Unknown Use.
Yield	Yield classifications are listed for twenty-seven (27No.) of the forty-two (42No.) GSI wells and springs. The yield classifications are summarised as follows: ▪ 5No. failed. ▪ 11No. are Poor. ▪ 1No. is Moderate. ▪ 4No. are Good. ▪ 6No. are Excellent. The yield is also provided for twenty-two (22No.) of the supplies. The reported yield ranged from 16.4m^3/day to 2180m^3/day.
Total Depth and Depth to Bedrock	The available records (GSI, 2024) indicate the depth of the wells for the boreholes and dug wells. The shallowest well was 0.6mbGL and the deepest was 155.0mbGL. The depth to bedrock was recorded for twenty-nine (29No.) of the boreholes and ranged from 0.0mbGL to 54.9mbGL.

There is no existing water supply at the Site, however, the adjacent Castle Park residential estate to the west of the Site is currently served by an existing UE watermain.

There are no groundwater source protection areas (SPAs) identified by the GSI (GSI, 2024) at the Site. However, the inner SPA for the Oliver's Cross Public Water Supply (PWS) is located approximately 0.76km northeast of the Site. As documented in the Oliver's Cross Water Supply Scheme Groundwater Source Protection Zones Report (GSI, 2000), one (1No.) borehole, commissioned in 1978, is used for the Oliver's Cross Water Supply. The borehole supplies a volume of approximately 1250m^3/d to the houses and farms along the 'back' road into Mallow at Keatleysclose and Carrigoon. It is noted that the Oliver's Cross is located upgradient of the Site and therefore there is no identified hydraulic connection.

The Blackwater (Munster)_150, located approximately 0.72km downstream of the Site is identified by the EPA (EPA, 2024) as a surface water drinking water source under Article 7 of the Water Framework Directive.

The location of the groundwater wells springs and SPAs are presented in Figure 6-8.

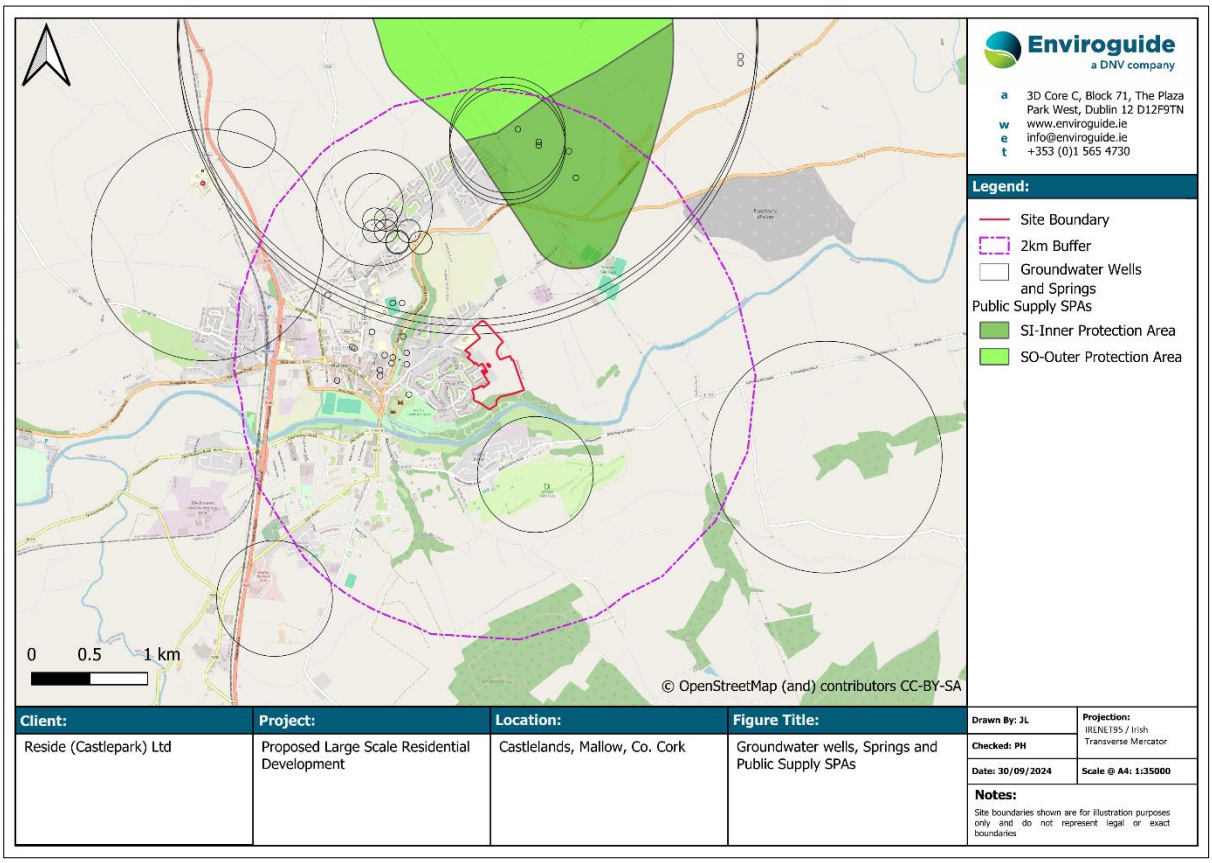

Figure 6-8 Groundwater Wells, Springs and Source Protection Areas

6.6.11 Water Quality Data

6.6.11.1 Published Regional Surface Water Quality

The EPA surface water quality monitoring database (EPA, 2024) was consulted and there is available EPA water quality monitoring data (EPA, 2024) published for the Blackwater [Munster] River.

A summary of the most recent EPA water quality monitoring data (EPA, 2024) published for the monitoring stations relevant to the Site is presented in Table 6-7.

Table 6.7 Surface Water Quality – Blackwater [Munster] River

River I.D. (Location)	Station Name	EPA WFD Parameter Quality & Trend Analysis				
		Parameter	Indicative Quality	Trend	Baseline Conc. (2017)	Q-Value (WFD Status)
Blackwater [Munster] River	Rly Br, Mallow (LHS)	Ammonia – Total (as N)	No Published Water Quality Data Available			Good (4) in 2021

(2.12km upstream of the Site)		Total Oxidised Nitrogen (as N)				
		ortho-Phosphate (as P)-unspecified				
Blackwater [Munster] River (2.12km upstream of the Site)	Rly Br, Mallow (RHS)	Ammonia – Total (as N)	No Published Water Quality Data Available			Moderate (3-4) in 2021
		Total Oxidised Nitrogen (as N)				
		ortho-Phosphate (as P)-unspecified				
Blackwater [Munster] River (2.12km upstream of the Site)	Mallow Br	Ammonia – Total (as N)	Good	Upwards	0.055	No Published Q Value Available
		Total Oxidised Nitrogen (as N)	No Published Water Quality Data Available			
		ortho-Phosphate (as P)-unspecified				
Blackwater [Munster] River (2.71km downstream of the Site)	Ne of Ballymagooly	Ammonia – Total (as N)	No Published Water Quality Data Available			Good (4) in 2020
		Total Oxidised Nitrogen (as N)				
		ortho-Phosphate (as P)-unspecified				
Blackwater [Munster] River (0.74km downstream of the Site)	Downstream of TPEFF0500D0052SW001	Ammonia – Total (as N)	High	Downwards	0.035	No Published Q Value Available
		Total Oxidised Nitrogen (as N)	Moderate	Upwards	1.953	
		ortho-Phosphate (as P)-unspecified	Good	Upwards	0.028	

6.6.11.2 Published Regional Groundwater Quality

The EPA (EPA, 2024) groundwater monitoring data was reviewed and there are seven (7No.) groundwater quality monitoring stations within the Mitchelstown GWB in which the Site is located. A summary of the most recent EPA groundwater quality monitoring data (EPA, 2024) published for these seven (7No.) monitoring stations is presented in Table 6-8.

Table 6.8 Groundwater Quality – Mitchelstown GWB

Station Name	EPA WFD Parameter Quality & Trend Analysis			
	Parameter	Indicative Quality	Trend	Baseline Conc. (2015)
Castletownroche WS (Sp 2)	Ammonia – Total (as N)	Good	Upwards	0.018
	Chloride	Good	Downwards	22.483mg/l
	Nitrate (as NO_3)	Good	Downwards	36.313

	ortho-Phosphate (as P) - unspecified	Good	Upwards	0.010
Charleville WS (BH 3)	Ammonia – Total (as N)	Good	Upwards	0.020
	Chloride	Good	Upwards	20.722
	Nitrate (as NO_3)	Good	Upwards	15.145
	ortho-Phosphate (as P) - unspecified	Failing to Achieve Good	Upwards	0.037
Downing Bridge PWS	Ammonia – Total (as N)	Good	Downwards	0.020
	Chloride	Failing to Achieve Good	Upwards	25.556
	Nitrate (as NO_3)	Failing to Achieve Good	Downwards	38.766
	ortho-Phosphate (as P) - unspecified	Good	Upwards	0.009
Glanworth PWS (Tobermore)	Ammonia – Total (as N)	Good	Upwards	0.019
	Chloride	Good	Upwards	20.822
	Nitrate (as NO_3)	Failing to Achieve Good	Upwards	50.822
	ortho-Phosphate (as P) - unspecified	Good	Upwards	0.009
Kildorrery WS	Ammonia – Total (as N)	Good	Upwards	0.019
	Chloride	Failing to Achieve Good	Upwards	39.417
	Nitrate (as NO_3)	Good	Downwards	26.489
	ortho-Phosphate (as P) - unspecified	Good	Upwards	0.009
Mounthnorth PWS	Ammonia – Total (as N)	Good	None	0.019
	Chloride	Good	Upwards	23.761
	Nitrate (as NO_3)	Good	Upwards	25.888
	ortho-Phosphate (as P) - unspecified	Good	Upwards	0.009
Shanballymore PWS (Doneraile)	Ammonia – Total (as N)	Good	Upwards	0.026
	Chloride	Good	None	21.950
	Nitrate (as NO_3)	Good	Upwards	26.781
	ortho-Phosphate (as P) - unspecified	Good	Upwards	0.010

There is also published groundwater quality data available in the Oliver's Cross Water Supply Scheme Groundwater Source Protection Zones Report (GSI, 2000).

The groundwater results were assessed using published water quality regulation values specified in the following:

- S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 and as amended (GW GTVs);
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 and as amended (AA-EQS and/or MAC EQS); and

- SI. No. 99/2023- European Union (Drinking Water) Regulations 2023 (DW PVs)The groundwater results are summarised and discussed below:
- Moderately hard to hard water with hardness values of 266-310 mg/l (equivalent CaCO3) and electrical conductivity values of 370-641µS/cm were reported, indicating that the groundwater has a hydrochemical signature of calcium bicarbonate type water.
- Reported nitrate concentrations ranged from 11mg/l to 37mg/l.
- Total coliforms were reported in two (2No.) samples collected on the 10th of February 1997 and the 11th October 1999. Faecal coliforms were also reported in the sample taken on the 11th of October 1999 which exceeds the applicable DW PV.
- The reported concentration of iron was 0.5 mg/l on the 4th of September 1996 which exceeds the applicable DW PV. This was attributed to the he sandstone and shale rock units to the north of the water supply borehole. The reported concentration of metals, where detected, for the remaining samples collected were reported below the applicable GW GTV, DW PV and SW EQS.
- The reported concentration of ammonium ranged from 0.013mg/l to 0.035mg/l which is less than the applicable GW GTV, DW PV and SW EQS.

6.6.11.3 Receiving Water Quality - Mallow WWTP

The most recent available Annual Environmental Report (AER) for the Mallow WWTP is 2022 (UE, 2022). The AER identified the final effluent was compliant with the Emission Limit Values (ELV) specified in the discharge license (EPA Licence No. D0052-01). The AER notes that the following in relation to ambient monitoring on the Blackwater [Munster] River:

The following is also noted under the significance of results section of the AER:

> *'The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.*
>
> *The ambient monitoring results meet the required EQS. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.*
>
> *The discharge from the wastewater treatment plant does not have an observable impact on the water quality.*
>
> *The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.'*

It is noted that upgrade works to the Mallow WWTP and Mallow Bridge Pumping Station were completed in 2023. The upgrade works, carried out by UE in partnership with Cork County Council will enhance the environmental performance of the wastewater treatment process, ensuring ongoing compliance with ELVs and contribute to a significant improvement in the water quality of the Blackwater River.

6.6.12 Water Framework Directive Status

The WFD status for river, lake, groundwater, transitional and/or coastal water bodies that have a potential hydraulic connection to the Site as recorded by the EPA (EPA, 2024) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003) are provided in Table 6-9 and Figure 6-9.

Table 6.9 WFD Risk and Waterbody Status

Waterbody Name	Waterbody; EU code	Distance Downstream from Site (km)*	WFD water body status (for the period of 2016-2021)	WFD 3rd cycle Risk Status
River Waterbodies				
Blackwater (Munster)_150	IE_SW_18B021720	0.0km (Located approximately 0.08km south and downgradient of the Site)	Good	Not at Risk
Blackwater (Munster)_160	IE_SW_18B021900	2.71	Moderate	At Risk
Blackwater (Munster)_170	IE_SW_18B022000	8.77	Good	Not at Risk
Blackwater (Munster)_180	IE_SW_18B022100	20.55	Good	Not at Risk
Blackwater (Munster)_190	IE_SW_18B022300	26.07	Good	Not at Risk
Blackwater (Munster)_200	IE_SW_18B022450	31.87	Good	Not at Risk
Blackwater (Munster)_210	IE_SW_18B022500	37.96	Good	Not at Risk
Blackwater (Munster)_220	IE_SW_18B022700	47.97	Moderate	At Risk
Transitional Waterbodies				
Upper Blackwater M Estuary	IE_SW_020_0500	57.76	Moderate	At risk
Lower Blackwater M Estuary / Youghal Harbour	IE_SW_020_0100	75.91	Moderate	At risk
Coastal Waterbodies				
Youghal Bay	IE_SW_020_0000	89.51	Moderate	At risk
Western Celtic Sea	IE_SW_010_0000	94.53	High	Not at risk
Groundwater Bodies				
Mitchelstown	IE_SW_G_082	Underlying the Site	Good	At risk

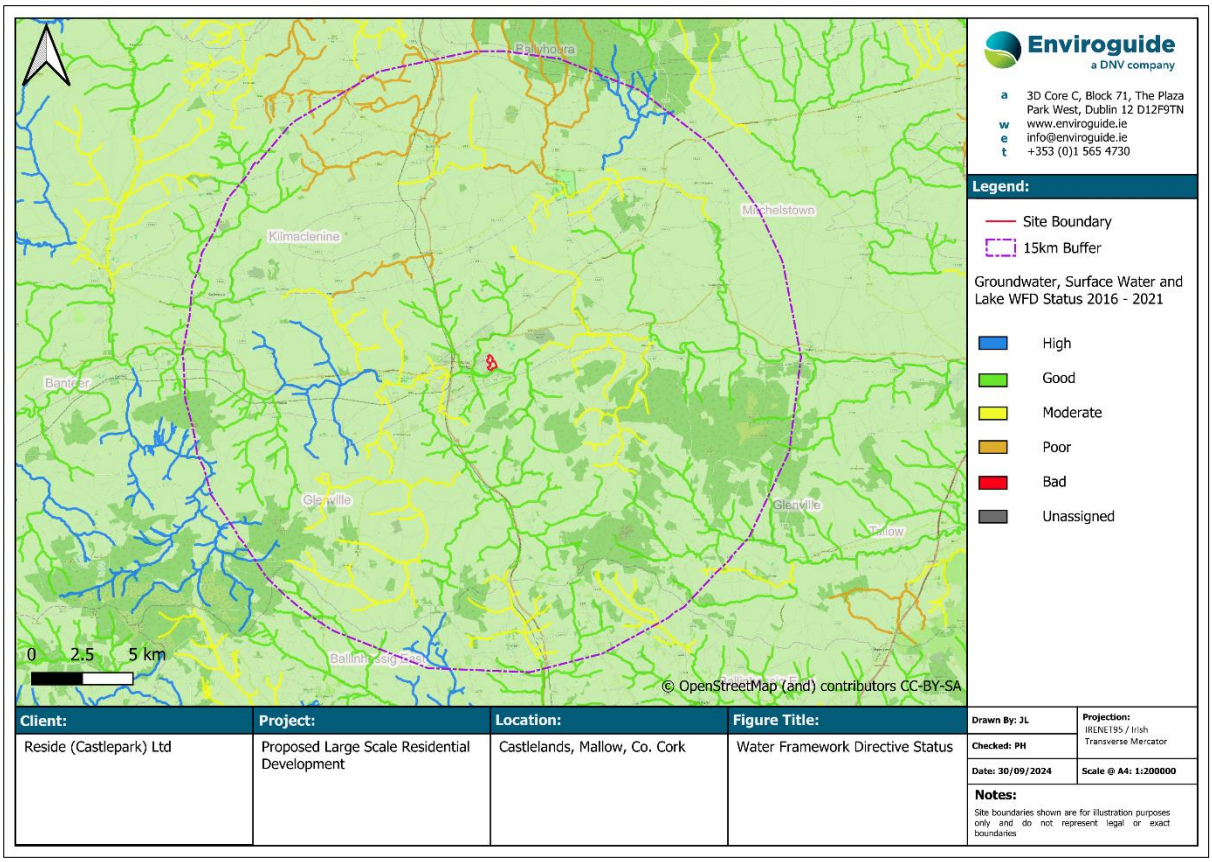

Figure 6-9 WFD Status

6.6.12.1 Nature Conservation

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (79/409/EEC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected Sites throughout the European Community. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each Site is selected correspond to the qualifying interests of the Sites; from these the conservation objectives of the Site are derived.

National Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with SAC and/or SPA Sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

There are five (5No.) Natura 2000 Sites that are identified with a potential hydraulic connection to the Site and Proposed Development (refer to Figure 6-10):

- Blackwater River (Cork/Waterford) SAC (Site Code: 002170)

- Blackwater Callows SPA (Site Code: 004094)
- Blackwater Estuary SPA (Site Code: 004028)
- Ballymacoda (Clonpriest and Pillmore) SAC (Site Code: 000077)
- Ballymacoda Bay SPA (Site Code: 004023)

There are also two (2No.) proposed NHAs identified with a potential hydraulic connection to the Site and Proposed Development (refer to Figure 6-10):

- Blackwater River Callows (Site Code: 000073)
- Blackwater River And Estuary (Site Code: 000072)

The SACs, SPAs, and pNHAs with a potential hydraulic connection to the subject Site and Proposed Development are presented in Figure 6-10.

The AA Screening Report completed for the Proposed Development (Enviroguide Consulting, 2024a submitted with the planning application), concluded that a degree of uncertainty exists in whether the Proposed Development could give rise to potentially significant effects on a nearby European site, namely, the Blackwater River (Cork/Waterford) SAC (Site Code: 002170).

Therefore, a Natura Impact Statement (NIS) Report (Enviroguide Consulting, 2024b) submitted with the planning application was prepared in order to further examine the potential direct and indirect impacts of the Proposed Development on the Blackwater River (Cork/Waterford) SAC. Where potentially significant effects were identified, a range of mitigation and avoidance measures have been recommended to address them. This NIS has concluded that, once the avoidance and mitigation measures are implemented as proposed, the Proposed Development will not have an adverse effect on the integrity of the above European site, individually or in combination with other plans and projects. The Natura 2000 Sites are assessed and described in further detail in Chapter 13 of this EIAR.

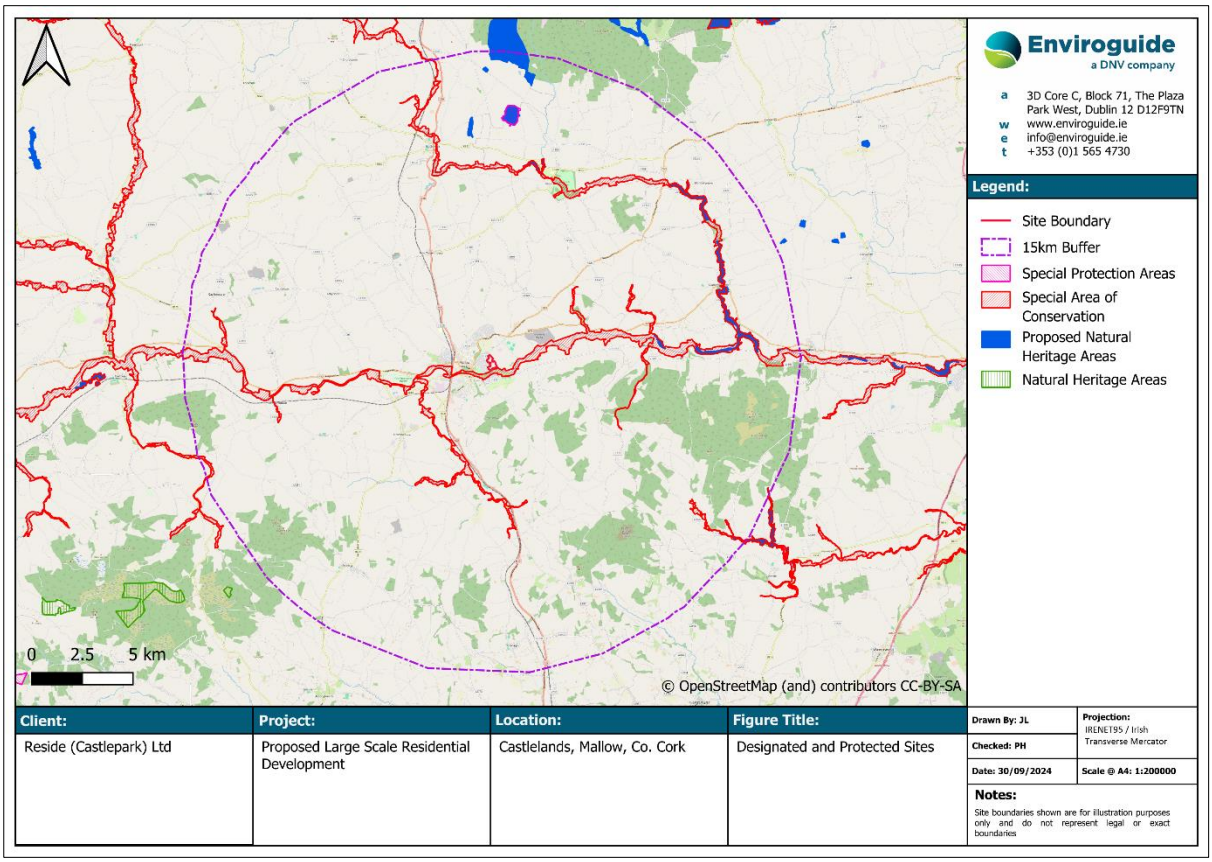

Figure 6-10 Designated and Protected Sites

6.6.12.2 Drinking Water

The river drinking water protected areas (DWPA) are represented by the full extent of the WFD river waterbodies from which there is a known qualifying abstraction of water for human consumption as defined under Article 7 of the WFD.

The Blackwater (Munster)_150, located approximately 0.72km downstream of the Site is identified by the EPA (EPA, 2024) as a surface water drinking water source under Article 7 of the Water Framework Directive. Other surface water drinking water source waterbodies downstream of the Site include the Blackwater (Munster)_180, located approximately 20km downstream of the Site.

6.6.12.3 Shellfish Areas

Although the Shellfish Waters Directive (SWD) has been repealed, areas used for the production of shellfish that were designated under the SWD, are protected under the WFD as 'areas designated for the protection of economically significant aquatic species'.

The requirement from a WFD perspective is to ensure that water quality does not impact on the quality of shellfish produced for human consumption. In Ireland, 64 areas have been designated as shellfish waters (S.I. No. 268 of 2006, S.I. No. 55 of 2009, S.I. 464 of 2009).

The closest hydraulically connected designated Shellfish Area location is at Ballymacoda Bay located approximately 92km downstream of the Site.

6.6.12.4 Nutrient Sensitive Areas

EU member states are required under the Urban Wastewater Treatment Directive (91/271/EEC) to identify nutrient-sensitive areas. These have been defined as "natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken".

The Blackwater River which is located approximately 0.08km south of the Site is designated as nutrient sensitive. The Blackwater Estuary Upper, located approximately 57.76km downstream of the Site is also designated as nutrient sensitive. The designated sections of surface water are immediately downstream of water treatment agglomerations.

6.6.12.5 Bathing Water

Bathing waters are designated under Regulation 5 of Directive 2006/7/EC. Designated Bathing Waters exist under S.I. No. 79/2008 and S.I. No. 351/2011 Bathing Water Quality (Amendment) Regulations 2011. EC Bathing Water Profiles - Best Practice and Guidance 2009.

The closest designated bathing water location is at Youghal Bay located approximately 83.5km downstream of the Site.

6.6.13 Importance of the Receiving Environment

Taking account of the receiving hydrological and hydrogeological environment, the Site is considered to be of 'high' hydrogeological importance (refer to **Error! Reference source not found.**) given that the Site is underlain by a regionally important karstified bedrock aquifer (Rkd).

The WFD status has been assigned as 'good' for the Mitchelstown GWB. The WFD status has been assigned as 'good' to the Blackwater (Munster) River at its closest point downgradient of the Site (refer to Section 6.6.12).

6.7 The 'Do nothing' Scenario

The 'Do Nothing' scenario assesses the potential impact on the receiving hydrological and hydrogeological environment if the Proposed Development did not proceed.

If the Proposed Development did not proceed the Site would remain as undeveloped lands and there would be no change to the drainage at the Site or to the hydrological and hydrogeological regime at the Site.

6.8 Potential Significant Effects

The procedure for determination of potential impacts on the receiving hydrology and hydrogeology is to identify potential receptors within the Site boundary and surrounding environment and use the information gathered during the desk study, the Site walkover undertaken in December 2023 and July 2024 and the PGL site investigation completed in February 2024 to assess the degree to which these receptors will be impacted upon in the absence of mitigation.

The potential impacts associated with the Construction Phase and Operation Phase of the Proposed Development are summarised below.

6.8.1 Construction Phase

6.8.1.1 Hydrological and Hydrogeological Flow Regime

Temporary diversions of water courses are not required and there will be no direct discharge to surface water during the construction phase of the Proposed Development. Therefore, there will be no impact on the hydrology or surface water flow regime within receiving surface water bodies during the construction phase of the Proposed Development

It is anticipated that excavations for construction of the Proposed Development will be above groundwater with no requirement for dewatering and no impact on the local groundwater resource and groundwater flow regime.

There will be no abstraction of water for use during construction works (i.e. dust suppression, welfare facilities). Water supply will be from mains supply in accordance with a connection agreement from UE and therefore there will be no impact on water resources.

6.8.1.2 Water Quality

Sources of contamination that could impact on water quality arising from the construction of the Proposed Development include:

- Storage and use of fuels, oils and chemicals used during construction which in the event of an accidental release could infiltrate to the underlying groundwater or migrate via surface water runoff to offsite surface water drains within the Castle Park residential estate adjacent the Site and receiving surface waterbodies (i.e., the Blackwater [Munster] River).
- Use of concrete and cementitious materials during construction in particular for below ground structures and foundations where shallow groundwater may be encountered.
- Runoff with entrained sediment or other contaminants from stockpiled soils onsite to offsite surface water drains within the Castle Park residential estate adjacent the Site and receiving surface waterbodies (i.e., the Blackwater [Munster] River).
- Sediment or contaminants entrained in surface water (rainwater) within excavations during dewatering.
- Accidental release of wash water or foul water from facilities at the Site (e.g., wheel wash and temporary welfare facilities).
- Release of foul water during connection to live sewers.

The potential pathway and pollutant linkages for the Construction Phase are identified as:

- Infiltration of contaminants through subsoils and /or exposed bedrock during excavations and groundworks where the groundwater vulnerability is increased and there is a more direct pathway for surface contaminates to underlying aquifer.
- Lateral migration within the bedrock aquifer.
- Sediment released during rainfall events entering the Blackwater [Munster] River via overland flow or offsite surface water drains within the Castle Park residential estate adjacent the Site and receiving surface waterbodies (i.e., the Blackwater [Munster] River).
- Sediment released to the Blackwater [Munster] River located 0.08km downgradient of the Site.

- Discharge of water (groundwater / surface water runoff) to sewer, watercourses or groundwater in accordance with all statutory requirements and obligations. Unauthorised discharge of water during the Construction Phase of the Proposed Development will not be permitted.

The potential water receptors for the Site include:

- Underlying bedrock aquifer which is part of the Mitchelstown GWB.
- The Blackwater [Munster] River and downstream waterbodies including the Upper Blackwater M Estuary and Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies and the Youghal Bay and Western Celtic Sea coastal waterbodies.
- There is an indirect hydraulic connection to the Blackwater River (Cork/Waterford) SAC. It is noted that Natura 2000 Sites are assessed in Chapter 13 of this EIAR.

The groundwater flow direction beneath the Site is considered to be to the south toward the Blackwater (Munster) River. Groundwater discharges in the Mitchelstown GWB will be to large springs within the GWB and to the rivers and streams crossing the GWB. The Oliver's Cross PWS is located approximately 0.76km northeast and upgradient of the Site. Furthermore, the one (1No.) groundwater user identified to the south of the Site is located to the south of the Blackwater (Munster) River. Therefore, there is no perceived pathway from groundwater beneath the Site to the identified groundwater users and thus these receptors are not considered further.

During excavation, there is a risk to the underlying bedrock aquifer due to any accidental release of deleterious materials (e.g., fuels or other hazardous materials being used onsite), through the failure of secondary containment or a materials handling accident at the Site, to exposed granular subsoils or bedrock creating a direct pathway to the underlying bedrock aquifer. During the construction phase of the Proposed Development, the groundwater vulnerability is expected to temporarily increase. In karstified limestone areas like the Mitchelstown GWB, there is a high degree of interconnection between groundwater and surface water. Furthermore, groundwater storage in karstified bedrock is low, limiting the potential for contaminant attenuation in such aquifers. During the construction phase the release of contaminants used onsite could enter the underlying aquifer and rapidly migrate towards receiving watercourses including the Blackwater (Munster) River and downstream waterbodies. In the event of such scenarios, it is considered that this could result in 'negative', 'significant' and 'medium-term' impact on a local area of the underlying aquifer environment and the receiving Blackwater (Munster) River depending on the nature of the incident.

There is also potential risk associated with the cementitious materials used during the construction of building foundations where groundwater may be encountered that could result in a 'negative', 'moderate to significant' and 'long term' impact on the underlying groundwater quality beneath the Site.

There is a risk of runoff with entrained sediment or other contaminants from groundworks areas and stockpiled soils entering the Blackwater [Munster] River via overland flow or via existing surface water drainage within the Castle Park residential estate adjacent the Site. The appointed contractor will ensure that any run-off from the Site will be managed for the duration of the Construction Phase to ensure that surface water runoff is contained, attenuated and treated onsite prior to discharge to surface water / groundwater. However, in the absence of mitigation measures, there is a potential 'negative', 'moderate' and 'medium-term' impact on the receiving waterbodies (i.e., the Blackwater

[Munster] River). Based on the dilution which will occur within the Blackwater [Munster] River, it is considered that there is no perceived risk to downstream waterbodies including the Upper Blackwater M Estuary, the Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies and the Youghal Bay and Western Celtic Sea coastal waterbodies.

Where water must be pumped from the excavations, water will be discharged by the contractor, following appropriate treatment (e.g., settlement or hydrocarbon interceptor), to sewer, watercourses or groundwater in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from Cork County Council under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water / groundwater. There will be no unauthorised discharge of water (groundwater / surface water runoff) to sewer, watercourses or groundwater during the Construction Phase of the Proposed Development. Therefore, the potential impacts will have been adequately assessed and mitigated as part of the statutory consent and there will be 'neutral', 'imperceptible' and 'temporary' impact on the receiving water environment.

6.8.2 Operational Phase

6.8.2.1 Hydrogeological and Hydrological Flow Regime

The Site currently comprises undeveloped lands which were stripped as part of the construction works of the previously permitted schemes at the Site (Planning Ref. 0755006 and 0655035). The construction of the Proposed Development will convert a percentage of the surface to impermeable surface due to the construction of building, roads and other infrastructure. The existing capacity for infiltration and recharge to the aquifer is extreme due to the thickness of subsoil and identified areas of exposed bedrock at surface. The change in cover from undeveloped land to paved areas within the Proposed Development will result in an unavoidable reduced infiltration potential within a localised portion of the 549m^2 Mitchelstown GWB. The incorporation of the SuDS elements within the surface water drainage network will encourage continued groundwater recharge and any change in recharge potential will only impact a very localised area of the aquifer within the vicinity of the Site. Therefore, it is considered that there will be an unavoidable 'negative', 'imperceptible' and 'long-term' impact on the hydrogeological regime within a very localised zone of the regionally important aquifer.

Furthermore, groundwater flow in the vicinity of the Site is considered to be in a southerly direction, discharging to the Blackwater [Munster] River. While the change in cover from undeveloped land to paved areas within the Proposed Development will result in an unavoidable reduction in infiltration potential to the underlying aquifer, all surface water from the Proposed Development will be treated and attenuated in accordance with the principles and objectives of SuDS. This will encourage continued groundwater recharge and also ensure that any intercepted surface water will ultimately discharge to the Blackwater [Munster] River via the existing drainage network for the adjoining Castle Park residential estate. Therefore, it is considered that there will be a 'neutral', 'imperceptible', and 'long-term' impact on the hydrological regime of the receiving Blackwater [Munster] River.

6.8.2.2 Drainage and Flood Risk

As outlined in the Infrastructure Report (DOSA, 2024a submitted with the planning application) the surface water drainage for the Proposed Development has been designed in accordance with SuDS and satisfies the requirements of the GDSDS to meet the following design criteria:

- Criterion 1 – River Water Quality Protection.
- Criterion 2 – River Regime Protection.
- Criterion 3 – Level of Service (Flooding) / Flood Risk Assessment.
- Criterion 4 – River Flood Protection.

The SSFRA (Arup, 2024 submitted with the planning application) identifies that the majority of the Site is located within Flood Zone C where the probability of flooding is low. Small parts of the site at the southern boundary are identified within Flood Zone A, an area with a high risk of flooding (more than 1% AEP). The proposed use for this area includes open space and footpaths, which are water-compatible uses and therefore appropriate for development in Flood Zone A. The SSFRA (Arup, 2024) concludes that the proposed development is appropriate for the site. Furthermore, given the design of the proposed development, including footpaths located within Flood Zone A that do not alter existing levels and are made from permeable materials, no mitigation is required.

Therefore, it is considered that the potential flooding impacts associated with the Proposed Development are 'neutral', 'imperceptible' and 'long-term'.

6.8.2.3 Water Quality

There will be no significant sources of contamination at the Site during the Operational Phase of the Proposed Development.

There will be no requirement for bulk storage of petroleum hydrocarbons-based fuels during the Operational Phase as the main operating systems for heating will include air source heat pumps. Further details are provided in Chapter 12 of this EIAR.

There will be no discharges to ground other than rainfall to unpaved landscaped areas and via limited recharge from SuDS measures incorporated into the surface water drainage network for the Proposed Development. As documented in the Infrastructure Report (DOSA, 2024a) prior to discharging to the existing surface water drainage within the Castle Park residential estate adjacent the Site and ultimately the Blackwater [Munster] River, all surface water runoff will be treated and attenuated in accordance with the principals and objectives of SuDS as detailed in Section 6.3.1.2 (i.e., permeable paving, rainwater harvesting, filter drains, tree pits, detention basins, hydrobrakes and swales) and petrol interceptors. Therefore, it is considered that there will be a 'neutral', 'imperceptible' and 'long-term' impact on to the quality of receiving hydrological receptors including the Blackwater [Munster] River. However, In the worst-case scenario of accidental spillage from a vehicle engine and failure of SuDS there is a potential risk to water quality in the receiving environment. In the absence of design avoidance measures, there is a potential 'negative', 'moderate' and 'long-term' impact on the quality of the receiving water environment depending on the nature of the incident.

As outlined in the Infrastructure Report (DOSA, 2024a), foul water from the Proposed Development will be treated in the Mallow WWTP (EPA Licence No. D0052-01) before ultimately discharging to Blackwater [Munster] River, in accordance with the requirements from the UÉ CoF letter (UE COF Reference: CDS22002703) and other applicable statutory consents verifying capacity at the Mallow WWTP for the Proposed Development. The Mallow WWTP is operated under existing statutory consents and the most recent available data in the 2022 AER verifies that discharge from the WWTP was compliant.

The upgrade works to Mallow WWTP which involved works to upgrade its waste management and processing infrastructure, were completed in July 2023, increasing the capacity of the plant to 22,000 PE initially, with an ability of future expansion to 24,595 PE. As part of the upgrade, a new Mallow Bridge Wastewater Pumping Station, storm tank, and rising main meant excess stormwater would no longer overflow into the Blackwater [Munster] River and instead would flow to the newly constructed storm tank with a capacity of 2,400m^3. The following is noted on Irish Waters website (Irishwater.ie) with regard to said improvement works:

"Uisce Éireann first began work on the original WWTP, which was outdated and overloaded, with Glan Agua back in early 2021. The project also involved the construction of a new pumping station and stormwater holding tank at Mallow Bridge. A separate contract to upgrade the wastewater network was signed with Ward & Burke Construction Ltd in early 2021. Work commenced in April 2021 and was completed in January 2023. The overall investment of €34m in these two projects will provide the additional capacity in the wastewater network and at the wastewater treatment plant to cater for current and future development and housing in the Mallow area and will also improve water quality in the River Blackwater through the provision of an enhanced wastewater treatment plant and the removal of eight combined storm overflows".

Therefore, there will be adequate capacity within the Mallow WWTP to accept foul effluent from the Proposed Development and the discharge of treated effluent from the Proposed Development will have a 'neutral', 'imperceptible', 'long-term' impact on receiving water quality and WFD status of the Blackwater [Munster] River.

Furthermore, the foul drainage for the Proposed Development has been designed in accordance with the principles and methods set out in UÉ's Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03) thereby, preventing any potential leakage of foul effluent to ground and risk of infiltration into the underlying groundwater and bedrock aquifer.

6.8.3 Cumulative Effects

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or offsite projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the accumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

A search of planning applications located within the vicinity of the Proposed Development was conducted using online planning resources including the National Planning Applications Database (MyPlan.ie) and Cork County Council's online planning database. Any planning application listed as granted, application registered or application pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on the receiving hydrological and hydrogeological environment. The larger-scale developments identified within the vicinity of the Site of the Proposed Development and considered for potential cumulative effects are listed in Table 6.1010.

Table 6.10 Planning Applications in the Vicinity of Site

Planning Reference	Location	Development description	Status
226156	Scoil Aonghusa CNS, Kingfort Avenue, Castlepark Village, Castlelands, Mallow, Co. Cork	Permission for construction of a single storey extension to existing school (Scoil Aonghusa CNS) incorporating a special educational needs base and associated facilities, alterations to northeast and northwest elevations of existing school and all associated Site works including the construction of a soft fall play area and retaining wall with fencing.	Permission Granted
224676	Old Course, Spaglen, Mallow, Co. Cork	The construction of a residential development of 96 no. dwelling units and all associated Site development works. The Proposed Development consists of the construction of 24 no. 4-bed semi-detached houses, 30 no. 3-bed semi-detached houses, 16 no. 3-bed townhouses, 14 no. 2-bedtownhouses and 6 no. 2-bed duplex units, 4 no. 2-bed apartment units and 2 no. 1-bed apartments units contained in 3 no. 3 storey apartment blocks. Vehicular access to the Proposed Development will be via the existing entrance from the L-1207. The Proposed Development also includes open space, landscaping, bicycle parking facilities, bin stores, public lighting, and all ancillary Site development works. A Natura Impact Statement (NIS) has been prepared and will be submitted to the planning authority with the application. The NIS will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the offices of the planning authority.	Permission Granted
235197	"Clonmore", Ballyviniter Lower, Mallow, Co. Cork	Application for 1) The construction of 108 no. dwelling houses, consisting of 3 no. 4 bed detached, 2 no. 3 bed detached, 68 no. 4 bed semi-detached, 32 no. 3 bed semi-detached and 3no. 3 bed terraced houses. These houses area to be assessed through the existing completed part of the housing development; 2) A crèche of 380 sqm of single/two storey construction, also accessed from the existing completed part of the housing development, including 11 carparking spaces and associated works; 3) the provision of a 1.2m diameter culvert within this development. This leads to an open water course which is to be provided in lieu of the existing pipe works along the western boundary of the Site; 4) all associated Site development works. Extension of Duration to Permission granted under Planning Ref. No. 16/6949, ABP-301221-18.	Permission Granted

226225	Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork	The construction of 52 no. residential units comprising of 12 no. 3 bed units, 18 no. 2 bed units and 22 no. 1 bed units [a mix of 3 bed townhouses, 1 & 2 bed maisonettes and 1, 2 & 3 bed own-door apartments]. The unit's range in height from 2 to 3 storeys. Permission is also sought for the construction of 3 no. commercial units [Beauty Salon/Coffee Shop/Café and Newsagents] as well as a multi-purpose/ community space at ground floor level. The development also includes landscaping, drainage, boundary treatments, 96 no. bicycle parking spaces, 57 no. car parking spaces, bin storage, play area, planting/screening and all associated Site development works at Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork. A Natura impact statement will be submitted to the planning authority with this application. The Natura impact statement will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the office of the relevant planning authority.	Permission Granted
312640; ABP-312640-22	Anabella, Mallow, Co. Cork.	Permission application for the construction of 299 no. residential units (185 no. houses, 114 no. apartments) creche and associated Site works	Permission Granted
244243; ABP-320525-24	Spa Glen, Mallow, Co. Cork	Permission for following Large Scale Residential Development (LRD) comprising the demolition of the existing farmhouse/buildings and the construction of 186 no. residential units, 1 no creche and all associated ancillary development works including the signalisation of the N72/L5331 junction to provide improved sightline visibility, amendments to part of the existing hedgerow along the N72 to improve sightline visibility, 2 no. vehicular access points, 1 no. toucan and 3 no. uncontrolled pedestrian and cycle crossing points on the L5331, footpaths, parking, drainage, landscaping/amenity areas and the undergrounding of existing 38KV overhead electricity lines. A Natura Impact Statement is submitted to the planning authority with this application	Permission Granted
235952; ABP 301429-18, amended by ABP 311986-21.	Hazel Brooke, Spaglen (townland), Mallow, Cork	Extension of Duration application for the construction of a strategic housing development comprising of 148 no. residential units, a creche, the provision of landscaping and amenity area to include 3 no. local play areas and 3 no. neighbourhood play areas and all associated ancillary development to include the provision of improved pedestrian facilities including the installation of dropped kerbs and tactile paving,	Permission Granted

		new pedestrian crossings and the realignment and improvement of the spa road junction and footpaths to the west, lighting, drainage, boundary treatments and bicycle & carparking and bin storage. Extension of Duration to Permission granted under Planning Ref. No. ABP Ref 301429-18 (as amended by ABP 311986-21).	
245530	Annabella, Mallow, Co. Cork	Permission for the construction of a creche facility to serve the adjacent permitted residential development (Cork County Council Ref. 15/6119 (extended under Ref. No. 20/6130) and all associated ancillary site development works including vehicular access, parking, footpaths, landscaping and amenity areas at Annabella (townland), Mallow, Co. Cork. The proposed creche will replace the creche previously permitted under Cork County Council Ref. 16/6023 (extended under ref. 22/6434).	Decision Pending Further Information

6.8.3.1 Water Resources

As detailed in the Infrastructure Report (DOSA, 2024a submitted with the planning application), water supply to the Proposed Development will be from the existing UÉ watermain, located in the adjacent Castle Park residential estate to the west of the Site, in accordance with the requirements from the UE CoF (UE COF Reference: CDS22002703). The UÉ CoF letter states that the water supply connection is feasible without infrastructure upgrade by UÉ.

The mains water supply will be operated in accordance with relevant existing statutory consents. Therefore, there will be no cumulative impacts associated with the Proposed Development on the supply network and water resources.

6.8.3.2 Water Quality

As detailed in the Infrastructure Report (DOSA, 2024a submitted with the planning application), surface water at the Proposed Development will discharge to the existing surface water drainage network located in the adjoining Castle Park residential estate to the west of the Site. Surface water from the Proposed Development, which will be managed in accordance with the principles and objectives of SuDS and the GDSDS, will be treated and attenuated through petrol interceptors and detention basins before discharging offsite at greenfield runoff rates. The surface water drainage network has been designed to cater for surface water runoff from the Castle Park residential estate and the Proposed Development. Therefore, there will be no cumulative impacts on the receiving surface water environment in terms of water quality and flood risk associated with the discharge of surface water runoff from the Proposed Development and considered offsite developments.

Foul water from the Proposed Development will be treated at the Mallow WWTP (EPA Licence No. D0052-01) before ultimately discharging to Blackwater [Munster] River, in accordance with the requirements from the UE CoF letter (UE COF Reference: CDS22002703) and other applicable statutory consents verifying capacity at the Mallow WWTP for the Proposed Development. The Mallow WWTP is operated under existing statutory consents and the most recent available data in the 2022 AER verifies that discharge from the WWTP was compliant. Therefore, the discharge of treated

effluent from the Proposed Development will have no cumulative impacts individually or in-combination on the Mallow WWTP or on the receiving water quality and WFD status.

A review of the EPA mapping tool (EPA, 2024) determined that there are several IPPC, IPC, or IEL facilities within the zone of influence (ZOI) of the Site. In this instance, the ZOI refers to the Blackwater [Munster] River channel itself. Licences/registered facilities along this channel, or those with the potential to impact the Blackwater [Munster] River, could provide in-combination impacts with the Proposed Development. The nearest IEL-licensed facility is Dairygold Co-Operative Society Limited (Mallow) (IE Licence No. P0403-03), located approximately 1.15 km northeast of the Proposed Development. Given the spatial separation of the Proposed Development from the above-listed EPA-registered facilities, and accounting for the requirement for each of these facilities to produce suitable risk assessments and/or mitigations on the potential for operations to produce adverse impacts on the Blackwater [Munster] River and other receiving waterbodies, alone or in combination, prior to EPA/relevant authority approval, it is considered that there is no potential for the Proposed Development to act in combination with the above-listed EPA-licensed/registered facilities in the vicinity, or those located further upstream and downstream of the Site, that may cause likely significant effects on the Blackwater [Munster] River.

There are no other potential cumulative impacts associated with the Proposed Development.

6.9 Mitigation and Monitoring

The measures outlined in this section of the report will ensure that there will be no significant impact on the receiving groundwater and surface water environment and associated receptors (e.g., Natura 2000 sites). The effective implementation of these measures will ensure that the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations (S.I. 272 of 2009 and as amended) and the European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 9 of 2010 and as amended) individually or in combination.

6.9.1 Construction Phase Mitigation

Enviroguide Consulting have prepared a Construction Environmental Management Plan (CEMP) (Enviroguide Consulting, 2024a) and a Resource Waste Management Plan (RWMP) (Enviroguide Consulting, 2024b) for the Construction Phase of the Proposed Development. Following appointment, the contractor will be required to implement the measures set out CEMP and RWMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001).

The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. These measures will address the main activities of potential impact which include:

- Control and Management of water and surface runoff.
- Control of Management of works nears water courses.

- Management and control of soil and materials
- Control of Management of materials from offsite sources.
- Appropriate fuel and chemical handling, transport and storage.
- Management of accidental release of contaminants at the site.
- Control and handling of cementitious materials

The construction works will be managed in accordance with all statutory obligations and regulations and with standard international best practice. Good construction management practices will minimise the risk of pollution from construction activities at the Site including but not limited to:

- Construction Industry Research and Information Association (CIRIA), 2001. Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- CIRIA, 2015. Environmental Good Practice on Site (C741).
- Enterprise Ireland Oil Storage Guidelines (BPGCS005).
- Environmental Protection Agency (EPA), 2013. IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities.
- CIRIA, 2007. The SuDS Manual (C697).
- UK Environment Agency, 2004. UK Pollution Prevention Guidelines (PPG);
- CIRIA, 2006. Control of Water Pollution from Linear Construction Projects: Technical Guidance (C648).
- National Roads Authority (now Transport Infrastructure Ireland), 2016. Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.
- Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.

6.9.1.1 Control and Management of Water and Surface Water Runoff

There will be no direct discharge to groundwater or surface water during the Construction Phase of the Proposed Development.

There may be a temporary increase in the exposure of the underlying shallow groundwater during excavation works. Surface water runoff will be prevented from entering open excavations with sandbags or other approved methods proposed by the appointed contractor. Furthermore, the appointed contractor will ensure that machinery does not enter the groundwater if encountered during construction.

All run-off from the Site or any areas of exposed soil will be managed as required with temporary pumping and following appropriate treatment as required. Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to temporary onsite settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge at a controlled rate. Furthermore, a temporary interceptor drain and silt fence or bunding will be installed at the southern boundary of the site to divert surface runoff to an onsite settlement pond.

Settlement ponds will be excavated to a depth. All ponds constructed in the poorly draining areas of the Site will be fully and securely lined with terram and dressed in clean stone across the base. Limestone will not be used within the ponds. For the well-drained areas of the site to the south the ponds will be dressed in clean stone across the base and water will be allowed to infiltrate to ground,

however contingencies will be put in place in the event that a discharge is required for these settlement ponds should the infiltration prove to be unsuccessful. Where this is the case, the discharge will be managed in the same way as the lined settlement ponds. If settlement tanks are required, the tanks must be sited as per the criteria listed above, with the discharge directed to a designated percolation area. The ponds will be securely fenced off and appropriate safety signage erected. The silt fencing, bunds and settlement ponds will be monitored daily by the appointed contractor and silt will be removed as required. Where relevant, discharge water from the settlement pond will be inspected on a daily basis by the Environmental Clerk of Works (ECoW) with a handheld turbidity probe. If turbidity is elevated, the flow will be stopped immediately and appropriate remedial works (e.g., enlargement of the pond, deployment of mobile 'siltbusters') will be carried out.

Where dewatering of shallow groundwater is required or where surface water runoff must be pumped from the excavations, water will be managed in accordance with best practice standards (i.e., CIRIA C750), the CMP, the CEMP and regulatory consents to minimise the potential impact on the local groundwater flow regime of the underlying aquifer.

Unauthorised discharge of water (groundwater / surface water runoff) to ground, drains or watercourses will not be permitted. Existing surface water drainage located along public roads (i.e., within the Castle Park residential estate) will be protected for the duration of the works. The appointed Contractor will ensure that the discharge of water to ground, drains or watercourses will be in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and Regulations for any water discharges to sewer or from Kildare County Council under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water.

Where required, stockpiles of loose materials pending re-use onsite will be managed in accordance with the procedures outlined in the CEMP (Enviroguide Consulting 2024a). A suitable temporary storage area shall be identified and designated. Storage areas must be on flat ground located as far as feasible from any existing surface water drains and the River Blackwater (a minimum set back of 50m from watercourses will be maintained) and will be appropriately sealed / covered and a silt fence or bunding will be installed around it to ensure no soils and sediments are washed out overland to the existing surface water networks, or directly into River Blackwater. The silt fences will be monitored daily by the appointed contractor and silt will be removed as required.

A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.

6.9.1.2 Concrete Works

The use of cementitious grout used during the Construction Phase of the Proposed Development will avoid any contamination of the receiving hydrogeological environment through the use of appropriate design and methods implemented by the appointed contractor and in accordance with the CEMP (Enviroguide Consulting, 2024a) and relevant industry standards to prevent impact on groundwater and surface water quality such as the use of water compatible grout.

All ready-mixed concrete will be delivered to the Site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite.

Shuttering will be designed to accommodate increases in the volume of material contained within the shuttered area due to rainfall. Discharge water generated during placement of concrete will be stored and removed off site for treatment and disposal.

A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge.

6.9.1.3 Drainage and Water Supply

All drainage and water supply works will be in accordance with the UE Code of Practice for Wastewater and Water Supply, the Wastewater Infrastructure Standard Details (Document Number: IW-CDS-5030-01) and the Water Infrastructure Standard Details (Document Number: IW-CDS-5020-01).

Drain inlets will be protected with a drain guard designed to filter oil and silt from stormwater run-off. sandbags will be placed around the inlet to provide additional protection from sediment. Inlet protection can only be removed once all construction activity that could generate sediment or result in emissions of other pollutants such as chemicals and fuel has ceased in a given location and the drainage infrastructure is operational (e.g., to allow for the discharge of stormwater from the roofs of newly constructed and completed dwellings into the stormwater network).

Measures will be employed to prevent soil wash out which will Include:

- Closing and stabilising open trenches as soon as possible.
- Sequencing the works so that open portions of the trench are closed before a new section of trenching is begun.
- No more than 500m of pipeline will be constructed before a trench is backfilled.

All new drainage will be tested by means of an approved air test during the Construction Phase in accordance with Irish Waters Code of Practice and Standard Details. All private drainage will be inspected and signed off by the design Engineer in accordance with the Building Regulations Part H and BCAR requirements. Drainage will be surveyed by CCTV to identify possible physical defects.

The connection of the new drainage to the public sewer will be carried out under the supervision of Irish Water and will be checked prior to commissioning.

Prior to commencement of excavations in public areas, all utilities and public services will be identified and checked, to ensure that adequate protection measures are implemented during the Construction Phase.

6.9.1.4 Handling of Fuels, Chemicals and Materials

Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (Enviroguide Consulting, 2024a), in a designated area of the Site at a minimum distance on 50m away from any watercourses and drains (where not possible to carry out such activities onsite).

Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan.

Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the Site will also be equipped with its own spill kit.

6.9.1.5 Emergency Procedures

Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.

- Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site.
- Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants.
- Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained.
- In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards.
- All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages.
- All construction works staff onsite will be fully trained on the use of equipment.

This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the Construction Phase of the Proposed Development.

6.9.1.6 Welfare Facilities

Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities

during the Construction Phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor.

Any connection to the public foul drainage network during the Construction Phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by UE.

6.9.1.7 Monitoring

During the Construction Phase of the Proposed Development the following monitoring measures will be considered:

- Inspections will be undertaken during excavations and other groundworks to ensure that measures that are protective of water quality outlined in this EIAR and the CEMP (Enviroguide Consulting, 2024a) are fully implemented and effective;
- As documented in the CEMP (Enviroguide Consulting, 2024a), the construction of the Development will be managed through a Schedule of Work Operation Record (SOWOR) system. The SOWOR for the construction phase of the Proposed Development will be managed by the Environmental Clerk of Works (ECoW), who is, or will be, trained to implement the process. Together with the ECoW, environmental triggers for the safe undertaking of high, intermediate, and low-risk activities associated with the construction of the Development will be agreed upon between the contractor, employer's representative, and any other experts or technical specialists needed for high-risk aspects of the project. An experienced ECoW can assist with determining these values, but the responsibility rests with the developer/employer. The SOWOR will specify commencement and abandonment triggers for key works activities (e.g., rainfall levels, water levels, weather, soil conditions, Flow in the Blackwater [Munster] River, turbidity in the Blackwater []Munster] River, upstream and downstream of the works area, hydrocarbon sheen, integrity of implemented mitigation measures etc.).
- All water protection measures will be incorporated into a detailed Water management System (WMS), which will be prepared by the contractor (once appointed) in consultation with the appointed ECoW and Employer's Representative. The WMS will take into account any changes in the physical conditions of the site (e.g., river flows or ground conditions) that may have occurred subsequent to the submission of the application. All elements of the WMS will be managed and maintained in line with the provisions of a detailed maintenance program. Daily inspections of the WMS will be carried out by the ECoW. The WMS will provide detailed designs for each stage of development and will detail how surface water management will be carried out. The WMS will include the following provisions:
    - The surface water protection and management measures outlined in the CEMP (Enviroguide Consulting, 2024a).
    - The design of the WMS will take due consideration of the requirements given in the document "Control of water pollution from Construction Sites – Guidance for consultants and contractors (Ciria C532)".

- The WMS will be contained within the redline boundary of the Site, unless prior agreement from adjacent landowners is received and permission to discharge treated water to land outside of the redline boundary is attained.
- Detailed methodologies for the construction of silt management systems (e.g., settlement ponds, silt traps, silt fences) and detailed procedures for pumping water from excavations.
- At least three mechanical siltbusters will be on standby to be employed sequentially if turbidity levels from pond outfalls are exceeded.
- At no time will any chemical coagulants be used to remove silt, whether in siltbusters or other areas.

- In advance of the construction phase commencing, and throughout the construction phase, the ECoW will undertake turbidity monitoring to establish baseline turbidity levels at the Blackwater River. Turbidity will be monitored via fixed sondes located upstream and downstream of the works area. The sondes will be set up to issue an alert via SMS to nominated individuals, including the ECoW, Construction Management Team (CMT), and Environmental Manager (once appointed), if turbidity levels at the downstream sonde increase by 20% over the baseline levels. An exact turbidity level will need to be decided above which works are suspended for investigation and remedial action. The monitoring data will be transmitted to the ECoW via SMS or to a central server so that records can be retained.
- Visual inspections of the Blackwater [Munster] River for hydrocarbon sheen, as well as ongoing monitoring of the weather forecast, onsite weather conditions, overland flow, and soil wetness conditions on Site, will also be undertaken by the ECoW.
- Discharges to surface water / foul sewers will be monitored where required in accordance with statutory consents (i.e., discharge licence).
- Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.

6.9.2 Operational Phase Mitigation

It is considered that the design of the Proposed Development is in line with the objectives of the Water Framework Directive (2000/60/EC as amended) (WFD) to prevent or limit any potential impact on water quality of the receiving environment.

Within the Site where possible, existing ditches, trees and hedgerows will be maintained. Incorporating these existing drainage features into the proposed overall SuDS strategy would provide for greater storage volume capacity within the site and will assist in the conveyance and treatment of the generated surface water runoff. The retention of existing trees and hedgerows will also assist in the reduction of surface water runoff by evapotranspiration. Any existing ditches that are to be retained, particularly along the existing field boundaries shall be cleaned out and assessed during the construction of the development. All ditches and existing drainage features being retained shall be incorporated into the proposed overall surface water network for the overall Site.

With regard to the proposed discharge of treated operational surface water from the Proposed Development to the offsite surface water drainage within the Castle Park residential estate and eventually discharging to the Blackwater [Munster] River, the potential for surface water generated at the Proposed Development to cause significant effects to downstream sensitivities during the

Operational Phase would be considered negligible due in part to the SuDS measures and petrol interceptors incorporated in the overall design.

6.9.2.1 Monitoring

Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development. This will ensure that there are no impacts on water quality and quantity (flow regime) during the Operational Phase of the Proposed Development.

6.9.3 Cumulative Mitigation

There is no requirement for mitigation measures to address potential cumulative impacts taking account of the design measures for the Proposed Development.

6.10 Water Framework Directive

There are identified potential impacts on the water quality associated with the Proposed Development in the absence of avoidance, remedial and reductive measures that could impact on the WFD Status of the receiving water bodies taking account of the worst-case scenario.

The Potential impact on WFD status for water bodies was assessed based on the worst-case scenario, taking account of the baseline hydrological and hydrogeological conditions at the Site, the WFD status assigned by the EPA (EPA, 2024) to the Blackwater [Munster] River and downstream waterbodies including the Upper Blackwater M Estuary and Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies and Western Celtic Sea coastal waterbodies and the underlying Mitchelstown GWB.

In the absence of any mitigation measures, there could be a potential 'negative', 'significant' and 'long-term' impact to the WFD status or the potential to achieve 'good' status of the of the Blackwater [Munster] River and underlying Mitchelstown GWB. Taking account of the distance downstream and the dilution which will occur, it is considered that there is no perceived impact on any further downstream waterbodies including the Upper Blackwater M Estuary and Lower Blackwater M Estuary / Youghal Harbour transitional waterbodies and Western Celtic Sea coastal waterbodies.

The design avoidance and mitigation measures as outline above, including the implementation of SuDS in accordance with the GDSDS and the construction mitigation measures, will prevent any impact on the receiving groundwater and surface water environment. Hence, the Proposed Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016).

The Proposed Development will not cause a deterioration in the status of waterbodies hydraulically connected with the Proposed Development, taking account of design avoidance and mitigation measures that will be implemented. The Proposed Development will not jeopardise objective to achieve 'good' surface water status or good ecological potential. The proposed petrol interceptors incorporated into the overall drainage design for the Proposed Development will lead to a positive

impact on water quality to downstream receptors including the underlying Mitchelstown GWB and the Blackwater [Munster] River. Therefore, the impacts of the Proposed Development on the WFD status of waterbodies will be 'neutral', 'imperceptible' and 'permanent'.

6.11 Residual Impact Assessment

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

6.11.1 Construction Phase

The predicted impacts of the Construction Phase of the Proposed Development are described in Table 6-11 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

Overall, there are no significant residual impacts on hydrology and hydrogeology anticipated regarding the Construction Phase of the Proposed Development.

Table 6.11 Summary of Residual Effects (Construction Phase)

Activity	Attribute	Predicted Impact	Quality	Significant	Duration	Type	Mitigation	Residual Impact
Construction Phase								
Accidental Release of Deleterious Materials (e.g., Fuels or Other Hazardous Materials Being Used Onsite).	Groundwater Quality / WFD Status	During excavations, the groundwater vulnerability will temporarily be increased and there will be a potential for uncontrolled release of deleterious materials to the underlying groundwater environment with potential impact on the receiving water quality / WFD Status of the underlying Mitchelstown GWB.	Negative	Significant	Medium Term	Direct / Worst-Case	Refuelling of plant and storage of any deleterious materials including fuels will be undertaken in accordance with the requirements and procedures outlined in the CEMP.	Imperceptible
Use of Cementitious Materials.	Groundwater Quality / WFD Status	Potential release of cementitious material during construction works for foundations, pavements and infrastructure to the subsurface and groundwater.	Negative	Moderate to Significant	Long Term	Direct	The appointed Contractor will implement appropriate design and methods in accordance with the CEMP and relevant industry standards.	Imperceptible
Release of Suspended Solids / Sediments During Groundworks	Surface Water Quality / WFD Status	During construction, there is a potential for runoff with entrained sediment or other contaminants from groundworks areas and stockpiled soils entering the	Negative	Moderate	Medium Term	Direct	The appointed contractor will ensure that any run-off from the Site will be managed in accordance with the procedures outlined in	Imperceptible

		Blackwater [Munster] River via overland flow or via existing surface water drainage within the Castle Park residential estate.					the CEMP to ensure that surface water runoff is contained, attenuated and treated onsite prior to discharge to surface water / groundwater.	
Discharge of Water to Sewer, Watercourses or Groundwater	Groundwater Quality / Surface Water Quality / WFD Status	Where water must be pumped from the excavations, water will be discharged following appropriate treatment (e.g., settlement or hydrocarbon interceptor) to sewer, watercourses or groundwater.	Neutral	Imperceptible	Temporary	Direct	There will be no unauthorised discharge of water (groundwater / surface water runoff) to sewer, watercourses or groundwater. All water will be discharged in accordance with the necessary discharge licences issued by UE or CCC.	Imperceptible

6.11.2 Operational Phase

The predicted impacts of the Operational Phase of the Proposed Development are described Table 6-12 in terms of quality, significance, extent, likelihood, and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance, remedial and mitigation measures.

Overall, there are no significant residual impacts on hydrology and hydrogeology anticipated regarding the Operational Phase of the Proposed Development.

Table 6.12 Summary of Residual Effects (Operational Phase)

Activity	Attribute	Predicted Impact	Quality	Significant	Duration	Type	Mitigation	Residual Impact
Operational Phase								
Increased Impermeable Surfaces	Hydrogeological Flow Regime	The change in cover from undeveloped land to paved areas within the Proposed Development will result in an unavoidable reduced infiltration potential within a localised portion of the 549km^2 Mitchelstown GWB.	Negative	Imperceptible	Long Term	Direct	None required. The incorporation of the SuDS elements within the surface water drainage network will encourage continued groundwater recharge and any change reduction in recharge potential will only impact a very localised area of the aquifer within the vicinity of the Site.	Imperceptible
Increased Impermeable Surfaces	Hydrological Flow Regime	The change in cover from undeveloped land to paved areas within the Proposed Development will result in an unavoidable reduced, albeit limited, rate of groundwater discharge to the Blackwater [Munster] River.	Negative	Imperceptible	Long Term	Direct	None required. The incorporation of the SuDS elements within the surface water drainage network will encourage continued groundwater recharge and also ensure that any intercepted surface water will ultimately discharge to the Blackwater [Munster] River.	Imperceptible

Proposed Development Drainage	Flood Risk and Surface Water Regime	The majority of the Site is located within Flood Zone C where the probability of flooding is low. Small parts of the site at the southern boundary are identified within Flood Zone A, an area with a high risk of flooding (more than 1% AEP). The proposed use for this area includes open space and footpaths, which are water-compatible uses and therefore appropriate for development in Flood Zone A. Furthermore, the surface water drainage for the Proposed Development has been designed in accordance with SuDS and satisfies the requirements of the GDSDS.	Neutral	Imperceptible	Long Term	Direct	None Required. Ongoing maintenance of the SUDS and drainage network will be undertaken.	Imperceptible
Surface Water Drainage	Surface Water Quality / WFD Status	Surface water runoff will be discharged to the existing surface water network in the Castle Park residential estate prior to outfalling to the Blackwater [Munster] River.	Neutral	Imperceptible	Long Term	Direct (also cumulative)	Surface water drainage at the Proposed Development has been designed in accordance with SuDS and therefore it is anticipated that there will be an overall positive impact on water	Imperceptible

							quality of groundwater and surface water.	
Surface Water Drainage and Management of SuDS	Surface Water Quality / WFD Status	In a worst-case scenario of accidental spillage of fuel from a vehicle engine and failure of SuDS, there is a potential risk on water quality in the receiving environment.	Negative	Moderate	Long Term	Direct/ Worst Case	Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development.	Imperceptible
Foul Drainage	Surface Water Quality / WFD Status	Foul water from the Proposed Development will be treated at the Mallow WWTP before ultimately discharging to Blackwater [Munster] River.	Neutral	Imperceptible	Long Term	Direct (also Cumulative)	None Required. foul water from the Proposed Development will be treated in the Mallow WWTP (EPA Licence No. D0052-01) in accordance with the requirements from the UE CoF letter (UE COF Reference: CDS22002703) and other applicable statutory consents verifying capacity at the Mallow WWTP for the Proposed Development.	Imperceptible

6.11.3 Cumulative Impact

There will be no cumulative impact on the receiving water environment associated with the Construction Phase of the Proposed Development.

The predicted cumulative impacts of the Operational Phase of the Proposed Development are described in Table 6-12.

Overall, there are no significant residual cumulative impacts on hydrology and hydrogeology anticipated regarding the Operational Phase of the Proposed Development.

6.12 Risk of Major Accidents or Disasters

There is no identified risk of flooding at the Site of the Proposed Development.

There are no karst features recorded within the Site boundary. However, the potential presence of karst could result in potential ground stability issues with a potential for a "negative" "moderate" and "permanent" impact. Appropriate geotechnical design avoidance and reductive measures will be incorporated in the design to prevent any potential impacts associated with karst. Detailed design will be specified by an appropriately qualified geotechnical engineer for the construction of foundations at the Site to ensure that ground conditions are engineered and controlled appropriately and therefore the potential impacts of karts features on the Proposed Development are considered 'neutral' 'imperceptible' and 'permanent'.

6.13 Significant Interactions

6.13.1 Population and Human Health

An assessment of the potential impacts of the Proposed Development on human health is included in Chapter 4 of this EIAR.

No public health issues associated with the water (hydrology and hydrogeology) conditions at the Site have been identified for the Construction Phase or Operational Phase of the Proposed Development.

Appropriate industry standard and health and safety legislative requirements will be implemented during the Construction Phase that will be protective of Site workers.

6.13.2 Biodiversity

An assessment of the potential impacts of the Proposed Development on the biodiversity of the subject Site, with emphasis on habitats, flora and fauna which may be impacted as is included in Chapter 13 of this EIAR such as potential pollution of waterbodies impacting on flora and fauna in the absence of mitigation measures.

Chapter 13 addresses impacts of the Proposed Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

6.13.3 Land, Soils and Geology

An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment during the Construction Phase and Operational Phase of the Proposed Development is set out in Chapter 5. In the absence of avoidance and mitigation measures, there is a potential for runoff with entrained sediment or other contaminants from groundworks areas and stockpiled soils entering the Blackwater [Munster] River via overland flow or via existing surface water drainage within the Castle Park residential estate adjacent the Site.

6.13.4 Material Assets- Site Services

An assessment of the potential impact on the Proposed Development on the material assets including built services and infrastructure has been set out in Chapter 12 of this EIAR.

During the Construction Phase of the Proposed Development discharge of water will be accordance with necessary licensing and consent of UÉ and / or CCC.

During the Operational Phase of the Proposed Development, any discharge to the public foul sewer and water supply will be under consent from UÉ.

6.14 References & Sources

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Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 7

Air Quality

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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7 Air Quality

7.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects on air quality as a result of the proposed development at Castlelands, Mallow, Co. Cork.

It should be read in conjunction with Chapter 11 'Material Assets: Traffic and Transport'.

7.2 Expertise & Qualifications

This chapter was completed by Ciara Nolan. Ciara is a Senior Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). She has over 7 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takea, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

7.3 Proposed Development

The proposed development is located within the townland of Castlelands to the west of Mallow town. The proposed development includes the construction of a mix of residential units, a creche, an interpretive centre/café, and all associated site development works. A full description of the proposed development is outlined in Chapter 2 'Site Location & Project Description' of this EIAR.

7.3.1 Aspects Relevant to this Assessment

During the construction phase construction dust emissions have the potential to impact air quality. Dust emissions will primarily occur as a result of site preparation works, earthworks and the movement of trucks on site and exiting the site. There is also the potential for engine emissions from site vehicles and machinery to impact air quality. Construction phase impacts will be short-term in duration.

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of NO_2, PM_{10} and $PM_{2.5}$. Operational phase impacts will be long-term in duration.

7.4 Methodology

7.4.1 Relevant Legislation & Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on Air Quality is summarised below.

- 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 (EPA, 2022);
- Guidance on the Assessment of Dust from Demolition and Construction Version 2.2 (Institute of Air Quality Management (IAQM), 2024);
- Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022) and TII Road Emissions Model (REM) online calculator tool (TII, 2024).

7.4.1.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate European Commission Directive 2008/50/EC. This has set limit values for numerous pollutants with the limit values for NO_2, PM_{10}, and $PM_{2.5}$ being relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC) and includes ambient limit values relating to $PM_{2.5}$. The applicable limit values for NO_2, PM_{10}, and $PM_{2.5}$ are set out in Table 7.1.

Table 7.1 Ambient Air Quality Standards & TA Luft

Pollutant	Regulation Note1	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 $mg/m^2/day$
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu g/m^3$
		Annual limit for protection of human health	40 $\mu g/m^3$
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 $\mu g/m^3$ PM_{10}
		Annual limit for protection of human health	40 $\mu g/m^3$ PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 $\mu g/m^3$ $PM_{2.5}$

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

In April 2023, the Government of Ireland published the *Clean Air Strategy for Ireland* (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (shown in Table 7.2). The strategy notes that a significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 $\mu g/m^3$. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*". Ireland will revise its air quality legislation in line with the proposed EU revisions to the CAFE Directive, which will set interim 2030 air quality standards and align the EU more closely with the WHO targets.

At present, the applicable standards for assessing compliance in relation to air quality are those outlined in Table 7.1.

Table 7.2 WHO Air Quality Guidelines

Pollutant	Regulation	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	WHO Air Quality Guidelines	24-hour limit for protection of human health	-	-	25 µg/m³
		Annual limit for protection of human health	20 µg/m³	-	10 µg/m³
PM (as PM_{10})		24-hour limit for protection of human health	75 µg/m³	50 µg/m³	45 µg/m³
		Annual limit for protection of human health	30 µg/m³	20 µg/m³	15 µg/m³
PM (as $PM_{2.5}$)		24-hour limit for protection of human health	37.5 µg/m³	25 µg/m³	15 µg/m³
		Annual limit for protection of human health	15 µg/m³	10 µg/m³	5 µg/m³

7.4.1.2 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust, which are less than 10 microns, and the EU ambient air quality standards outlined in Section 7.4.1.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard 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.

However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the proposed development.

7.4.1.3 Air Quality & Traffic Significance Criteria

The TII document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. The TII significance criteria are outlined in Table 4.9 of *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) and reproduced in Table 7.3 below. These criteria have been adopted for the proposed development to predict the impact of NO_2, PM_{10} and $PM_{2.5}$ emissions as a result of the proposed development.

Table 7.3 Air Quality Significance Criteria

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Limit Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial

Source: TII (2022) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106

7.4.2 Site Surveys/Investigation

No on-site surveys were required for the air quality assessment. The baseline air quality environment was established using available long-term EPA monitoring data for representative locations (see Section 7.6.2).

7.4.3 Consultation

A response was received from TII as part of the consultation process. TII in their response have highlighted that:

> *"The developer, in conducting Environmental Impact Assessment, should have regard to TII Environment Guidelines that deal with assessment and mitigation measures for varied environmental factors and occurrences, in particular:*
>
> *TII's Environmental Assessment and Construction Guidelines, including the, 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes', (National Roads Authority (NRA), 2006)"*

The air quality assessment has been conducted following the TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022) which has superseded the previous 2006 NRA guidance referenced in the TII consultation response.

7.4.4 Construction Phase Methodology

7.4.4.1 Construction Dust Assessment

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024) outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development 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 recommended by Transport Infrastructure Ireland in their guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022).

The major dust generating activities are divided into four types within the IAQM guidance (2024) to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

The magnitude of each of the four categories is divided into large, medium or small scale depending on the nature of the activities involved. The criteria for determining the category for the works involved are outlined in Table 7.4, these are based on the IAQM guidance (2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Table 7.4 IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	**Medium**	**Large**
Demolition		
▪ total building volume <12,000 m^3 ▪ construction material with low potential for dust release (e.g. metal cladding or timber) ▪ demolition activities <6 m above ground ▪ demolition during wetter months	▪ total building volume 12,000 - 75,000 m^3 ▪ potentially dusty construction material ▪ demolition activities 6 – 12 m above ground level	▪ total building volume >75,000 m^3 ▪ potentially dusty construction material (e.g. concrete) ▪ on-site crushing and screening ▪ demolition activities >12 m above ground level
Earthworks		
▪ total site area <18,000 m^2 ▪ soil type with large grain size (e.g. sand) ▪ <5 heavy earth moving vehicles active at any one time ▪ formation of bunds <4 m in height ▪ earthworks during wetter months	▪ total site area 18,000 m^2 - 110,000 m^2 ▪ moderately dusty soil type (e.g. silt) ▪ 5 – 10 heavy earth moving vehicles active at any one time ▪ formation of bunds 3 – 6 m in height	▪ total site area >110,000 m^2 ▪ potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) ▪ >10 heavy earth moving vehicles active at any one time ▪ formation of bunds >6 m in height
Construction		
▪ total building volume ▪ <12,000 m^3 ▪ construction material with low potential for dust release (e.g. metal cladding or timber)	▪ total building volume 12,000 - 75,000 m^3 ▪ potentially dusty construction material (e.g. concrete) ▪ on-site concrete batching	▪ total building volume ▪ >75,000 m^3 ▪ on-site concrete batching ▪ sandblasting
Trackout (truck movements)		
▪ <20 HDV (>3.5 t) outward movements in any one day ▪ surface material with low potential for dust release ▪ unpaved road length <50 m	▪ 20 – 50 HDV (>3.5 t) ▪ outward movements in any one day ▪ moderately dusty surface material (e.g. high clay content) ▪ unpaved road length 50 – 100 m	▪ >50 HDV (>3.5 t) outward movements in any one day ▪ potentially dusty surface material (e.g. high clay content) ▪ unpaved road length >100 m

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 7.5.

Table 7.5 IAQM Criteria to Determine Risk of Dust Impacts

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible

7.4.4.2 Construction Phase Traffic Assessment

Construction phase traffic has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

The construction stage traffic will not increase by 1,000 AADT or 200 HDV AADT and therefore does not meet the above scoping criteria. In addition, there are no proposed changes to the traffic speeds or road alignment. As a result, a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

7.4.5 Operational Phase Methodology

7.4.5.1 Operational Phase Traffic Assessment

Operational phase traffic has the potential to impact local air quality as a result of increased vehicle movements associated with the proposed development. The TII scoping criteria detailed in Section 7.4.4.2 were used to determine if any road links are affected by the proposed development and require inclusion in a detailed air dispersion modelling assessment. The proposed development will result in the operational phase traffic increasing by more than 1,000 AADT on a number of road links. Therefore, an air dispersion modelling assessment of operational phase traffic emissions was conducted.

To provide for a worst-case assessment and to assess potential cumulative impacts, the traffic data has included specific cumulative developments within the area, including the full buildout of all phases of the proposed development site (see Traffic and Transport Assessment and Chapter 11: Material Assets (Traffic & Transport) for further details).

The impact to air quality due to changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. These are discussed in further detail within Section 7.6.3.2 and shown graphically in Figure 7.3.

The TII guidance (2022a) states that modelling should be conducted for NO_2, PM_{10} and $PM_{2.5}$ for the base, opening and design years for both the Do Minimum (Do Nothing) and Do Something scenarios. Modelling of operational NO_2, PM_{10} and $PM_{2.5}$ concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2024).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy-duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type, project county location and pollutant background concentrations. The Default fleet mix option was selected along with the Intermediate Case fleet data base selection, as per TII Guidance (TII, 2024). The Intermediate Case assumes a linear interpolation between the *Business-as-Usual* case – where current trends in vehicle ownership continue and the Climate Action Plan (CAP) case – where adoption of low emission light duty vehicles occurs.

Using this input data the model predicts the road traffic contribution to ambient ground level concentrations at the identified sensitive receptors using generic meteorological data. The TII REM uses county-based Irish fleet composition for different road types, for different European emission standards from pre-Euro to Euro 6/VI with scaling factors to reflect improvements in fuel quality, retrofitting, and technology conversions. The TII REM also includes emission factors for PM_{10} emissions associated with brake and tyre wear (TII, 2024). The predicted road contributions are then added to

the existing background concentrations to give the predicted ambient concentrations. The ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

The TII guidance (2022a) also states that impacts to sensitive ecology due to traffic emissions should be considered. Consideration should be given to designated sites within 2km of the proposed development. However, a detailed assessment is only required at a local level, where there is a designated site within 200m of impacted road links. The TII guidance (TII, 2022) notes that only sites that are sensitive to nitrogen and acid deposition need to be included in the assessment. It is not necessary to include sites for example that have been designated as a geological feature or water course. There are no designated ecological sites within 200m of the impacted road links and therefore no assessment was required as there is no potential for significant impacts to the designated sites due to changes in air quality. An assessment in relation to dust impacts to ecology has been undertaken as per the IAQM guidance (2024) and is outlined in Section 7.8.1.1

7.4.5.2 Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from Punch Consulting Engineers for the purposes of this assessment. Data was provided for the Base Year 2023, Opening Year 2026 and Design Year 2041 (see Traffic and Transport Assessment for further details). A total of 2 no. scenarios were assessed, these include:

- The Do Minimum scenario – this is the "Do Nothing" scenario and assumes the proposed development is not in place in future years but includes traffic associated with cumulative developments in the wider area.
- The Proposed scenario – this scenario includes traffic from the Do Minimum scenario and traffic associated with the full build-out of the site as well as traffic associated with cumulative developments in the wider area.

Further detail on the modelling scenarios can be found in the Traffic and Transport Assessment prepared by Punch Consulting and submitted with this planning application. The traffic data is detailed in Table 7.6. Only road links that met the TII scoping criteria and that were within 200m of receptors were included in the modelling assessment. Background concentrations have been included as per Section 7.6.2 of this chapter based on available EPA background monitoring data (EPA, 2024).

Table 7.6 Traffic Data used in Operational Phase Air Modelling Assessment

Location	Speed (kph)	Base Year 2023	Opening Year 2026		Design Year 2041	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
St Joseph's Road	50	7,115 (285)	8,346 (354)	10,029 (371)	9,622 (478)	14,558 (642)
Kingsfort Avenue	10	2,272 (28)	3,061 (39)	3,925 (25)	3,448 (52)	6,003 (47)
Castlepark Avenue	10	3,334 (66)	4,506 (94)	5,363 (87)	5,076 (124)	7,750 (150)

7.5 Difficulties Encountered

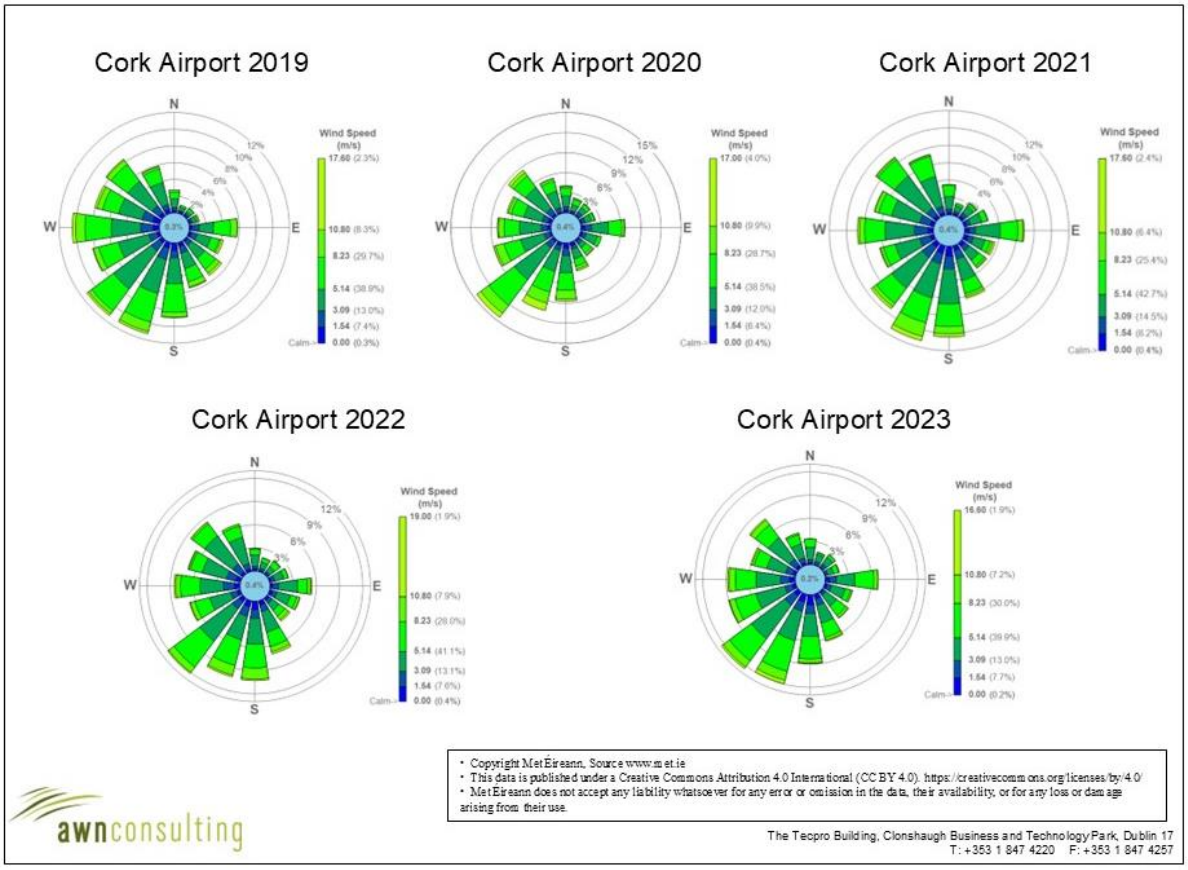
There were no difficulties encountered in compiling this assessment.

7.6 Baseline Environment

7.6.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Cork Airport meteorological station, which is located approximately 33 km south of the proposed development. Cork Airport meteorological data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 7.1). For data collated during five representative years (2019 – 2023), the predominant wind direction is south-westerly with a mean wind speed of 5.0 m/s over the 30-year period 1991 – 2020 (Met Eireann, 2024).



Source: Met Eireann, 2024

Figure 7.1 Cork Airport Windroses, 2019 – 2023

7.6.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is "*Air Quality in Ireland 2023*" (EPA, 2024). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2024). 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 site is within Zone D (EPA, 2024). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). Representative EPA monitoring stations have been used to determine an estimate of the background air quality in the region of the proposed development.

7.6.2.1 NO_2

Long-term NO_2 monitoring was carried out at the representative Zone D suburban background location of Castlebar Co. Mayo, and the rural background locations of Emo Co. Laois and Killkitt Co. Monaghan over the period 2019 – 2023 (EPA, 2024).

Long term average NO_2 concentrations are significantly below the annual average limit of 40 µg/m^3 (see Table 7.7). Average results range from 2 – 8 µg/m^3 over the period 2019 – 2023 for the Zone D sites. The 5-year average NO_2 concentration suggests an upper average concentration of no more than 7 µg/m^3 as a background concentration.

There is also an EPA monitoring station for NO_2 located in Mallow, approximately 970m south-west of the proposed development location. Monitoring at Mallow has been carried out since 2021 and data is available for the period 2021 – 2023. Annual mean concentrations of NO_2 at the Mallow monitoring station range from 13 – 16 µg/m^3 over the period 2021 – 2023.

Based on the above information, a background NO_2 concentration of 15 µg/m^3 has been used for the region of the proposed development.

Table 7.7 Trends in Air Quality – Nitrogen Dioxide (NO_2)

Station	Averaging Period Note 1	Year				
		2019	2020	2021	2022	2023
Castlebar (Zone D Suburban Background)	Annual Mean NO_2 (µg/m^3)	8	6	6	8	7
	Max 1-hr NO_2 (µg/m^3)	86	85	73	85	66
Emo (Zone D Rural Background)	Annual Mean NO_2 (µg/m^3)	4	3	4	3	2
	Max 1-hr NO_2 (µg/m^3)	56	179	64	179	55
Killkitt (Zone D Rural Background)	Annual Mean NO_2 (µg/m^3)	5	2	2	2	2
	Max 1-hr NO_2 (µg/m^3)	59	13	11	19	17
Mallow (Zone D Suburban Background)	Annual Mean NO_2 (µg/m^3)	-	-	16	16	13
	Max 1-hr NO_2 (µg/m^3)	-	-	81	80	142

Note 1 Annual average limit value - 40 µg/m^3 and 1-hour limit value - 200 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

7.6.2.2 PM_{10}

Continuous PM_{10} monitoring was carried out at the representative Zone D suburban background location of Castlebar Co. Mayo, and the rural background locations of Claremorris Co. Mayo and Killkitt Co. Monaghan over the period 2019 – 2023 (EPA, 2024).

Long-term PM_{10} concentrations are in compliance with the annual average limit value of 40 µg/m^3. Levels range from 7 - 16 µg/m^3 over the five-year period at the Zone D sites (see Table 7.8)., with at most 2 exceedances (in Castlebar) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year) (EPA, 2024). The 5-year average PM_{10} concentration at the sites suggests an upper average concentration of no more than 13 µg/m^3. Additionally, annual mean concentrations of PM_{10} at the Mallow monitoring station range from 11 – 15 µg/m^3 over the period 2021 – 2023.

Based on the EPA data, a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 14 µg/m^3.

Table 7.8 Trends in Air Quality – Particulate Matter, PM_{10}

Station	Averaging Period Note 1	Year				
		2019	2020	2021	2022	2023
Castlebar (Zone D Suburban Background)	Annual Mean PM_{10} (µg/m^3)	16	14	14	11	10
	24-hr Mean > 50 µg/m^3 (days)	1	2	1	0	0
Claremorris (Zone D Rural Background)	Annual Mean PM_{10} (µg/m^3)	11	10	8	8	8
	24-hr Mean > 50 µg/m^3 (days)	0	0	0	0	0
Killkitt (Zone D Rural Background)	Annual Mean PM_{10} (µg/m^3)	7	8	8	9	7
	24-hr Mean > 50 µg/m^3 (days)	1	0	0	0	0
Mallow (Zone D Suburban Background)	Annual Mean PM_{10} (µg/m^3)	-	-	15	14	11
	24-hr Mean > 50 µg/m^3 (days)	-	-	3	1	2

Note1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022). Daily limit value - 50 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 739 of 2022).

7.6.2.3 $PM_{2.5}$

Average $PM_{2.5}$ levels in Claremorris Co. Mayo over the period 2019 - 2023 ranged from 4 - 8 µg/m^3, (EPA, 2024). Additionally, annual mean $PM_{2.5}$ concentrations in Mallow ranged from 6.1 – 9.5 µg/m^3 over the period 2021 – 2023. Based on this information, a background $PM_{2.5}$ concentration in the region of the proposed development of 8 µg/m^3 has been used in the assessment.

7.6.2.4 Summary

Based on the above information the air quality in the area is generally good, with concentrations of the key pollutants generally well below the relevant limit values. However, the EPA have indicated that road transport emissions are contributing to increased levels of NO_2. There is the potential for breaches in the annual NO_2 limit value in future years at locations within urban centres and roadside locations. In addition, burning of solid fuels for home heating is contributing to increased levels of particulate matter (PM_{10} and $PM_{2.5}$). The EPA predict that exceedances in the particulate matter limit values are likely in future years if burning of solid fuels for residential heating continues (EPA, 2024).

The current background concentrations have been used in the operational phase air quality assessment for the Opening Year 2026 and Design Year of 2041 as a conservative approach in order to predict pollutant concentrations in future years. This is in line with the TII methodology (TII, 2022).

7.6.3 Sensitivity of the Receiving Environment

7.6.3.1 Construction Phase

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024), 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), schools and hospitals. Commercial premises and places of work are regarded as medium sensitivity and places where people are present for short periods, or do not expect a high level of amenity, are regarded as low sensitivity.

The sensitivity of the area to dust soiling effects and dust-related human health effects are first considered. The IAQM guidance (2024) states that where there are no sensitive human receptors present within 250 m of the site, then no assessment of dust impacts is required.

In terms of receptor sensitivity to dust soiling, there are 58 no. high sensitivity residential properties within 20 m of the site (see Figure 7.2). Based on these receptor numbers and using the IAQM criteria in Table 7.9, the overall sensitivity of the area to dust soiling impacts is high.

Table 7.9 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	**High**	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Source (IAQM, 2024) Guidance on the Assessment of Dust from Demolition and Construction

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 14 µg/m^3 and there are 58 no. high sensitivity residential properties within 20 m of the site (see Figure 7.2). Based on the IAQM criteria outlined in Table 7.10, the worst-case sensitivity of the area to dust-related human health impacts is low.

Table 7.10 Sensitivity of the Area to Dust Related Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	**Low**	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Source (IAQM, 2024) Guidance on the Assessment of Dust from Demolition and Construction

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the

photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site, and 50 m from site access roads, up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present.

A section of the Blackwater River SAC (site code 002170) is to the direct south of the proposed development, with a small section being within the site boundary (see Figure 7.2). This site is considered a high sensitivity receptor according to the IAQM guidance (2024) due to its European designation and the potential for dust sensitive species to be present. As per the criteria in Table 7.11, the sensitivity of the area to dust-related ecological effects is high.

Table 7.11 Sensitivity of the Area to Dust Related Ecological Impacts

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	**High**	Medium
Medium	Medium	Low
Low	Low	Low

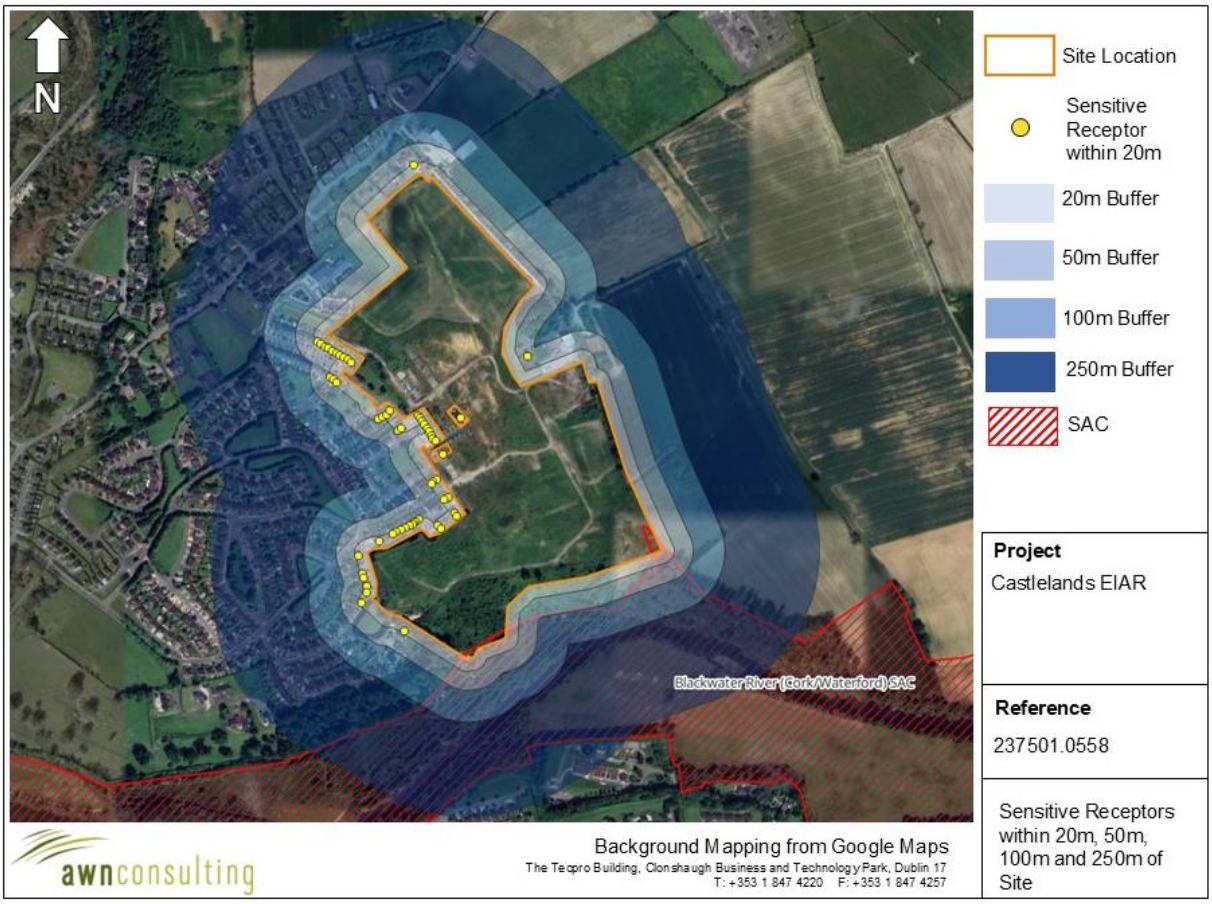


Figure 7.2 Sensitive Receptors within 20m, 50m, 100m and 250m of Site Boundary

7.6.3.2 Operational Phase

The impact to air quality due to changes in traffic is assessed at sensitive receptors in the vicinity of affected roads. The TII guidance (2022) states that a proportionate number of representative receptors, which are located in areas which will experience the highest concentrations or greatest improvements because of the proposed development, are to be included in the modelling. The TII criteria state that receptors within 200 m of impacted road links should be assessed; roads which are greater than 200 m from receptors will not impact pollutant concentrations at that receptor (TII, 2022). The TII guidance (2022) defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term-accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours. A total of 3 no. high sensitivity residential receptors (R1, R3 and R4) and 1 no. school (R2) were included in the modelling assessment (see Figure 7.3)

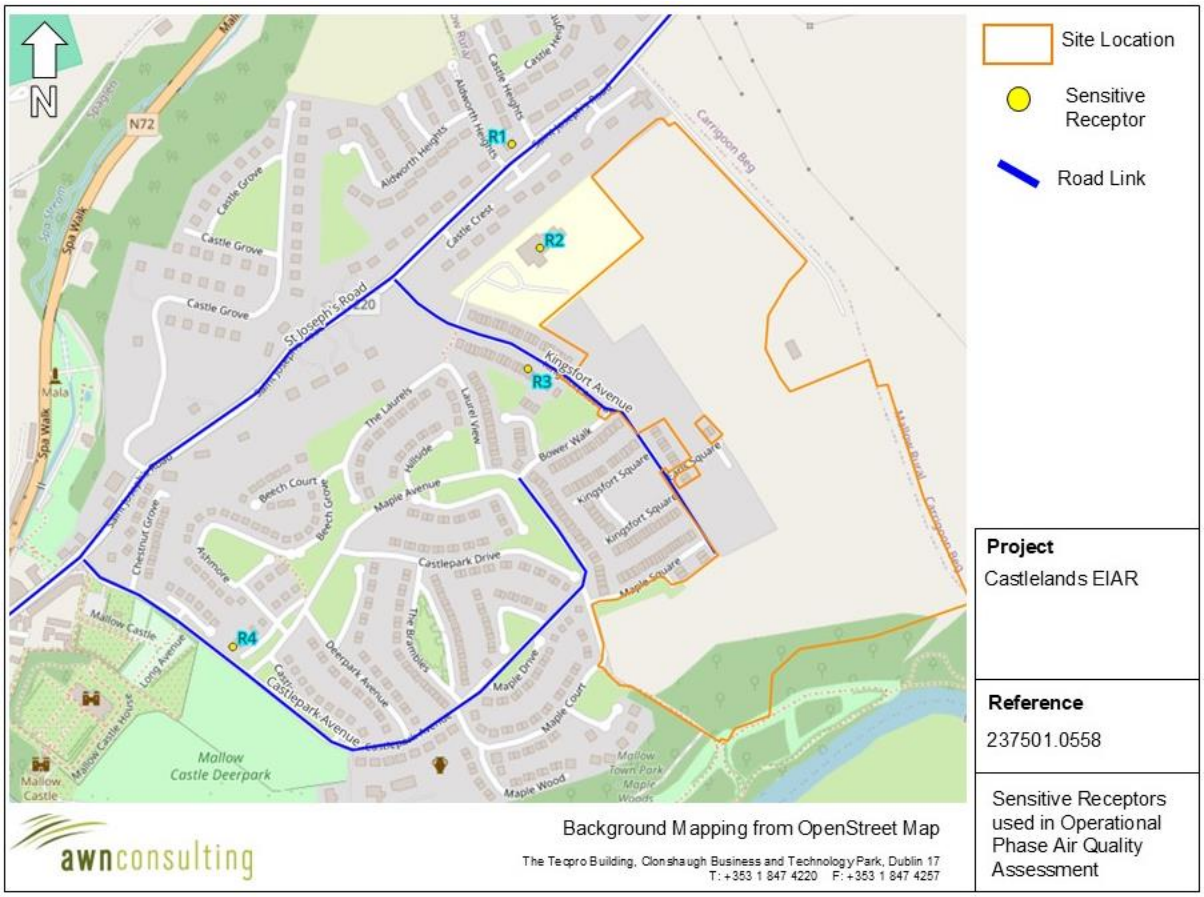


Figure 7.3 Location of Sensitive Receptors used in Operational Phase Air Quality Assessment

7.7 The 'Do Nothing' Scenario

In the Do Nothing Scenario no construction works will take place and the identified impacts of fugitive dust and particulate matter emissions will not occur at the subject site. The air quality baseline will continue to develop in line with current trends.

The Do Nothing scenario associated with the operational phase of the development is assessed within Section 7.8.2 and it was found to be direct, long-term, negative and imperceptible which is overall not significant.

7.8 Potential Significant Effects

7.8.1 Construction Phase

7.8.1.1 Construction Dust Assessment

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 250m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2024). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. A review of Cork Airport meteorological data indicates that the prevailing wind direction is south-westerly and wind speeds are generally moderate in nature (see Section 7.6.1). 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 218 days per year have rainfall over 0.2 mm (Met Eireann, 2024) and therefore it can be determined that 60% of the time dust generation will be reduced due to natural meteorological conditions.

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 7.6.3). As per Section 7.4.4.1, 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.

7.8.1.1.1 Determining the Potential Dust Emission Magnitude

The magnitude of the works under each category can be classified as either small, medium or large depending on the scale of the works involved. The magnitude of each activity has been determined below for the proposed development using the criteria in Table 7.4.

- Demolition: There is no significant demolition activities associated with the proposed development. Approximately 25.6 m^2 of the former lodge will be demolished however, this is considered imperceptible in relation to potential dust generation. However, in order to be conservative, the 'small' dust emission magnitude category (Table 7.4) has been assigned to the works to ensure all potential impacts are captured.

- Earthworks: The dust emission magnitude for the proposed earthwork activities can be classified as large as the total site area is greater than 110,000 m^2.

- Construction: The dust emission magnitude for the proposed construction activities can be classified as large as a worst-case as the total volume of buildings to be constructed will be greater than 75,000 m^3.

- Trackout: The dust emission magnitude for the proposed trackout can be classified as small, as there will less than 20 outward HGV movements per day during the construction phase of the proposed development.

7.8.1.1.2 Determining the Risk of Dust Impacts

Once the dust emission magnitude has been determined the next step, according to the IAQM guidance (2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, dust-related human health and dust-related ecological effects (see Section 7.6.3). The level of risk associated with each activity is determined using the criteria in Table 7.5.

Demolition

The sensitivity of the area, as determined in Section 7.6.3, is combined with the small dust emission magnitude for the demolition works and the overall risk of impacts is shown in Table 7.12. As the overall sensitivity of the area to dust soiling and dust-related ecological effects is high, when combined with a small dust emission magnitude, this produces an overall medium risk of dust impacts (as per the criteria in Table 7.5). As the overall sensitivity of the area to dust-related human health effects is low, this results in a negligible risk of dust-related human health effects (as per the criteria in Table 7.5).

Table 7.12 Risk of Dust Impacts – Demolition

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Construction	Risk of Dust-Related Impacts
Dust Soiling	High	Small	Medium Risk
Human Health	Low		Negligible Risk
Ecology	High		Medium Risk

Earthworks

The sensitivity of the area, as determined in Section 7.6.3, is combined with the large dust emission magnitude and the overall risk of impacts is shown in Table 7.13. As the overall sensitivity of the area to dust soiling and dust-related ecological effects is high, when combined with a large dust emission magnitude, this produces an overall high risk of dust impacts (as per the criteria in Table 7.5). As the overall sensitivity of the area to dust-related human health effects is low, this results in a low risk of dust-related human health effects (as per the criteria in Table 7.5).

Table 7.13 Risk of Dust Impacts – Earthworks

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	High	Large	High Risk
Human Health	Low		Low Risk
Ecology	High		High Risk

Construction

The overall risk of dust impacts from the construction works is shown in Table 7.14 for each category. Combining the large dust emissions magnitude for the construction activities with the high sensitivity to dust soiling and dust-related ecological effects results in a high risk of dust impacts using the criteria in Table 7.5. There is an overall low risk of dust-related human health impacts as a result of the proposed construction activities.

Table 7.14 Risk of Dust Impacts – Construction

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Construction	Risk of Dust-Related Impacts
Dust Soiling	High	Large	High Risk
Human Health	Low		Low Risk
Ecology	High		High Risk

Trackout

The overall risk of dust impacts from the construction works is shown in Table 7.15 for each category. Combining the small dust emissions magnitude for the trackout activities with the high sensitivity to dust soiling and dust-related ecological effects results in a low risk of dust impacts using the criteria in Table 7.5. There is an overall negligible risk of dust-related human health impacts as a result of the proposed trackout activities.

Table 7.15 Risk of Dust Impacts – Trackout

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Trackout	Risk of Dust-Related Impacts
Dust Soiling	High	Small	Low Risk
Human Health	Low		Negligible Risk
Ecology	High		Low Risk

Summary of Dust Emission Risks

The risk of dust impacts as a result of the proposed development are summarised in Table 7.16 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.

There is a high risk of dust soiling impacts and dust-related ecological impacts, and a low risk of dust-related human health impacts associated with the proposed works. As a result, best practice dust mitigation measures associated with high-risk works will be implemented to ensure there are no

significant impacts at nearby sensitive receptors. In the absence of mitigation, dust impacts are predicted to be direct, short-term, negative and slight.

Table 7.16 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Emission Magnitude	Small	Large	Large	Small
Dust Soiling Risk	Medium Risk	High Risk	High Risk	Low Risk
Human Health Risk	Negligible	Low Risk	Low Risk	Negligible Risk
Ecology Risk	Medium Risk	High Risk	High Risk	Low Risk

7.8.1.2 Construction Phase Traffic Assessment

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 has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the TII scoping assessment criteria in Section 7.4.4. It can therefore be determined that the construction stage traffic will have an imperceptible, direct, neutral and short-term impact on air quality.

7.8.1.3 Construction Phase Air Quality & Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 7.10, the surrounding area is of low sensitivity to dust-related human health impacts. In addition, there is at most a low risk of dust-related human health impacts as a result of the proposed construction works. In the absence of mitigation there is the potential for direct, short-term, negative and imperceptible impacts to human health as a result of construction dust emissions.

7.8.2 Operational Phase

7.8.2.1 Operational Phase Traffic Assessment

The potential impact of the proposed development has been assessed by modelling emissions from the traffic generated because of the development. The traffic data has included specific cumulative developments within the area to provide for a worst-case assessment and to assess potential cumulative impacts (see Traffic and Transport Assessment and Chapter 11: Material Assets (Traffic & Transport) for further details).

The traffic data includes the Do Nothing (DN) and Do Something (DS) scenarios. The impact of NO_2, PM_{10} and $PM_{2.5}$ emissions for the Opening and Design Years was predicted at the nearest sensitive receptors to the impacted road links. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined.

The TII guidance PE-ENV-01106 (TII, 2022) details a methodology for determining air quality impact significance criteria for TII road schemes and infrastructure projects. However, this significance criteria

can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do Nothing' scenario, which assumes that the proposed development is not in place in future years, to determine the degree of impact.

The results of the assessment of the impact of the proposed development on NO_2 in the Opening Year 2026 and Design Year 2041 are shown in Table 7.17. The annual average concentration is in compliance with the limit value at the worst-case receptor in 2026 and 2041. Concentrations of NO_2 are at most 46% of the annual limit value in 2026 and 42% of the limit value in 2041. There are predicted to be some increases in traffic volumes between the Opening Year and Design Year, therefore, any reduction in concentrations is due to improved engine technologies. In addition, the TII guidance (2022) states that the hourly limit value for NO_2 of 200 µg/m^3 is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m^3. As predicted NO_2 concentrations are significantly below 60 µg/m^3 (Table 7.17) it can be concluded that the short-term NO_2 limit value will be complied with at all receptor locations.

The impact of the proposed development on annual mean NO_2 concentrations can be assessed relative to 'Do Nothing (DN)' levels. NO_2 concentrations at receptors are predicted to increase as a result of the proposed development when compared with the Do-Nothing scenario. There will be at most an increase of 0.60 µg/m^3 at receptor R4. When comparing the change in concentration with the air quality limit value, it reveals a maximum change of 1.5% at receptor R4. All other receptors will experience similar or lesser impacts.

The impact is considered neutral, as per the TII significance criteria (see Table 7.3), where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7.1) and there is a less than 5% change in concentrations.

Therefore, the impact of the proposed development on NO_2 concentrations is neutral.

Table 7.17 Predicted Annual Mean NO_2 Concentrations (µg/m^3)

Receptor	Impact Opening Year					Impact Design Year				
	DN	DS	DS-DN	% Change of AQAL	Description	DN	DS	DS-DN	% Change of AQAL	Description
R1	17.4	17.9	0.46	1.1%	Neutral	16.1	16.6	0.52	1.3%	Neutral
R2	15.7	15.8	0.13	0.3%	Neutral	15.3	15.4	0.15	0.4%	Neutral
R3	16.8	17.2	0.44	1.1%	Neutral	15.8	16.3	0.51	1.3%	Neutral
R4	17.9	18.3	0.47	1.2%	Neutral	16.3	16.9	0.60	1.5%	Neutral

In relation to changes in PM_{10} concentrations due to the proposed development, the results of the assessment can be seen in Table 7.18 for the Opening Year 2026 and Design Year 2041. The annual average concentration is in compliance with the limit value at the worst-case receptor in 2026 and 2041. Concentrations of PM_{10} are at most 39% of the annual limit value in 2026 and 41% of the limit in 2041. In addition, the proposed development will not result in any exceedance of the daily PM_{10} limit value of 50 µg/m^3 at receptors. The impact of the proposed development on annual mean PM_{10}

concentrations can be assessed relative to 'Do Nothing (DN)' levels. PM_{10} concentrations will increase at receptors as a result of the proposed development when compared with the Do-Nothing scenario. There will be at most an increase of 0.74 µg/m^3 at receptor R1. This is a 1.9% increase when compared with the ambient air quality limit value of 40 µg/m^3. All other receptors will experience similar or lesser impacts.

As with NO_2, the impact is considered neutral, as per the TII significance criteria (see Table 7.3), where the predicted annual mean concentrations are less than 75% of the air quality standard (see Table 7.1) and there is a less than 5% change in concentrations. Therefore, the impact of the proposed development on PM_{10} concentrations is neutral.

Table 7.18 Predicted Annual Mean PM_{10} Concentrations (µg/m^3)

Receptor	Impact Opening Year					Impact Design Year				
	DN	DS	DS-DN	% Change of AQAL	Description	DN	DS	DS-DN	% Change of AQAL	Description
R1	15.4	15.6	0.24	0.6%	Neutral	15.6	16.3	0.74	1.9%	Neutral
R2	14.3	14.4	0.07	0.2%	Neutral	14.4	14.5	0.17	0.4%	Neutral
R3	14.6	14.7	0.14	0.3%	Neutral	14.6	15.0	0.40	1.0%	Neutral
R4	14.9	15.1	0.16	0.4%	Neutral	15.0	15.4	0.48	1.2%	Neutral

The results of the assessment of changes in $PM_{2.5}$ concentrations, due to the proposed development, can be seen in Table 7.19 for the Opening Year 2026 and Design Year 2041. The annual average concentration is in compliance with the limit value at the worst-case receptors in 2026 and 2041. Concentrations of $PM_{2.5}$ are at most 36% of the annual limit value in 2026 and 37% of the annual limit in 2041. The impact of the proposed development on annual mean $PM_{2.5}$ concentrations can be assessed relative to 'Do Nothing (DN)' levels. $PM_{2.5}$ concentrations at receptors will increase as a result of the proposed development when compared with the Do-Nothing scenario. There will be at most an increase of 0.43 µg/m^3 at receptor R1. This is a 1.7% increase when compared with the ambient air quality limit value of 25 µg/m^3. As with NO_2 and PM_{10}, where the predicted annual mean concentrations are less than 75% of the air quality limit value (see Table 7.1) and there is a less than 5% change in concentrations then the impact is considered neutral as per the TII significance criteria (see Table 7.3). Therefore, the impact of the proposed development on $PM_{2.5}$ concentrations is neutral.

Table 7.19 Predicted Annual Mean $PM_{2.5}$ Concentrations (µg/m^3)

Receptor	Impact Opening Year					Impact Design Year				
	DN	DS	DS-DN	% Change of AQAL	Description	DN	DS	DS-DN	% Change of AQAL	Description
R1	8.8	9.0	0.15	0.6%	Neutral	8.9	9.3	0.43	1.7%	Neutral
R2	8.2	8.2	0.04	0.2%	Neutral	8.2	8.3	0.11	0.4%	Neutral
R3	8.4	8.4	0.08	0.3%	Neutral	8.4	8.6	0.24	1.0%	Neutral

Receptor	Impact Opening Year					Impact Design Year				
	DN	DS	DS-DN	% Change of AQAL	Description	DN	DS	DS-DN	% Change of AQAL	Description
R4	8.6	8.7	0.10	0.4%	Neutral	8.6	8.9	0.28	1.1%	Neutral

Overall, the impact of the proposed development on ambient air quality in the operational stage, using the EPA EIA terminology (EPA, 2022), is long-term, localised, direct, negative, and imperceptible which is overall not significant.

7.8.2.2 Operational Phase Air Quality & Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, air dispersion modelling of traffic emissions has shown that levels of all pollutants are below the ambient air quality standards set for the protection of human health. It can be determined that the impact to human health during the operational stage is long-term, localised, direct, negative, and imperceptible.

7.8.3 Cumulative Effects

7.8.3.1 Construction Phase

There is the potential for cumulative construction dust impacts to nearby sensitive receptors if the construction phase of the proposed development coincides with that of other large-scale developments within 500m of the site.

A review of the planned and permitted projects within the vicinity of the site was undertaken in order to identify developments with the potential for cumulative construction phase impacts. There is 1 no. development identified that may result in coinciding construction phases and cumulative dust impacts to sensitive receptors - ABP Reference: JP04.320648.

The dust mitigation measures outlined in Section 7.9.1 will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development is short-term, direct, negative and not significant.

7.8.3.2 Operational Phase

There is the potential for cumulative impacts to air quality during the operational phase as a result of traffic associated with other existing and permitted developments within the area. The traffic data provided for the operational stage air quality assessment included specific cumulative developments within the area, including the full build-out of the site (see Traffic and Transport Assessment and Chapter 11: Material Assets (Traffic & Transport) for further details).

The cumulative operational phase impact is assessed within Section 7.8.2.1 and was found to have a neutral impact on air quality as per the TII significance criteria (Table 7.3). The cumulative operational stage impact is long-term, localised, direct, negative, and imperceptible which is overall not significant.

7.9 Mitigation

7.9.1 Construction Phase Mitigation

The proposed development has been assessed as having a high risk of dust soiling impacts and a low risk of dust related human health impacts during the construction phase as a result of earthworks, construction and trackout activities (see Section 7.8.1.1). Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a high risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses.
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details.

Site Management

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions.
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Monitoring

- Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

7.9.2 Operational Phase Mitigation

The impact of the operational traffic associated with proposed development on air quality is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

7.10 Monitoring

7.10.1 Construction Stage

Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The TA Luft limit value is 350 mg/m^2/day during the monitoring period of 30 days (+/- 2 days).

7.10.2 Operational Stage

There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be imperceptible.

7.11 Residual Impact Assessment

7.11.1 Construction Phase

7.11.1.1 Air Quality

Once the dust minimisation measures outlined in Section 7.9.1 are implemented, the impact of the proposed development in terms of dust soiling will be direct, short-term, negative, localised and not significant at nearby receptors.

7.11.1.2 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development will be direct, short-term, negative, localised and not significant with respect to human health.

7.11.2 Operational Phase

7.11.2.1 Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development will be not significant. Therefore, the operational phase impact to air quality is long-term, direct, negative, and not significant.

7.11.2.2 Human Health

As the air dispersion modelling has shown, predicted emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, direct, negative and not significant.

7.11.3 Cumulative Impact

7.11.3.1 Construction Phase

According to the IAQM guidance (2024) should the construction phase of the proposed development coincide with the construction phase of any other developments within 500m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 7.9.1, are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted. Impacts are predicted to be direct, short-term, negative, localised and not significant.

7.11.3.2 Operational Phase

Air dispersion modelling of operational traffic emissions associated with the proposed development and cumulative developments in the wider area was carried out using the TII REM tool. The modelling assessment determined that the change in emissions of NO_2, PM_{10} and $PM_{2.5}$ at nearby sensitive receptors as a result of the proposed development in combination with cumulative developments will be imperceptible. Therefore, the operational phase impact to air quality is long-term, direct, negative, and not significant.

7.12 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to air quality associated with the proposed development due to the nature and scale of the development. The proposed development is residential in nature and will not require large scale quantities of hazardous materials or fuels.

7.13 Significant Interactions

Air Quality and Human Health and Population

Construction Phase

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. There is a low risk of dust-related human health impacts during the construction phase of the proposed development. Best practice mitigation measures will be implemented during the construction phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, short-term, negative, localised and not significant with respect to Population and Human Health during the construction phase.

Operational Phase

Vehicles accessing the site will emit pollutants which may impact Air Quality and Human Health. However, the increased number of vehicles associated with the proposed development will not cause a significant change in air pollutant emissions in the locality. It has been assessed that emissions will be in compliance with the ambient air quality standards which are set for the protection of human health. Impacts will be long-term, localised, direct, negative and not significant.

Air Quality and Climate

Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate both air quality and climate impacts. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Air Quality and Land, Soils and Hydrogeology

Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between Air Quality and Land and Soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase.

Operational Phase

There are no potentially significant interactions identified between Air Quality, and Land and Soils during the operational phase.

Air Quality and Biodiversity

Construction Phase

Dust generation can occur during extended dry weather periods due to construction traffic along haul routes and construction activities such as excavations and infilling works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. There is a section of the River Blackwater SAC that is directly adjacent to the proposed development site boundary, with a small section being within the site boundary. It has been assessed that there is a high

risk of dust-related ecological effects as a result of the proposed development. A high level of dust mitigation is proposed to ensure no significant effects occur. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative, localised and not significant with respect to biodiversity.

Operational Phase

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

Air Quality and Material Assets – Traffic & Transport

Construction Phase

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 direct, short-term, negative, localised and not significant during the construction phase.

Operational Phase

The impact of the interactions between Traffic and Air Quality are considered to be long-term, direct, negative and not significant during the operational phase.

7.14 References & Sources

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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

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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)

World Health Organisation (2021) Air Quality Guidelines 2021

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 8

Climate Change

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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8 Climate

8.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects on climate as a result of the proposed development at Castlelands, Mallow, Co. Cork.

It should be read in conjunction with Chapter 7 – Air Quality, Chapter 11 – Material Assets Traffic & Transport and the Building Lifecycle Report prepared by Deady Gahan Architects in relation to the development.

8.2 Expertise & Qualifications

This chapter was completed by Ciara Nolan. Ciara is a Senior Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). She has over 7 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takea, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

8.3 Description of the Proposed Development

The proposed development is located within the townland of Castlelands to the west of Mallow town. The proposed development includes the construction of a mix of residential units, a creche, an interpretive centre/café, and all associated site development works. A full description of the proposed development is outlined in Chapter 2 'Site Location & Project Description' of this EIAR.

8.3.1 Aspects Relevant to this Assessment

During the construction phase engine emissions from site vehicles and machinery have the potential to impact climate through the release of carbon dioxide (CO_2) and to a lesser extent, other greenhouse gases (GHGs). Embodied carbon of materials used in the construction of the development along with site activities will impact climate. Impacts to climate are assessed against Ireland's obligations under the EU 2030 GHG targets and sectoral emissions ceilings.

Engine emissions from vehicles accessing the site have the potential to impact climate during the operational phase of the development through the release of CO_2. Operational phase impacts will be long-term in duration. In addition, the vulnerability of the proposed development in relation to future climate change must be considered during the operational phase.

The climate assessment is divided into two distinct sections; a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude; and
- Climate Change Risk Assessment (CCRA) identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience

8.4 Methodology

8.4.1 Relevant Legislation, Policy & Guidance

The assessment of potential impacts on climate has been prepared taking the relevant legislation, policy and guidance described in the following sections into consideration.

8.4.1.1 Legislation

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 first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 (CAP19) outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The Government published the second Climate Action Plan in November 2021 (Government of Ireland, 2020) and a third update in December 2022 (Government of Ireland, 2022). The current Climate Action Plan is CAP24, published in December 2023 (DECC, 2023a).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in

December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) in March 2021. The Climate Act was signed into Law on the 23rd of July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act (Government of Ireland, 2021) is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act 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*".

In relation to carbon budgets, the 2021 Climate Action and Low Carbon Development (Amendment) Act states "*A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'Budget Period')*". The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 8.1. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in the Climate Action Plan 2024 (CAP24) (DECC, 2023a) and are shown in Table 8.2.

Table 8.1 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2035

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 8.2 Sectoral Emission Ceilings 2030

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025 – 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment – Residential	7	29	23	4	40

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025 – 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Built Environment – Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	**68**				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	**-**	**295**	**200**	**-**	**51**

8.4.1.2 Policy

In December 2023 the current Climate Action Plan, CAP24, was published (DECC, 2023). This CAP builds on the progress of CAP23, which first published carbon budgets and sectoral emissions ceilings, and it aims to implement the required changes to achieve a 51% reduction in carbon emissions by 2030 and 2050 net zero goal. The CAP has six vital high impact sectors where the biggest savings can be made. These sectors are renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and change of land-use. CAP24 states that the decarbonisation of Ireland's manufacturing industry is key for Ireland's economy and future competitiveness. There is a target to reduce the embodied carbon in construction materials by 10% for materials produced and used in Ireland by 2025 and by at least 30% for materials produced and used in Ireland by 2030. CAP24 states that these reductions can be brought about by product substitution for construction materials and reduction of clinker content in cement. Cement and other high embodied carbon construction elements can be reduced by the adoption of the methods set out in the Construction Industry Federation 2021 report Modern Methods of Construction (Construction Industry Federation, 2021). The IDA Ireland will also seek to attract businesses to invest in decarbonisation technologies to ensure economic growth can continue alongside a reduction in emissions.

In April 2023, the Government published its *Long-Term Strategy on Greenhouse Gas Emissions Reductions* (DECC, 2023b). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the Climate Action Plan.

The second National Adaptation Framework (NAF) (DECC, 2024) was published in June 2024 in line the five-year requirement of the 2015 Climate and Low Carbon Development Act. The plan provides a whole of government and society approach to climate adaptation in Ireland to reduce Irelands vulnerability to climate change risks including extreme weather events, flooding, drought, loss of biodiversity, sea level rise and increased temperatures. Similar to the *"Just Transition"* when considering carbon emissions, the NAF aims for *"Just Resilience"* stating that:

> *"A climate resilient Ireland will have a reduced reliance on fossil fuel, it will have widely accessible electrified public transport and will have transitioned towards sustainable agricultural practices such as agroforestry and organic farming."*

In relation to the built environment the NAF states in Chapter 3 "*deepening of adaptation considerations in the planning and building standards processes is considered the most appropriate way of increasing the resilience of the built environment*". Within the NAF it mentions that there is a risk of damage to buildings and structures from severe weather events such as high winds and intense rainfall. New development should accommodate predicted future climate change impacts without requiring major redesign or redevelopment in the future which may be costly and inefficient. This will require facilitating innovative building design, new materials and standards (to accommodate hotter summers while withstanding changes in precipitation patterns and more intense storms for example) according to the NAF (DECC, 2024).

The National Climate Change Risk Assessment (NCCRA) was published in May 2024 (EPA 2024a). The NCCRA was required to be developed under Action 457 from the 2021 CAP (Government of Ireland 2021). Action 457 seeks to "*Further develop Ireland's national climate change risk assessment capacity to identify the priority physical risks of climate change to Ireland'*. The NCCRA uses definitions of the risk determinants from the Intergovernmental Panel on Climate Change (IPCC) Risk Framework (IPCC 2023):

- **Hazard** - the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources
- **Exposure** - the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected
- **Vulnerability** - the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity
- **Risk** - the potential for adverse consequences for human or ecological systems.

When considering risk, the NCCRA assess exposure and vulnerability for two future climate change scenarios or Representative Concentration Pathways (RCPs):

- RCP4.5 was selected as it represents a scenario aligned with the global temperature trajectory
- RCP8.5 was selected as it represents a high-emissions scenario and achieves the highest level of modelled temperature increases by the end of the century. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

These scenarios align with a conservative approach to assess risks to Ireland and assumes global emission reduction targets are not met. This aligns with the principle of precaution as stated in the NAF (DECC 2024). In addition to the future climate scenarios, the NCCRA assesses the risk from the future climate during the following timeframes:

- Present (~2030)

- Medium term (~2050)
- Long term (~2100).

8.4.1.3 Guidance

The assessment of potential impacts on climate has been prepared in accordance with the most relevant principal guidance and best practice documents:

- 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 (EPA, 2022);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013);
- PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (Transport Infrastructure Ireland (TII), 2022a);
- 2030 Climate and Energy Policy Framework (European Commission, 2014);
- 2030 EU Climate Target Plan (European Commission, 2021b);
- Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) (Government of Ireland, 2021);
- Climate Action Plan 2024 (DECC, 2023);
- 2nd National Adaptation Plan (DECC, 2024);
- Assessing Greenhouse Gas Emissions and Evaluating their Significance (Institute of Environmental Management & Assessment (IEMA), 2022);
- IEMA Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the IEMA 2022 GHG Guidance) (IEMA, 2022);
- IEMA Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the IEMA 2020 EIA Guide) (IEMA, 2020a);
- IEMA GHG Management Hierarchy (hereafter referred to as the IEMA 2020 GHG Management Hierarchy) (IEMA, 2020b).

8.4.2 Site Surveys/Investigation

No surveys were required as part of the climate assessment.

8.4.3 Consultation

A response was received from TII as part of the consultation process. TII in their response have highlighted that:

> *"The developer, in conducting Environmental Impact Assessment, should have regard to TII Environment Guidelines that deal with assessment and mitigation measures for varied environmental factors and occurrences, in particular:*

TII's Environmental Assessment and Construction Guidelines, including the, 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes', (National Roads Authority (NRA), 2006)"

The NRA 2006 guidance referred to climate impact assessments however, TII have since published updated guidance documents that are specific to climate assessments and are more relevant tot eh assessment for the proposed development. The climate assessment undertaken as part of this EIAR has been conducted following the TII guidance PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a) which has superseded the previous 2006 NRA guidance referenced in the TII consultation response.

8.4.4 Greenhouse Gas Assessment

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 8.6).

8.4.4.1 Construction Phase

The GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The reference study period (i.e. the assumed building life expectancy) for the purposes of the assessment is 50 years. Embodied carbon emissions are attributed to four main categories, taken from BS EN 15978. The categories are:

- **Product Stages (Category A1 to A3)** The carbon emissions generated at this stage arise from extracting the raw materials from the ground, their transport to a point of manufacture and then the primary energy used (and the associated carbon impacts that arise) from transforming the raw materials into construction products.
- **Construction (Category A4 to A5)** These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building. This has been included within the scope of the assessment.
- **Use Stage (Category B1 to B7)** This covers a wide range of sources from the GHG emissions associated with the operation of the building (B1), maintenance (B2), repair (B3), refurbishment (B4) and replacement (B5) of materials, and operational energy use (B6) and water use (B7).
- **End of Life Stages (Category C1 to C4)** The eventual deconstruction and disposal of the existing building at the end of its life takes account of the on-site activities of the demolition contractors. No 'credit' is taken for any future carbon benefit associated with the reuse or recycling of a material into new products.

PE-ENV-01104 (TII, 2022a) recommends the calculation of the construction stage embodied carbon using the TII Online Carbon Tool. Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The purpose of the embodied carbon assessment is to engage the design team in the consideration of embodied carbon at an early stage in the development and mitigate embodied carbon. This engagement aims to ensure carbon savings are made and to assist in aligning the project to Ireland's CAP goal of Net Carbon Zero by 2050.

The TII Online Carbon Tool (TII, 2022c) has been commissioned by TII to assess GHG emissions associated with road or rail projects in Ireland. The TII Carbon Tool (TII, 2022c) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013), which can be applied to a variety of developments, not just road or rail. The use of the TII carbon tool is considered appropriate for certain elements of the proposed development as the material types and construction activities employed by the proposed development are accounted for in the tool. The carbon emissions are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction/maintenance phase. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

The use of the TII Carbon Tool was not considered suitable for the building elements of the proposed development. As the TII Carbon Tool was developed for road and infrastructure projects, the material types within the tool are specific to these types of developments. These material types are not fully appropriate for assessing the embodied carbon associated with the construction of buildings. Therefore, the carbon impact of the buildings was carried out using an alternative tool; the Carbon Designer for Ireland tool.

The Irish Green Building Council in partnership with One Click LCA Ltd. have developed the Carbon Designer for Ireland tool (One Click LCA Ltd., 2023) for use on Irish specific building projects. The Carbon Designer tool is promoted by the EPA and the Land Development Agency. OneClickLCA is certified to EN 15978, EN 15978, ISO 21931 – 1 & ISO 21929, and data requirements of ISO 14040 & EN 15804, and is LEED, BREEAM and PAS 2080 aligned. It allows users to assess the carbon impact of buildings at an early stage using typical default materials and values. Inputs to the tool include the gross floor area and number of stories above ground level along with the building frame type. Once the baseline is established using generic data, the tool allows for optioneering and optimization of the carbon impact. It highlights the key areas within the building with the highest carbon impact and provides options for lower carbon intensive materials. The Carbon Designer for Ireland tool was completed by the project architects with the outputs provided to AWN Consulting to assess the GHG impact of the building elements of the proposed development.

Reasonable conservative estimates have been used in this assessment where necessary to provide an estimate of the GHGs associated with the proposed development.

8.4.4.2 Operational Phase

8.4.4.2.1 Traffic Emissions

Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022c), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment, and also the climate assessment. While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;

- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

As per Chapter 7 – Air Quality, there are a small number of road links that will experience a change of over 1,000 AADT during the operational phase as a result of the proposed development. As a result, a detailed assessment of traffic related carbon dioxide (CO_2) emissions was conducted.

PE-ENV-01104 (TII, 2022a) states that road traffic related emissions information should be obtained from an Air Quality Practitioner to show future user emissions during operation without the development in place. The Air Quality Practitioner calculated the traffic related emissions through the use of the TII REM tool (TII, 2022b) which includes detailed fleet predictions for age, fuel technology, engine size and weight based on available national forecasts. The output is provided in terms of CO_2e.

Traffic flow information was obtained from Punch Consulting Engineers for the purposes of this assessment. Data was provided for the Base Year 2024, Opening Year 2026 and Design Year 2041 (see Traffic and Transport Assessment for further details). Both the Do Nothing and Do Something scenarios are quantified to determine the degree of change in emissions as a result of the proposed development. A total of two scenarios were assessed, these include:

- **The Do Minimum Scenario** This is the "Do Nothing" scenario and assumes the proposed development is not in place in future years but includes traffic associated with cumulative developments in the wider area.
- **The Proposed Scenario** This scenario includes traffic from the Do Minimum scenario and traffic associated with the full build-out of the site as well as traffic associated with cumulative developments in the wider area.

Further detail on the modelling scenarios can be found in the Traffic and Transport Assessment prepared by Punch Consulting and submitted with this planning application. The traffic data is detailed in Table 8.3. Only road links that met the TII scoping criteria were included in the modelling assessment. Inputs include light duty vehicle (LDV) annual average daily traffic movements (AADT), annual average daily heavy duty vehicles (HDV AADT), annual average traffic speeds, road link lengths, road type and project county location. See Chapter 7 Air Quality and Chapter 11 Material Assets – Transport for further details on the traffic data.

Table 8.3 Traffic Data used in Operational Phase Climate Assessment

Location	Speed (kph)	Base Year 2023	Opening Year 2026		Design Year 2041	
			Do Nothing	Do Something	Do Nothing	Do Something
		LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)	LDV AADT (HDV AADT)
St Josephs Road	50	7,115 (285)	8,346 (354)	10,029 (371)	9,622 (478)	14,558 (642)
Kingsfort Avenue	10	2,272 (28)	3,061 (39)	3,925 (25)	3,448 (52)	6,003 (47)
Castlepark Avenue	10	3,334 (66)	4,506 (94)	5,363 (87)	5,076 (124)	7,750 (150)

8.4.4.2.2 Operational Phase Energy Use

The EU guidance (European Commission, 2013) also states indirect GHG emissions as a result of a development must be considered, which includes emissions associated with energy usage. A Building Lifecycle Report was prepared by Deady Gahan Architects in relation to the proposed development and is submitted separately with this planning application. The report outlines a number of measures which have been incorporated into the overall design of the development which will have the benefit of reducing the impact to climate where possible during operation. In addition, details on proposed sustainability measures have been supplied by the site developer to inform the climate assessment.

8.4.4.3 Significance Criteria for GHGA

The Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways)-Overarching Technical Document* (TII, 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development.

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on IEMA guidance (IEMA, 2022) which is broadly consistent with the terminology contained within Figure 3.4 of the EPA's *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022).

The 2022 IEMA Guidance (IEMA, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact. However, some projects will replace existing development or baseline activity that has a higher GHG profile. Therefore, the significance of a project's emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended TII significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII, 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even*

the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero[1] *by 2050*".

Significance is determined using the criteria outlined in Table 8.4(derived from Table 6.7 of PE-ENV-01104 (TII, 2022a)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 8.4 GHGA Significance Criteria

Effects	Significance Level	Description
Significant adverse	Major adverse	▪ The project's GHG impacts are not mitigated. ▪ The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and ▪ No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	▪ The project's GHG impacts are partially mitigated. ▪ The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and ▪ Falls short of full contribution to Ireland's trajectory towards net zero.
Not Significant	Minor adverse	▪ The project's GHG impacts are mitigated through 'good practice' measures. ▪ The project has complied with existing and emerging policy requirements; and ▪ Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	▪ The project's GHG impacts are mitigated beyond design standards. ▪ The project has gone well beyond existing and emerging policy requirements; and ▪ Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	▪ The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. ▪ The project has gone well beyond existing and emerging policy requirements; and ▪ Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Ireland's carbon budgets can also be used to contextualise the magnitude of GHG emissions from the proposed development (TII, 2022a). The approach is based on comparing the net proposed development GHG emissions to the relevant carbon budgets (DECC, 2023a). With the publication of

[1] Net Zero: "*When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.*" Net zero is achieved where emissions are first educed in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

the Climate Action Act in 2021 and the Climate Action Plan 2024, sectoral carbon budgets have been published for comparison with the net GHG emissions from the proposed development over its lifespan.

8.4.5 Climate Change Risk Assessment

The assessment involves determining the vulnerability of the proposed development to climate change. This involves an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability.

PE-ENV-01104 (TII, 2022a) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- Technical guidance on the climate proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (IEMA, 2020).

The baseline environment information provided in Section 8.6, future climate change modelling and input from other experts working on the proposed development (i.e. hydrologists) should be used to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The proposed development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022a) provides the list of asset categories and climate hazards to be considered. The asset categories will vary for development type and need to be determined on a development by development basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2**.**
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken. The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective

of the project type. For example, flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location, i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location, i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location, i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

8.4.5.1.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the proposed development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the proposed development to various climate hazards.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 8.5 details the vulnerability matrix. Vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022a) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. Therefore, the impact from climate change on the proposed development can be considered to be not significant.

Where residual medium or high vulnerabilities exist, the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks. An assessment of construction phase CCRA impacts is only required according to the TII guidance (TII, 2022a) if a detailed CCRA is required.

Table 8.5 Vulnerability Matrix

		Exposure		
		High (3)	Medium (2)	Low (1)
Sensitivity	High (3)	9 – High	6 – High	3 – Medium
	Medium (2)	6 – High	4 – Medium	2 – Low
	Low (1)	3 – Medium	2 – Low	1 – Low

The screening CCRA, detailed in Section 8.8.2.2, did not identify any residual medium or high risks to the proposed development as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

While a CCRA for the construction phase was not required, best practice mitigation against climate hazards is still recommended in Section 8.9.1.

8.5 Difficulties Encountered

There were no difficulties encountered in compiling this assessment.

8.6 Baseline Environment

PE-ENV-01104 (TII, 2022a) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

8.6.1 Current GHGA Baseline

Data published in July 2024 (EPA, 2024), indicates that Ireland exceeded, without the use of flexibilities, its 2023 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 2.27 Mt CO_2e. However, the 2023 emissions were the first time that Irelands emission were below (-1.2%) 1990 levels. ETS emissions decreased (-17.0%) and ESR emissions decreased (-3.4%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018. The EPA estimate that 2023 total national GHG emissions, excluding LULUCF, have decreased by 6.8% on 2022 levels to 55.01 Mt CO_2e, with a 2.2 Mt CO_2e (-21.6%) reduction in electricity industries alone. This was driven by a 40.7% share of energy from renewables in 2023 and by increasing our imported electricity. Manufacturing combustion and industrial processes decreased by 5.1% to 6.3 Mt CO_2e in 2023 due to declines in fossil fuel usage. The sector with the highest emissions in 2023 was agriculture at 37.6% of the total, followed by transport at 21.4%. For 2023, total national emissions (including LULUCF) were 60.62 Mt CO_2e (EPA, 2024), as shown in Table 8.6.

The provisional 2023 figures indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025.

Table 8.6 Trends in Total National GHG Emissions 2021 – 2023

Sector *Note 1*	2021	2022	2023	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2022 to 2023
Electricity	9.893	9.694	7.558	40.0	67.9%	-22.0%
Transport	11.089	11.760	11.791	54.0	64.1%	0.3%
Buildings (Residential)	6.868	5.753	5.346	29.0	62.0%	-7.1%
Buildings (Commercial and Public)	1.444	1.447	1.409	7.0	61.4%	-2.6%
Industry	7.093	6.622	6.288	30.0	66.7%	-5.0%
Agriculture	21.940	21.795	20.782	106.0	60.9%	-4.6%
Other *Note 2*	1.864	1.931	1.832	9.0	62.5%	-5.1%
LULUCF	4.628	3.983	5.614	–	–	40.9%

Total including LULUCF	**64.819**	**62.986**	**60.620**	**295.0**	**63.9%**	**-3.8%**

Note 1 Reproduced from latest emissions data on the EPA website July 2024 (EPA, 2024).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

8.6.2 Future GHGA Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with IEMA guidance (IEMA, 2022) on which the TII guidance (TII, 2022a) is based, the future baseline is a trajectory towards net zero by 2050, *"whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*.

The future baseline will be determined by Ireland meeting its targets set out in the CAP24, and future CAPs, alongside binding 2030 EU targets. The European Union (EU) enacted *'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013'* (hereafter referred to as the Regulation) (European Union, 2018) to meet the commitments under the Paris Agreement. The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and includes GHG emissions from transport, residential and commercial buildings and agriculture.

In June 2024, the EPA released the report Ireland's Greenhouse Gas Emissions Projections 2023-2050 (EPA 2024d), which includes total projected emissions and a breakdown of projected emissions per sector under the 'With Existing Measures' and 'With Additional Measures' scenarios. The EPA projections indicate that under the 'With Existing Measures' scenario, Ireland will achieve a reduction of 11% on 2018 levels by 2030. A reduction of 29% by 2030 can be achieved under the 'With Additional Measures' scenario, which is still short of the 42% reduction target, set out in the carbon budgets.

8.6.3 Current CCRA Baseline

The region of the proposed development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Cork Airport is the nearest, representative, weather and climate monitoring station to the proposed development with meteorological data recorded for the 30-year period from 1991 to 2020. The historical regional weather data for Cork Airport metrological station is representative of the current climate in the region of the proposed development. The data for the 30-year period from 1991 to 2020 indicates that the wettest months at Cork Airport Metrological Station were January, October and December, and the driest month on average was May (Met Éireann, 2024a). July was the warmest month with a mean temperature of 15.2 Celsius. January was the coldest month with a mean temperature of 5.7 Celsius.

Met Éireann's 2023 Climate Statement (Met Éireann, 2024b) states 2023's average shaded air temperature in Ireland is provisionally 11.20°C, which is 1.65°C above the 1961-1990 long-term average. Previous to this 2022 was the warmest year on record; however, 2023 was 0.38°C warmer (see Figure 8.1).

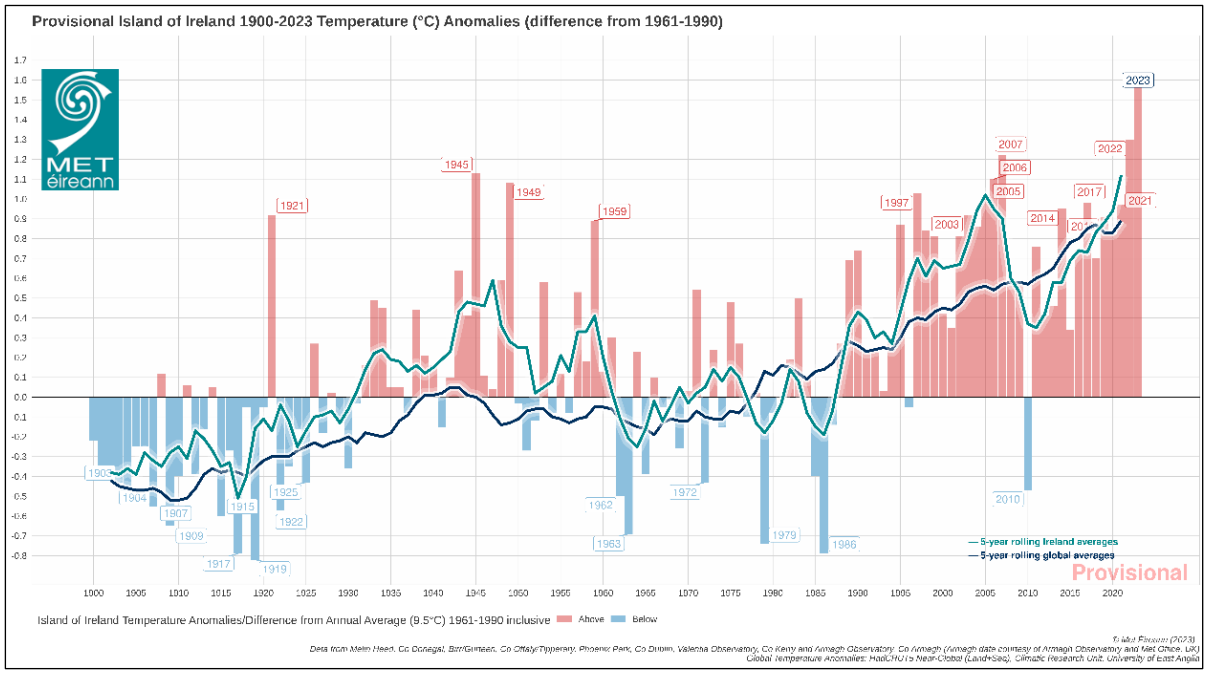


Figure 8.1 1900-2023 Temperature (°C) Temperature Anomalies (differences from 1961-1990).

2023 also had above average rainfall, this included the warmest June on record and the wettest March and July on record. Record high sea surface temperatures (SST) were recorded since April 2023 which included a severe marine heatwave to the west of Ireland during the June 2023. This marine heatwave contributed to the record rainfall in July.

Recent weather patterns and records of extreme weather events recorded by Met Éireann have been reviewed. Considering the extraordinary 2023 data, Met Éireann states that the latest Irish climate change projections indicate further warming in the future, including warmer winters. The record temperatures means the likelihood of extreme weather events occurring has increased. This will result in longer dry periods and heavy rainfall events. Storm surges and coastal flooding due to sea level rise. Compound events, where coastal surges and extreme rainfall events occur simultaneously will also increase. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

8.6.4 Future CCRA Baseline

Impacts as a result of climate change will evolve with a changing future baseline. Changes have the potential to include increases in global temperatures and increases in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration is needed with respect to this within the design of the proposed development.

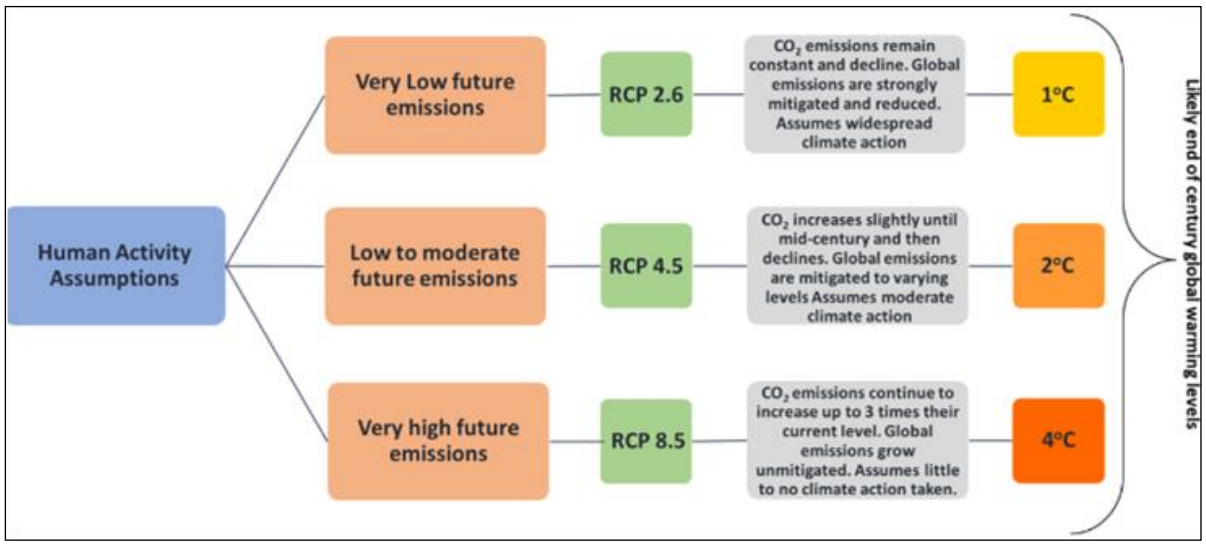
Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east including in the region where the proposed development

will be located (EPA, 2021b). The EPA have compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the proposed development (EPA, 2021a):

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

TII's Guidance document PE-ENV-01104 (TII, 2022a) states that for future climate change a moderate to high Representative Concentration Pathways (RCP) should be adopted. RPC4.5 is considered moderate while RPC8.5 is considered high. Representative Concentration Pathways (RCPs) describe different 21st century pathways of GHG emissions depending on the level of climate mitigation action undertaken.

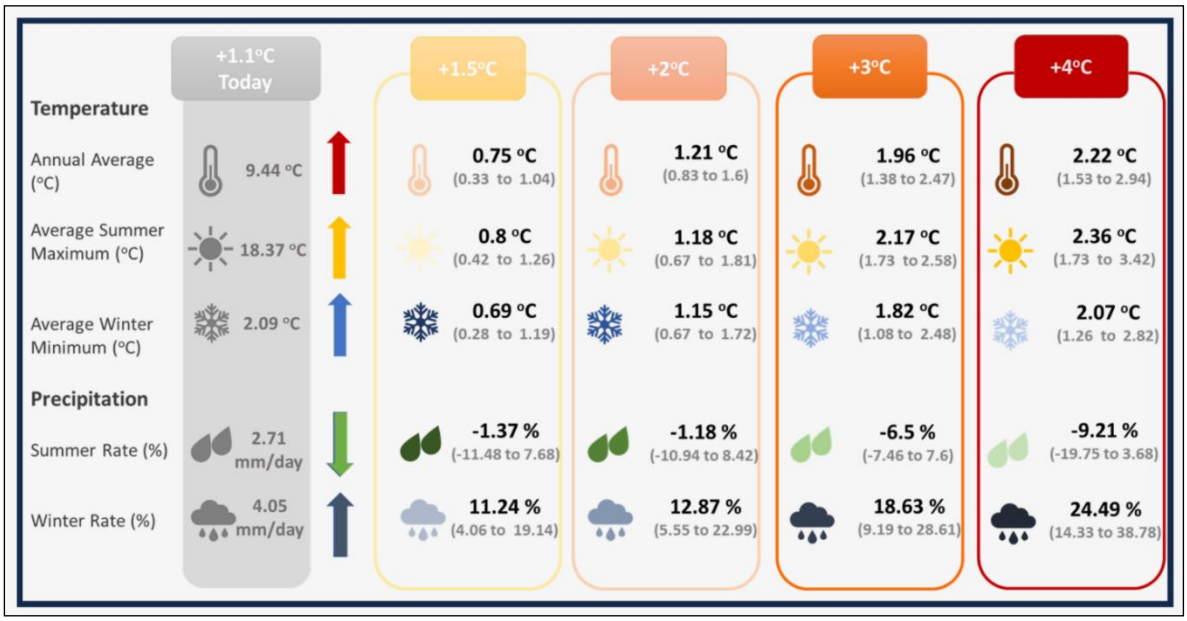
National Framework for Climate Services (NFCS) was founded in June 2022 to streamline the provision of climate services in Ireland and will be led by Met Éireann. The aim of the NFCS is to enable the co-production, delivery and use of accurate, actionable and accessible climate information and tools to support climate resilience planning and decision making. In addition to the NFCS, further work has been ongoing into climate projects in Ireland through research under the TRANSLATE project. TRANSLATE (Met Éireann, 2023b) has been led by climate researchers from University of Galway – Irish Centre for High End Computing (ICHEC), and University College Cork – SFI Research Centre for Energy, Climate and Marine (MaREI), supported by Met Éireann climatologists. TRANSLATE's outputs are produced using a selection of internationally reviewed and accepted models from both CORDEX and CMIP5. Representative Concentration Pathways (RCPs) provide a broad range of possible futures based on assumptions of human activity. The modelled scenarios include for "*least*" (RCP2.6), "*more*" (RCP4.5) or "*most*" (RCP8.5) climate change, see Figure 8.2.



Source TRANSLATE Project Story Map (Met Éireann, 2023b)

Figure 8.2 Representative Concentration Pathways Associated Emission Levels

TRANSLATE (Met Éireann, 2023b) provides the first standardised and bias-corrected national climate projections for Ireland to aid climate risk decision making across multiple sectors (e.g. transport, energy, water), by providing information on how Ireland's climate could change as global temperatures increase to 1.5˚C ,2˚C, 2.5˚C, 3˚C or 4˚C (see Figure 8.3). Projections broadly agree with previous projections for Ireland. With climate change Ireland's temperature and rainfall will undergo more and more significant changes. For example, on average summer temperature could increase by more than 2°C, summer rainfall could decrease by 9% while winter rainfall could increase by 24%. Future projects also include a 10-fold increase in the frequency of summer nights (values > 15°C) by the end of the century, a decrease in the frequency of cold winter nights and an increase in the number of heatwaves. A heatwave in Ireland is defined as a period of 5 consecutive days where the daily maximum temperature is greater than 25°C.



Source TRANSLATE Project Story Map (Met Éireann, 2023b)

Figure 8.3 Change of Climate Variables for Ireland for Different Global Warming Thresholds

The TRANSLATE research report (Met Éireann 2024d) finds that night-time temperatures will warm more than day-time temperatures, with temperatures increases across all seasons but the highest in the summer (with an increase of 0.5°C to 3.5°C). Autumn is projected to have the highest increase in average minimum temperatures (with an increase of 1.1°C to 4.4°C). The variance is dependent on the scenario that is being reviewed. While these temperatures are projected across all of Ireland, they increase most in the east of the country compared to the west. With respect to rainfall, increases of 4% to 38% are projected, however this will not be spread across the year as during summer months there are projected decreases in rainfall beyond the 2°C warming scenario.

In January 2024 the EPA published Ireland's Climate Change Assessment Synthesis Report (EPA 2024e) which contained four volumes:

- Volume 1: Climate Science: Ireland in a Changing World
- Volume 2: Achieving Climate Neutrality by 2050
- Volume 3: Being Prepared for Ireland's Future Climate
- Volume 4: Realising the Benefits of Transition and Transformation

This report reinforces the existing and future risks arising from climate change. Volume 1 (EPA 2024e) states that under Early action, the temperature increase averaged across the island of Ireland relative to the recent past (1976 to 2005) would reach 0.91°C (0.44 to 1.10°C) by mid-century before falling back to 0.80°C (0.34 to 1.07°C) at the end of the century. Whereas under Late action, by the end of the century it is projected that the temperature increases could be 2.77°C (2.02 to 3.49°C). Heat extremes will become more frequent and more severe and cold extremes will become less frequent and less severe with further warming.

Precipitation was 7% higher over the period 1991 to 2020 than over the 1961 to 1990 period. The average future predicted increase in precipitation is <10% in annual mean accumulated. By 2100 projected additional rises in sea level range from 0.32 to 0.6m under early action to 0.63 to 1.01m under late action scenarios, with greater storm surges potentially effecting critical infrastructure along the coastline. Projections of changes in storminess are highly uncertain and translate into large uncertainties in future frequency and intensity of extreme waves.

Volume 3 (EPA 2024e) discusses how water supplies will face growing pressures resulting in increased water demand and how options need to be developed, including potential new sources. The report states the key role of critical infrastructure for delivering public services, economic development and a sustainable environment. These are exposed to a range of climate extremes. Failures in critical infrastructure can cascade across other sectors and present a multi-sector risk due to climate change.

The report references the EPA's Critical Infrastructure Vulnerability to Climate Change report (EPA 2021a) as the most substantial research project in Ireland to date on climate change and critical infrastructure which assesses the future performance of Ireland's critical infrastructure when climate is considered. The Critical Infrastructure Vulnerability to Climate Change report states with respect to water availability and quality, that flood risk and heatwaves have a medium vulnerability index, and the underground supply network has a high vulnerability to snowstorms and cold spells. However, while the vulnerability is high, the exposure is likely to reduce due to future climate change resulting in less cold weather events. The risk assessment highlights the co-dependence of the water sector to the energy sector, and how vulnerability in the energy sector may have cascading impacts.

Volume 4 (EPA 2024e) calls for system change, including a transformation of urban settings. Stating that meaningful urban transformation can create a better living environment while simultaneously reducing emissions.

8.7 The 'Do Nothing' Scenario

In the Do Nothing Scenario construction works associated with the proposed development will not take place. Impacts from increased traffic volumes and associated emissions from the proposed development will also not occur. The climate baseline will continue to develop in line with the identified trends (see Section 8.6).

8.8 Potential Significant Effects

8.8.1 Greenhouse Gas Assessment

8.8.1.1 Construction Phase

The most significant proportion of GHG emissions tend to occur during the construction phase as a result of embodied carbon in construction materials and emissions from construction activities. Therefore, the assessment has been included in the construction phase assessment for the purposes of the EIAR. The assessment is broken down into the following stages as per Section 8.4.4.1:

- Product stage (A1 – A3);
- Transportation to site (A4);
- Site operations (construction activities) (A5); and
- Material replacement & refurbishment (B4 – B5).

The construction phase GHG emissions comprise stages A1 – A5 which includes the construction materials, the transport of the materials to site and the construction activities or site operations. Ongoing material refurbishment and replacement throughout the lifetime of the development is included within category B4 – B5, these are default values based on the typical maintenance requirements for the chosen material types over the assumed 50-year lifetime. Figure 8.4 shows the GHG emissions for the proposed development per life-cycle stage with both the output from the Carbon Designer for Ireland tool and TII Carbon Tool assessments included.

Construction materials make up the majority of GHG emissions for the proposed development making up approximately 75% of the total construction phase GHG emissions across the different building types. In relation to the housing units, the foundations and external walls elements are the areas with the highest GHG impact. Material transportation to site, site operations and material replacement make up the remainder of the construction GHG emissions.

The carbon assessment has highlighted the areas where the highest embodied carbon emissions occur, specifically as a result of building materials. Where material types were not known, as these will not be selected until detailed design stage, the standard default material type was used. Additionally, the average material types within the TII Carbon Tool were used for the purposes of this assessment in the absence of more detailed information.

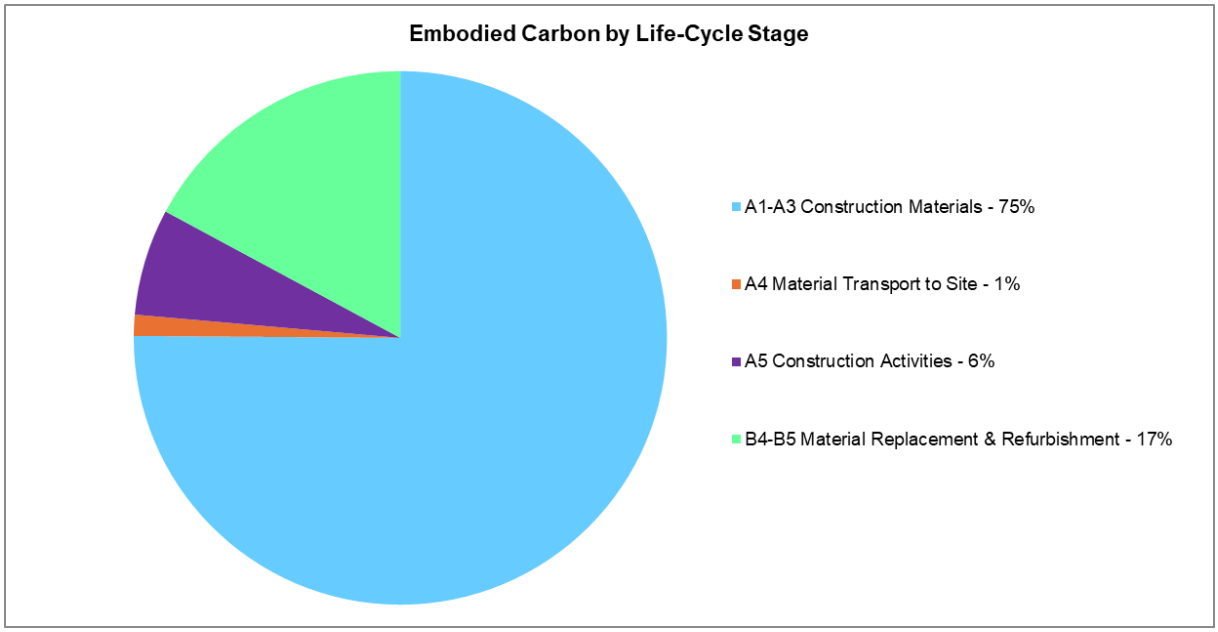


Figure 8.4 Embodied Carbon by Life-Cycle Stage

It has been calculated that the total construction phase embodied carbon (including maintenance and replacement of materials over the development lifetime) will be 18,258 tonnes CO_2e (see Table 8.7). The GHG emissions from the development as a total cannot be compared against one specific sector 2030 carbon budget, the emissions are broken down into different assessment categories and these must be compared separately to the relevant sectoral emissions budget which are detailed in Table 8.7. The relevant sectoral emissions for the proposed development comparison include the Industry sector, Transport sector and Waste sector. The predicted emissions for the proposed development are annualised over the assumed 50 year lifespan and then compared to the relevant sector 2030 carbon budgets. Annualising the full carbon emissions over the lifetime of the development allows for appropriate comparison with annual GHG targets.

Table 8.7 GHG Assessment Results

Stage	GHG Assessment Category	Predicted GHG Emissions (tCO_2e)	Relevant Sector for Carbon Budget Comparison	Annualised GHG Emissions as % of Relevant Carbon Budget
A1-A3	Materials	13,715	Industry	0.007%
A4	Material Transport	233	Transport	0.0001%
A5	Excavations	110	Industry	0.00006%
A5	Construction site material waste	833	Waste	0.0017%
A5	Construction site material waste transport	202	Transport	0.000067%
A5	Construction site waste	35	Waste	0.0001%
B4 – B5	Maintenance Material	3,130	Industry	0.002%
Total		**18,258**		

The predicted GHG emissions (as shown in Table 8.8) can be averaged over the full lifespan of the proposed development to give the predicted annual emissions to allow for direct comparison with national annual emissions and targets.

In Table 8.8, GHG emissions have been compared against the carbon budget for the industry, transport and waste sectors in 2030 (DECC, 2024), against Ireland's total GHG emissions in 2023 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (33 Mt CO_2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total GHG emissions, when annualised over the 50-year proposed development lifespan, are equivalent to 0.0006% of Ireland's total GHG emissions in 2023 and 0.001% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with transport-related activities are 0.0001% of the 2030 Transport budget, construction waste GHG emissions are 0.002% of the Waste budget and industry-related activities are 0.01% of the 2030 Industry budget.

Table 8.8 Estimated GHG Emissions Relative to Sectoral Budgets and GHG Baseline

Target/Sectoral Budget (tCO_2e)		Annualised Development GHG Emissions	% of Relevant Target/Budget
Ireland's 2023 Total GHG Emissions (existing baseline)	60,620,000	Total GHG Emissions	0.0006%
Non-ETS 2030 Target	33,000,000	Total GHG Emissions	0.001%
2030 Sectoral Budget (Industry Sector)	4,000,000	Total Industry Emissions	0.01%
2030 Sectoral Budget (Transport Sector)	6,000,000	Total Transport Emissions	0.0001%
2030 Sectoral Budget (Waste Sector)	1,000,000	Total Waste Emissions	0.002%

8.8.1.2 Operational Phase

8.8.1.2.1 Operational Energy Usage

The proposed development has been designed to reduce the impact to climate where possible. A number of measures have been incorporated into the design to ensure the operational phase emissions are minimised. The primary elements with respect to reducing climate impacts and optimising energy usage are summarised in Section 8.9.2 and are based on information provided by the project developer and the Building Lifecycle Report prepared by Deady Gahan Architects for the proposed development.

8.8.1.2.2 Operational Traffic Emissions

There is the potential for increased traffic volumes to impact climate during the operational phase. To provide for a worst-case assessment and to assess potential cumulative impacts, the traffic data has included specific cumulative developments within the area (see Traffic & Transportation Assessment for further details).

The predicted concentrations of CO_2e for the future years of 2026 and 2041 are detailed in Table 8.9. These are significantly less than Ireland's national 2026 and 2030 targets set out under EU legislation (targets beyond 2030 are not available) and the 2030 sectoral emissions ceilings. It is predicted that in 2026 the proposed development will increase CO_2 emissions by 280 tonnes CO_2e. This equates to

0.0007% of the 2026 national emission ceiling or 0.005% of the 2030 Transport sector emissions ceiling (see Table 8.9). Similarly low increases in CO_2 emissions are predicted to occur in 2041 with emissions increasing by 735 tonnes CO_2e. This equates to 0.002% of the 2030 national emission ceiling or 0.012% of the 2030 Transport sector emissions ceiling (see Table 8.9).

In addition, bicycle parking and electric vehicle parking and charging infrastructure will be provided as part of the parking requirements at the proposed development which will promote the use of more sustainable methods of transport.

Table 8.9 Traffic Emissions GHG Impact Assessment

Year	Scenario	CO_2e (tonnes/annum)
2026	Do Nothing	13,491
	Do Something	14,242
2041	Do Nothing	14,339
	Do Something	15,595
Increment Change in 2026		280
National Emission Ceiling 2026 (Tonnes) Note 1		**37,869,352**
Impact in 2026 (as % of national emissions ceiling)		0.0007%
Transport Sector 2030 Emission Ceiling		**6,000,000**
Impact in 2026 (as % of transport sector emissions ceiling)		0.005%
Increment Change in 2041		735
National Emission Ceiling 2030 (Tonnes) Note 1		**33,381,312**
Impact in 2041 (as % of national emissions ceiling)		0.002%
Impact in 2041 (as % of transport sector emissions ceiling)		0.012%

Note 1 Target under Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council.

8.8.1.3 GHGA Significance of Effects

The TII guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 8.9 has been taken into account when determining the significance of the proposed development's GHG emissions. According to the TII significance criteria described in Section 8.4.4.2.2 and Table 8.4, the significance of the GHG emissions during the construction and operational phase is minor adverse. The proposed development has mitigated GHG impacts and is in line with Ireland's trajectory towards net zero.

In accordance with the EPA guidelines (EPA, 2022), the above significance equates to a significance of effect of GHG emissions during the construction and operational phase, which is direct, long-term, negative and slight, which is overall not significant.

8.8.2 Climate Change Risk Assessment

8.8.2.1 Construction Phase

A detailed CCRA of the construction phase has been scoped out, as discussed in Section 8.4.5 and Section 8.8.2.2, which state that there are no residual medium or high risk vulnerabilities to climate change hazards. Therefore, a detailed CCRA is not required (TII, 2022a). However, consideration has been given to the proposed development's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 8.9.1:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow; and
- Major Storm Damage including wind damage.

8.8.2.2 Operational Phase

The sensitivity and exposure of the development to various climate hazards must first be determined to then determine the vulnerability of the proposed development to climate change. Flooding (coastal, pluvial, fluvial), extreme heat, extreme cold, wildfire, drought, extreme wind, lightning, hail, landslides and fog have been considered as climate hazards in the context of the proposed development.

The sensitivity of the proposed development to the climate hazards is assessed irrespective of the project location. Table 8.10 details the sensitivity of the proposed development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been established the exposure of the proposed development to each of the climate hazards is determined, this is the likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the proposed development to each of the climate hazards as per Table 8.5. The results of the vulnerability assessment are detailed in Table 8.10.

Table 8.10 Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Coastal, Pluvial, Fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	2 (Medium)	2 (Low)
Wildfire	1 (Low)	1 (Low)	1 (Low)
Drought	1 (Low)	1 (Low)	1 (Low)
Extreme Wind	1 (Low)	1 (Low)	1 (Low)
Lightning & Hail	1 (Low)	1 (Low)	1 (Low)
Landslides	1 (Low)	1 (Low)	1 (Low)
Fog	1 (Low)	1 (Low)	1 (Low)

The sensitivity and exposure of the area was determined with reference to a number of online tools and with input from the various discipline specialists on the project team. It was concluded that the proposed development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections. All vulnerabilities are classified as low.

Flooding

Increased rainfall in future years as a result of climate change has the potential to result in flooding. A Site-Specific Flood Risk Assessment (SSFRA) for the proposed development was undertaken by DOSA, with an additional SSFRA undertaken by ARUP. These are submitted with this planning application. The SSFRA has concluded that flooding is not a risk to the proposed development. The SSFRA undertaken by ARUP has concluded that the majority of the site is in Flood Zone C, an area at low risk of flooding (less than 0.1% Annual Exceedance Probability - AEP). Small parts of the site at the southern boundary are within Flood Zone A, which are at high risk of flooding (more than 1% AEP). The proposed use at this area is for an open space and footpath, a water compatible use and, as such, appropriate for development in Flood Zone A. The extreme flood water level from Blackwater River is at 46.37m AOD for the 0.1% AEP. All highly and less vulnerable development is proposed above this level, between 61.75m AOD and 85.15m AOD. The risk of fluvial flooding to the development is therefore low.

The SSFRA has also concluded that pluvial flooding is not a risk at the proposed development site and the risk of groundwater flooding to the site is also low.

The drainage design standards used for the development allow for increased rainfall in future years as a result of climate change (additional 20%) and are in line with the “Medium Risk” RCP4.5 scenario. Therefore, the sensitivity to pluvial flooding has been categorised as 2 (Medium) as the design only mitigates the medium risk future scenario; allowing an additional 30% for future climate change related rainfall in the drainage calculations would align with the “High Risk” RCP8.5 scenario. However, the risk of pluvial flooding and flooding at the proposed development overall is still considered Low overall.

The proposed development is not considered at risk due to flooding (coastal, fluvial or pluvial).

Extreme Wind, Fog, Lightning & Hail

In relation to extreme winds, the buildings shall be designed to the appropriate standards to account for the relevant wind loadings events for RCP4.5 and RCP8.5. If required as part of the building design, lightning protection shall be provided for. Hail and fog are not predicted to significantly affect the buildings due to their design.

Wildfires

In relation to wildfires, the *Think Hazard!* tool developed by the Global Facility for Disaster Reduction and Recovery (GFDRR, 2023), indicates that the wildfire hazard is classified as medium for the Cork area. This means that there is between a 10% to 50% chance of experiencing weather that could support a hazardous wildfire that may pose some risk of life and property loss in any given year. Future climate modelling indicates that there could be an increase in the weather conditions which are favourable to fire conditions, these include increases in temperature and prolonged dry periods.

However, due to the project location in a built-up, suburban area the risk of wildfire is significantly lessened, and it can be concluded that the proposed development is of low vulnerability to wildfires.

Landslides

The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2024) was reviewed to determine the risk from landslides at the proposed development. There have not been any historical landslide events in the vicinity of the proposed development and the area is of low susceptibility to future landslides. Therefore, landslides are not a risk for the proposed development site.

Extreme Temperatures (Heat & Cold) & Drought

In relation to extreme temperatures, both extreme heat and extreme cold, these have the potential to impact the building materials and some related infrastructure. However, the building materials selected at the detailed design stage will be of high quality and durability with consideration for RCP4.5 and RCP8.5. The landscaping has included plants which will be resilient to fluctuating weather such as droughts or flooding. Therefore, extreme temperatures are not considered a significant risk.

Summary

Overall, the proposed development has at most low vulnerabilities to the identified climate hazards. Therefore, no detailed risk assessment is required.

8.8.2.3 CCRA Significance of Effects

With design mitigation in place, there are no significant risks to the proposed development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the proposed development as a result of climate change are *direct, long-term, negative* and *imperceptible*, which is overall *not significant* in EIA terms.

8.8.3 Cumulative Effects

With respect to the requirement for a cumulative assessment the IEMA (IEMA, 2022) and TII (TII, 2022a) guidance on which the assessment is based states that:

> *"The identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative".*

The traffic data used for the operational phase assessment included cumulative traffic from existing and permitted developments in the surrounding area and the full masterplan development. Therefore, this impact assessment is cumulative.

As per the above, the cumulative impact of the proposed development in relation to GHG emissions is considered *direct, long-term, negative* and *slight*, which is overall *not significant* in EIA terms.

8.9 Mitigation

8.9.1 Construction Phase Mitigation

Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate:

- 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. A construction waste management plan will be implemented to minimise construction waste sent to landfills. Recycling of materials will be promoted to and reduce the environmental footprint of the site.
- Sourcing materials locally will be prioritised. This will help to reduce transport related CO_2 emissions and helps support local suppliers, further promoting economic sustainability.
- Timber-framed construction will be used for the houses instead of more carbon-intensive materials like steel or concrete. Timber is a renewable material with a lower embodied energy compared to concrete and steel, making it a more eco-friendly choice. Additionally, timber provides excellent insulating properties, enhancing the energy efficiency of the homes, which contributes to a high Building Energy Rating (BER). Additional material choices and quantities will be reviewed during detailed design, to identify and implement any additional lower embodied carbon options, where feasible.

In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

8.9.2 Operational Phase Mitigation

A number of mitigation measures have been incorporated into the design of the development to reduce the impact on climate wherever possible. The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards and will achieve a Building Energy Rating (BER) in line with the NZEB requirements. The following sustainability measures were outlined by the project developer and will be committed to across the project.

- **Energy-Efficient Insulation** Houses will be equipped with high-performance insulation, to reduce heat loss and enhance energy efficiency. Proper insulation is essential for achieving a high Building Energy Rating (BER), as it ensures that minimal heat escapes during winter and that homes remain cool in summer. This will contribute to lower energy consumption and reduced carbon emissions.
- **Heat Recovery Ventilation (HRV) Systems** Houses will include HRV system in all homes, capturing heat from outgoing air and reusing it to pre-warm incoming fresh air. This process significantly reduces energy consumption for heating and improves indoor air quality. HRV systems are crucial in maintaining low energy demand.
- **Double-Glazed Argon filled Windows** Installation of Double-Glazed Argon filled windows throughout all homes. This ensures that heat loss is minimized, further contributing to the energy efficiency of the houses, enhancing both the thermal insulation and soundproofing, providing comfort to residents while reducing energy use, which is critical for achieving a high Building Energy Rating (BER).
- **Underfloor Heating** Energy-efficient underfloor heating systems will be installed in all homes. Underfloor heating provides a more even distribution of heat compared to traditional radiators, enhancing comfort and reducing energy consumption. It works efficiently with renewable energy sources and helps to lower overall heating costs, contributing to a higher energy efficiency rating.
- **Electric Vehicle Charging Points in Homes** Each home will be equipped with a dedicated electric vehicle (EV) charging point, encouraging residents to adopt electric vehicles. This reduces dependency on fossil fuels and lowers the community's carbon footprint by making it easier for homeowners to transition to sustainable transportation.
- **Public Electric Charging Points** Public EV charging stations will be strategically located throughout the estate, encouraging the use of electric vehicles for both residents and visitors. By providing easily accessible charging infrastructure, the development will promote greener transportation options and help reduce overall carbon emissions within the community.
- **Bike Racks Across the Estate** Bike racks will be installed in multiple locations throughout the development, making it easy for residents to choose cycling as a mode of transportation. By promoting cycling, the estate aims to reduce the number of car journeys, lower traffic congestion, and contribute to improved air quality and reduced greenhouse gas emissions.
- **Sustainability Measures in Green and Landscaped Areas** In the green areas and landscaped spaces throughout the estate, the development will focus on implementing low-maintenance planting to reduce resource consumption and promote environmental sustainability.
- **Maintenance and Conservation of Existing Trees** Mature trees act as natural carbon sinks, absorbing and storing carbon dioxide, thus contributing to climate change mitigation. By conserving these trees, the development actively reduces its carbon footprint. Existing trees provide important habitats for local wildlife, including birds and insects. Preserving these trees supports local biodiversity and enhances the ecological balance within the estate.
- **Landscaping** It is proposed to plant a large quantity of trees throughout the development along with wildflower meadows which help pollinators, biodiversity and carbon sequestration. In addition, the location of the greenway and linkage to it encourages people to use pedestrian mobility methods and reduces the need for private vehicle journeys.

In addition to the above sustainability measures the following measures are outlined within the Building Lifecycle Report prepared by Deady Gahan Architects in relation to the apartment units within the proposed development.

- The apartment units will aim to achieve a BER of A2.
- U-values and thermal bridging in line with the Technical Guidance Documents Part L, *'Conservation of Fuel and Energy Buildings other than Dwellings'* requirements will be achieved.
- The white goods proposed will be of a very high standard and have a high energy efficiency rating.
- Low voltage, energy efficient LED lighting will be utilised in the external areas. The operation of the lighting shall be on a dusk-dawn profile to reduce unnecessary artificial light usage.
- The design, separation distances and layout of the apartment units have been designed to optimise the ingress of natural daylight/ sunlight to the proposed dwellings to provide good levels of natural light. This has the benefit of reducing the need for artificial lighting.
- The building materials chosen will be long-lasting and have a high durability which will reduce the requirements for ongoing maintenance and replacement which will reduce the embodied carbon emissions associated with this element.

These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Climate Action Plan.

A number of measures have been incorporated into the design of the development to mitigate against the impacts of future climate change. For example, adequate 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. Additionally, SuDS measures have been incorporated into the landscaping elements of the proposed development. The plant palette has been chosen so as to be suitable to fluctuating weather such as droughts and flooding. Street trees have been included so as to provide cooling of the urban environment. These measures have been considered when assessing the vulnerability of the proposed development to climate change (see Section 8.8.2.2).

8.9.3 Cumulative Mitigation

No specific cumulative mitigation is required.

8.10 Residual Impact Assessment

The impact to climate as a result of a proposed development must be assessed as a whole for all phases. The proposed development will result in some impacts to climate through the release of GHGs. TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*". The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible. As per the assessment criteria in Table 8.4 the residual impact of the proposed development in relation to GHG emissions is considered direct, long-term, negative and slight, which is overall not significant in EIA terms.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development as a result of climate change. The residual effect of climate change on the proposed development is considered direct, long-term, negative and imperceptible, which is overall *not significant* in EIA terms.

8.11 Risk of Major Accidents or Disasters

As detailed in Section 8.8.2.1, climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. However, the potential for flooding on site has been reviewed and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. The proposed development has been assessed as having only low vulnerabilities to various climate change related hazards and there is no significant risk to the site as a result of climate change. Therefore, the impact will be neutral and imperceptible.

8.12 Significant Interactions

Climate has the potential to interact with a number of other environmental attributes.

Land, Soils, Geology and Hydrology

The impact of flood risk has been assessed and the surface water drainage network will be designed to cater for increased rainfall in future years as a result of climate change. The effect of the interactions between climate and land, soils, geology and hydrology are direct, short-term, negative and imperceptible during the construction phase and direct, long-term, negative and imperceptible during the operational phase, which is overall *not significant* in EIA terms.

Air Quality

Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. Air quality modelling outputs are utilised within the Climate Chapter. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Traffic and Transportation

During the construction and operational phase, there is the potential for interactions between climate and traffic. Vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. The effects of the proposed development on climate are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the effects of the interactions between traffic and climate are considered to be *direct, short-term, negative* and *not significant* during the construction phase and direct, long-term, negative and not significant during the operational phase, which is overall *not significant* in EIA terms.

Waste

Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling. The effect of the interactions between waste and climate are considered to be direct, short-

term, negative and not significant during the construction phase and direct, long-term, negative and not significant during the operational phase, which is overall *not significant* in EIA terms.

8.13 References & Sources

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The Geological Society of Ireland (GSI) (2024) Landslide Susceptibility Mapping Database

The Greenhouse Gas Protocol (2004) A Corporate Accounting and Reporting Standard, Revised Edition

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Transport Infrastructure Ireland (2022b) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document

Transport Infrastructure Ireland (2022c) PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 9

Noise and Vibration

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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9 Noise & Vibration

9.1 Introduction

This EIAR Chapter has been prepared by AWN Consulting Ltd (AWN) to assess the potential noise and vibration effects of the proposed development in the context of current relevant standards and guidance.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development, during both the short-term construction phase and the long-term operational phase. The assessment of direct, indirect and cumulative noise and vibration effects on the surrounding environment have been considered in this chapter.

Noise and vibration impact is considered in terms of two aspects. The first is the outward effect of the proposed development on its surrounding environment, and the second is the inward effect of existing noise sources in the surrounding environment on the development itself. A full project description is included in Chapter 2: Site Location & Project Description of this Environmental Impact Assessment Report (EIAR).

9.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Dominic Wright (Acoustic Consultant) who holds the Institute of Acoustics Diploma in Acoustics and Noise Control, along with a Diploma in Music Technology. With a background in audio engineering, he has over 2 years' experience working in the field of acoustics, contributing to various residential, industrial and infrastructure projects. He also has experience in both environmental noise surveying and modelling.

9.3 Proposed Development

The proposed development includes the construction of 469 no. residential units and a creche, an interpretive centre/café, and all associated site development works.

The full description of the proposed development is outlined in Chapter 2 ‘Site Location and Project Description’ of this EIAR.

9.4 Methodology

9.4.1 Assessment Overview

The following methodology has been prepared based on the requirements of the EPA Guidelines the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) and on AWN's experience of preparing the noise and vibration chapters for similar developments. The following approach has been used for this assessment:

- Baseline noise monitoring has been undertaken at the development site in order to characterise the existing noise environment;
- A review of the most applicable standards and guidelines has been reviewed 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 estimate the likely noise emissions during the construction phase of the proposed development at the nearest Noise sensitive Locations (NSLs) to the site;
- Predictive calculations have been performed to assess the potential effects associated with the operation of the proposed development at NSLs surrounding the site;
- An assessment has been completed of potential cumulative effects that may arise as a result of the proposed development and other existing or proposed plans and projects;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development; and

9.4.2 Criteria for Rating of Impacts

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. There are no statutory standards in Ireland relating to noise and vibration limit values for construction works or for environmental noise relating to the operational phase. In the absence of specific statutory Irish guidelines, the assessment has made reference to non-statutory national guidelines, where available, in addition to international standards and guidelines relating to noise and / or vibration impact for environmental sources.

In addition to specific noise and vibration guidance documents, the following Environmental Protection Agency (EPA) Guidelines the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) were considered and consulted in the preparation of this Chapter.

The significance of noise and vibration effects has been assessed in accordance with the EPA 2022 Guidelines. With regard to the quality of the effect, ratings may have positive, neutral or negative applications.

9.4.3 Assessment Criteria and Guidelines – Construction Phase

Local Authorities typically control construction activities by imposing limits on the hours of construction and consider noise limits at their discretion. Construction noise sources include construction plant and machinery, and construction related traffic on surrounding roads. Reference is made to the following guidelines and standards to inform the most appropriate construction noise and vibration significance thresholds and assessment methodologies:

- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2014a);
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (hereafter referred to as BS 5228 – 2) (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385–2). (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (hereafter referred to as BS 6472–1) (BSI 2008);
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHA 2020); and
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (hereafter referred to as ISO 9613 – 2) (ISO 1996).

9.4.3.1 Construction Noise

The British Standard BS 5228–1 (BSI 2014a) 'ABC' method 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.

The approach adopted calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. This then sets a threshold noise value that, if exceeded at this location, indicates a potential significant noise effect is associated with the construction activities, depending on context. Note that, in accordance with the BS5228-1 guidance, this assessment criterion is only applicable to residential receptors.

Table 9.1 sets out the construction noise thresholds (CNTs) at the façade of residential receptors for the different baseline noise categorises from BS 5228-1.

Table 9.1 Threshold of Potential Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A[A]	Category B[B]	Category C[C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends D	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

9.4.3.2 Proposed Threshold Noise Levels

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 9.6), BS 5228-1 has been used to inform the assessment approach for construction noise.

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- For residential NSLs in proximity to the main site development works, Category A values are deemed appropriate using the ABC method.
- For commercial premises, the Category C value is considered an appropriate threshold value.
- There is no scheduled night-time construction work proposed as part of the proposed development.

9.4.3.3 Significance of Construction Noise Levels (CNL)

In order to assist with interpretation of significance relating a calculated construction noise level (CNL), Table 9.2 includes guidance as to the likely magnitude of impact associated with construction noise, relative to the CNT. This guidance is derived from DMRB: Noise and Vibration (UKHA 2020) and adapted to include the EPA EIAR Guidelines.

Table 9.2 Construction Noise Significance Ratings

Guidelines for Noise Impact Assessment Significance (DMRB)	Construction Noise Level per Period	EPA EIAR Significance Effects	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on CNT, duration & baseline noise level
Minor	Above baseline noise level and below or equal to CNT	Slight to Moderate	
Moderate	Above CNT and below or equal to CNT +5 dB	Moderate to Significant	
Major	Above CNT +5 dB	Significant, to Very Significant	

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely effects during the construction stage.

9.4.3.4 Construction Vibration

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. For the purpose of the proposed development, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

Peak Particle Velocity (PPV) is a measure of the velocity of vibration displacement in terms of millimetres per second (mm/s). It is defined as follows within BS 7385-2 (BSI 1993) as 'the maximum instantaneous velocity of a particle at a point during a given time interval'.

Building Response

There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- British Standard BS 5228-2 (BSI 2014b); and
- British Standard BS 7385-2 (BSI 1993)

BS7385-2 (BSI 1993) and BS5228-2 (BSI 2014b) advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. 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 Table B.2 of BS5228-2 (BSI 2014b) 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. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be

more vulnerable to vibration unless they have existing structural defects. The recommend transient vibration thresholds from BS5228-2 (BSI 2014b) for the avoidance of cosmetic damage to light framed and residential buildings are summarised in Table 9.3.

Table 9.3 Recommended Construction Vibration Threshold for Control of Building Damage

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of: -		
Less than 15Hz	15 to 40Hz	40Hz and above
15mm/s	20mm/s	50mm/s

Human Response

Human response to vibration stimuli occurs at orders of magnitude below those associated with any form of building damage, hence vibration levels lower than those indicated in Table 9.3 can lead to concern. Table 9.4 presents the significance table relating to potential effects to building occupants during construction based on guidance from BS5228-2 (BSI 2014b), the DMRB Noise and Vibration (UKHA 2020) document and the associated EPA significant ratings.

Table 9.4 Guidance on Effects of Human Response to PPV Magnitudes

PPV Range	BS 5228-2 (Note A, B, C)	DMRB Impact Magnitude	EPA Significance Ratings
≥10 mm/s PPV	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.	Very High	Very Significant
≥1 to 10 mm/s PPV	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	High	Significant to Very Significant
≥0.3 to <1 mm/s PPV	Vibration might be just perceptible in residential environments.	Medium	Slight to Moderate
<0.3 mm/s PPV	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.	Low	Not significant

Notes from BS5228-2

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 (BS1 2008), 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.

9.4.3.5 Construction Phase Traffic Noise

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced: DMRB Noise and Vibration (UKHA 2020) and the EPA Guidelines (EPA, 2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB Noise and Vibration (UKHA 2020) document.

Table 9.5 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 9.5 Classification of Magnitude of traffic noise changes for Construction Traffic

Change in Sound Level (dB)	Subjective Reaction	DMRB Impact Magnitude (Short -term)	EPA Significance Ratings
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

9.4.4 Assessment Criteria and Guidelines – Operational Phase

The main potential source of outward noise from the proposed development will be limited to traffic flows to and from the development site onto the public roads. There may also be an element of mechanical and electrical plant required to service the apartment buildings. The relevant guidance documents used to assess potential operational noise, and vibration impacts on the surrounding environment are summarised below.

- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (hereafter referred to as BS 8233) (BSI 2014c);
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (hereafter referred to as BS 4142) (BSI 2019);
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (hereafter referred to as ISO 1996 – 1) (ISO 2016);
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1988).
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (UKHA 2020);
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (hereafter referred to as ISO 9613 – 2) (ISO 1996);
- ANC, IOA & CIEH (2017). ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise – New Residential Development (hereafter referred to as ProPG: Planning and Noise).

9.4.4.1 Operational Phase Traffic Noise

Vehicular movement to and from the proposed development will make use of the existing road network and new junction arrangement. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to consider the increase in traffic noise level that arises as a result of any additional vehicular movements associated with the development.

In order to assess the potential impact of additional traffic on the human perception of noise, the following two guidelines are referenced DMRB Noise and Vibration (UKHA 2020) and the EPA EIAR Guidelines (EPA, 2022) which categorise the magnitude of effect relating to changes in road traffic. For the operational phase, traffic noise impacts are assessed against the 'long term' magnitude ratings from the DMRB. These are discussed in Table 9.6.

Table 9.6 Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB)	Subjective Reaction	DMRB Impact Magnitude (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

9.4.4.2 Mechanical and Electrical Services Criteria

The proposed development is residential in nature comprising a mixture of houses, duplex and apartments. There will be minimal mechanical and / or electrical plant items required to service the development that will generate any audible noise levels outside of the site boundary or at the developments buildings themselves. Plant contained within enclosed plant rooms has the least potential for impact, once consideration is given to appropriate design of the space.

The closest noise sensitive locations to any operational plant items are residential properties adjacent to the proposed development and the residential dwellings within the proposed development itself.

Good practice guidance on noise emissions from mechanical plant items would typically make reference to the British Standard BS 4142: 2014 +A1 2019: Method for Rating and Assessing Industrial and Commercial Sound. This document is the industry standard method for analysing building services plant noise emissions to residential receptors and is the document used commonly by local authorities in their standard planning conditions and also in complaint investigations.

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

For an appropriate BS 4142 assessment, it is necessary to compare the measured external background noise level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where noise emissions are found to be tonal, impulsive in

nature or irregular enough to attract attention, BS 4142 also advises that a penalty be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal noise characteristics outlined in BS 4142 recommends the application of a 2 dB penalty for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

The following definitions are taken from BS 4142:

"ambient noise level, $L_{Aeq,T}$" is the noise level produced by all sources including the sources of concern, i.e. the residual noise level plus the specific noise of mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].

"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].

"specific noise level, $L_{Aeq,T}$" is the sound level associated with the sources of concern, i.e. noise emissions solely from the mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].

"rating level, $L_{Ar,T}$" is the specific sound level plus any adjustments for the characteristic features of the sound (e.g. tonal, impulsive or irregular components);

"background noise level, $L_{A90,T}$" is the sound pressure level of the residual noise that is exceeded for 90% of the time period T.

If the rated plant noise level is +10 dB or more above the pre-existing background noise level, then this indicates that complaints are likely to occur and that there will be a significant adverse impact. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

Once operational noise levels within the proposed residential units are controlled to within the criteria within BS 4142 discussed above, operational noise emissions to the surrounding environment will be minimal. The operational noise impact to the surrounding existing NSLs is therefore not significant.

9.4.4.3 Operational Phase – Vibration Criteria

There are no sources of vibration associated with the operational phase, therefore, vibration criteria have not been specified for this phase.

9.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the specified information for this EIA chapter.

9.6 Baseline Environment

The subject site is located at Kingsfort Avenue, Castlelands Mallow, County Cork. The site is bound by Mallow Community National School to the North, residential properties and agricultural lands to the East, a waste water treatment plant to the South and various residential properties to the west along Kingsfort Avenue, Maple Square and Maple Wood. Figure 9-1 demonstrates the proposed site layout.

Figure 9-1 Proposed Site Layout

9.6.1 Noise Survey

An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise. Specific details are set out below.

9.6.1.1 Choice of Measurement Locations

The measurement locations were selected to represent the noise environment at noise-sensitive locations surrounding the proposed development. The selected measurement locations are shown in Figure 9-2 and described as follows:

AT 1 – Attended Position at residential properties along Maple Square.
AT 2 – Attended Position at residential properties along Kingsfort Avenue.
AT 3 – Attended Position to the west of the site at residential properties along the site boundary.
AT 4 – Attended Position to the North of the site at Mallow Community National School.

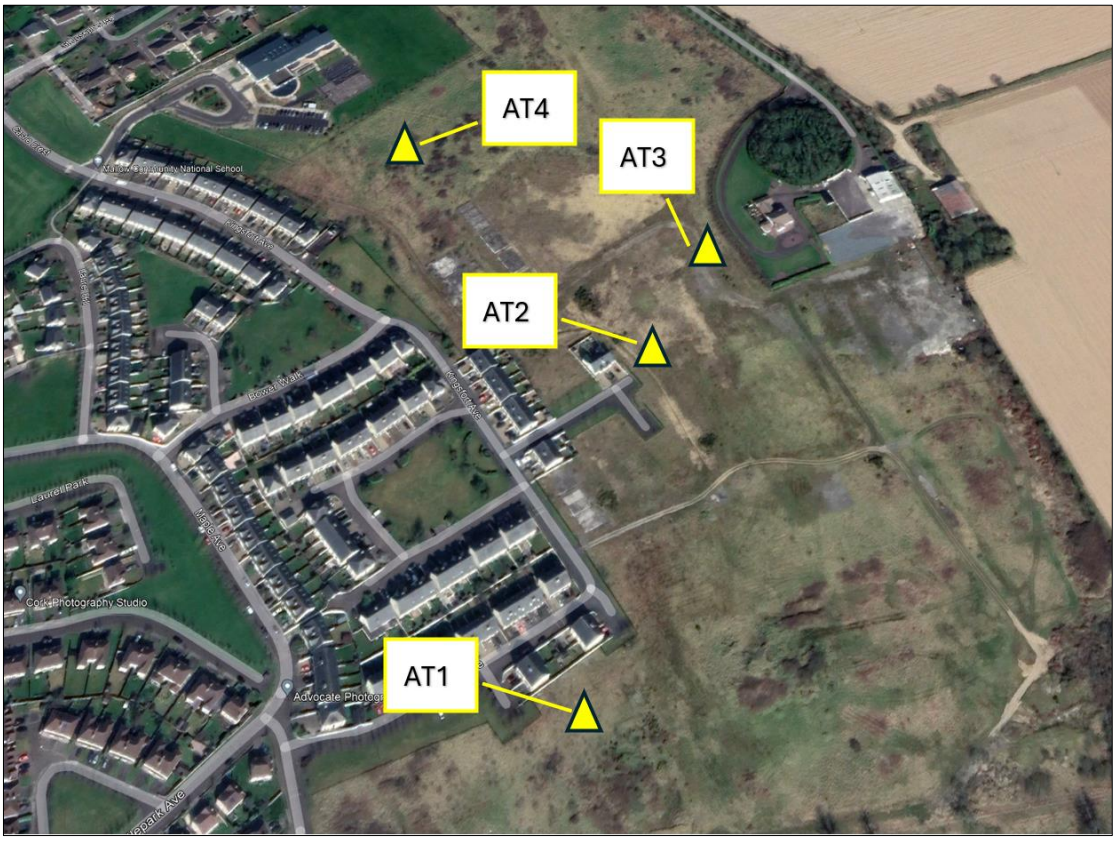

Figure 9-2 Baseline Noise Survey Locations

9.6.1.2 Survey Periods

Attended daytime noise measurements at locations AT1 to AT4 were conducted between 12:45 to 16:17 on the 23rd November 2023.

Attended nighttime noise measurements at locations AT1 to AT4 were conducted between 23:00 on the 23rd November 2023 to 01:11 to 24th November 2023.

Weather conditions during the attended measurements were between 11 - 12°C with wind speeds of below 5 m/s, the maximum wind speed at which the microphone windshield is effective.

9.6.1.3 Personnel and Instrumentation

AWN carried out all attended surveys. The following instrumentation was used in conducting the noise surveys:

Table 9.7 Equipment used for Noise Monitoring

Equipment	Type	Serial Number	Calibration Date
Sound Level Meter	Rion NL-52	976162	02/09/2022
Calibrator	B&K 4231	2205805	25/10/2023

9.6.1.4 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_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

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.

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 x 10^{-5} Pa.

9.6.1.5 Noise Survey Results

The results of the attended noise surveys at AT1, AT2, AT3 and AT4 are summarised in Table 9.8 to Table 9.9. It should be noted that a logarithmic average is used for the L_{Aeq} parameter, while an arithmetic average is used for the L_{A90} parameter.

Table 9.8 Summary of Attended noise measurements at AT1

Period	Time	L_{Aeq}	L_{Amax}	L_{A90}
Day	12:45	46	67	40
Day	14:06	43	63	38
Day	15:22	56	80	43
Day	16:38	44	61	39
Day Average	**--**	**45**	**61 - 67**	**39**
Night	23:00	35	61	30
Night	00:17	39	75	30
Night Average	**--**	**37**	**61- 75**	**30**

The noise environment at AT1 during the daytime period was made up of activity from the neighbouring residential properties including waste collections and children playing. Other noise sources included distant road traffic, wind rustle and bird song. During the third measurement a digger was present close to the measurement position which elevated the levels of noise. This measurement has not been included in the daytime averages due to the elevated levels of noise not being a fair representation of the noise environment at the location. Ambient noise levels during the day were in the range of 43 to 46 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 38 to 40 dB $L_{A90,15mins}$.

During the nighttime period the noise environment was made up of wind rustle, distant road traffic and distant dogs barking. The waste water treatment plant was also intermittently audible at this location, a low frequency tonal component was subjectively noted down in relation to the noise from the waste water treatment plant during the night time measurements. Ambient noise levels during the night were in the range of 35 to 39 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 30 dB $L_{A90,15mins}$.

Table 9.9 Summary of Attended noise measurements at AT2

Period	Time	L_{Aeq}	L_{Amax}	L_{A90}
Day	13:05	42	63	39
Day	14:25	42	59	39
Day	15:41	42	70	39
Day Average	**--**	**42**	**59 – 70**	**39**
Night	23:19	34	61	29
Night	00:36	33	56	27
Night Average	**--**	**34**	**56 – 61**	**28**

The noise environment at AT2 during the daytime period was made up of distant road traffic, distant construction noise and intermittent activity from the neighbouring residential properties. Other noise sources at this location included wind rustle and bird song. Ambient noise levels during the day were in the range of 42dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 39dB $L_{A90,15mins}$.

During the nighttime period the noise environment was made up of wind rustle, distant road traffic and distant dogs barking. The waste water treatment plant was also intermittently audible at this measurement location when in operation. Ambient noise levels during the night were in the range of 33 to 34 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 27 to 29 dB $L_{A90,15mins}$.

Table 9.10 Summary of Attended noise measurements at AT3

Period	Time	L_{Aeq}	L_{Amax}	L_{A90}
Day	13:25	42	58	41
Day	14:42	43	68	41
Day	15:58	43	53	41
Day Average	**--**	**43**	**53 - 68**	**41**
Night	23:37	34	58	30
Night	00:53	32	58	27
Night Average	**--**	**33**	**58**	**29**

The noise environment at AT3 during the daytime period was made up of distant construction noise, wind rustle and occasional vehicle movement from the property close to the measurement position. Other noise sources included distant road traffic and faint intermittent aircraft noise. Ambient noise levels during the day were in the range of 42 to 43 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 41dB $L_{A90,15mins}$.

During the nighttime period the noise environment was made up of distant road traffic noise and the existing wastewater treatment plant when it was operational. Other noise sources included wind rustle and occasional wildlife noise. Ambient noise levels during the night were in the range of 32 to 34 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 27 to 30 dB $L_{A90,15mins}$.

Table 9.11 Summary of Attended noise measurements at AT4

Period	Time	L_{Aeq}	L_{Amax}	L_{A90}
Day	13:45	44	63	40
Day	15:01	43	58	41
Day	16:17	42	56	41
Day Average	**--**	**43**	**56 - 63**	**41**
Night	23:56	34	58	31
Night	01:11	33	63	27
Night Average	**--**	**34**	**58 - 63**	**29**

The noise environment at AT4 during the daytime period was made up of construction noise, distant road traffic and occasional agricultural works including tractors from neighbouring fields. Other noise sources included bird noise and wind rustle. Ambient noise levels during the day were in the range of 42 to 44 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 40 to 41dB $L_{A90,15mins.}$

During the nighttime period the noise environment was made up of distant road traffic noise and distant dogs barking. The wastewater treatment plant was also faintly audible at this location during the nighttime period. Ambient noise levels during the night were in the range of 33 to 34 dB $L_{Aeq,15\ mins}$ and background noise levels were in the range of 27 to 31 dB $L_{A90,15mins.}$

9.7 The 'Do nothing' Scenario

In the absence of the proposed project, the existing noise and vibration levels within the study area are expected to remain largely unchanged. The current baseline conditions characterised by the noise surveys within Section 9.6.1 will continue to prevail.

9.8 Characteristics of the Proposed Development

The proposed development comprises a mix of residential units and all associated site works. A full description of the development is available in included in Chapter 2: Site Location and Development Description.

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:

- the construction and demolition phase, and;
- the operational phase.

9.8.1 Construction Phase

The highest potential noise and vibration impact of the proposed development will occur during the construction phase due to the activity of mobile and construction plant items with high noise levels. The outline CEMP for the proposed development outlines construction phase of the development is approximately 72 months meaning that any noise impacts during this period is likely to be of short-term duration (i.e. less than 7 years).

During the construction phase, activities will involve site clearance, excavation and foundation works during the early-stage clearance and ground works. Following this structural and building works associated with the house, apartment and duplex buildings will be undertaken. Following the main ground and structural works, internal fit out works and landscaping will occur. For each stage there will be on-site plant and equipment operating in addition to construction traffic including movement of machinery and materials within and to and from the construction site. It is planned to construct the proposed development over 5 phases.

A variety of items of plant will be in use during these construction work all of which have the potential to generate high levels of noise. These will include excavators, loaders, dozers, cranes and static plant such as generators, compressors and pumps.

Vibration associated with the proposed construction site activities will be low due to the absence of any intrusive ground works and the distance between the works and the nearest structures and buildings.

The potential impact associated with these activities are discussed in the following sections.

9.8.2 Operational Phase

Once operational, there are no major noise sources associated with the proposed development which is residential in nature. The range of operational activities are in line with those in the surrounding environment at nearby existing and planned residential areas (e.g., local vehicle movements, amenity and Creche areas etc.). None of these activities are associated with any significant noise impacts to the surrounding noise environment. The main potential source of outward noise from the proposed development is associated with traffic flows to and from the development site on the surrounding road network. There will also be potential for an element of mechanical and electrical plant required to service apartment buildings and the interpretive centre to the southwest of the proposed development.

9.9 Potential Significant Effects

9.9.1 Construction Phase

9.9.1.1 Closest NSLs and Noise Thresholds

The construction of the proposed development will occur over five construction phases. The proposed construction phasing program is highlighted below in Figure 9-3. As the works in each phase are completed the residential units within the completed phases, once occupied, will become NSLs.

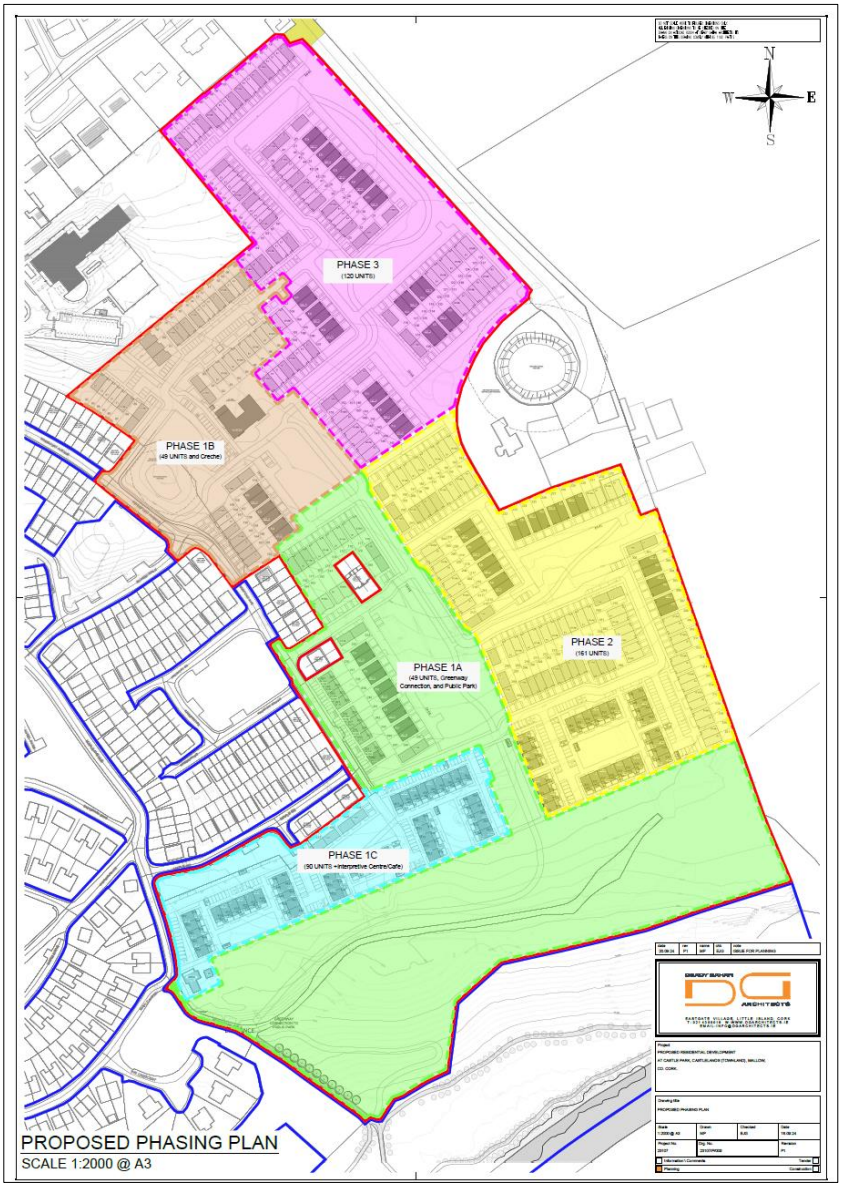

Figure 9-3 Proposed Construction Phasing for Proposed Development

Figure 9-4 illustrates the location of the closest NSLs in the surrounding environment. These NSLs are also discussed below in relation to their position with the proposed development.

NSL1 – This NSL is to the west of the proposed development and will be bounded on all sides by properties within the proposed development.

NSL2- These NSLs to the west of the proposed development will be bounded to the north, east and south by properties within the proposed development.

NSL3- These NSLs are to the west of the proposed development along Kingsfort Avenue, Kingsfort Square, Maple Square, Maple Avenue and Bower Walk.

NSL4- These NSLs are to the west of the proposed development along Maple Wood and Castlepark Avenue.

NSL5- These NSLs are to the north west of the proposed development along Kingsfort Avenue.

NSL6- This NSL is the Mallow Community National School to the north of the proposed development and will be bounded to the south and east by properties within the proposed development.

NSL7- These NSLs are to the north of the proposed development along St Joseph's Road and will be bound to the south by properties within the proposed development.

NSL8- This NSL is a residential dwelling to the east of the proposed development and will be bounded to the north, south and west by properties within the proposed development.

Figure 9-4 Identified NSLs during Construction

The construction noise threshold is determined by referring to Table 9.1(BS 5228-1) and the baseline ambient noise levels (as referred to in Section 9.6.1), as outlined in the assessment criteria section.

The standard working hours for the proposed development as outlined within the CEMP are as follows:

- Monday to Friday: 08:00 to 18:00hrs;
- Saturdays: 08:00 to 14:00hrs,

The CEMP also notes that it is not anticipated that work will take place on Sundays and Bank Holidays. Should there be a requirement for works outside of the normal working hours a written submission seeking authorisation will be made to Cork County Council.

Based on the prevailing noise environment measured, the construction noise thresholds are defined from Category A as appropriate and defined within Table 9.1.

Category A sets the following construction noise thresholds:

- Monday to Friday (07:00 – 19:00) **65dB $L_{Aeq,T}$**
- Saturdays (07:00 – 13:00hrs) **65dB $L_{Aeq,T}$**
- Evening and Saturday (13:00 – 23:00hrs) **55 dB $L_{Aeq,T}$**

9.9.1.2 Source Noise Levels

Since the construction programme has been established in outline form, construction noise associated with activities on site during each construction phase are reviewed for the purposes of determining the likely significant effects. Indicative ranges of noise levels associated with construction may be calculated in accordance with the methodology set out in BS 5228-1. This standard sets out sound power and sound pressure levels for plant items normally encountered on construction sites, which in turn enables the prediction of noise levels.

Given that the construction stage is highly transient in nature and involves a number of various stages which will encompass a range of different activities on a day to day and week to week basis, it is not possible to calculate with a high degree of accuracy the specific levels of noise associated with each stage. The construction stage will be undertaken over a number of stages from site preparation through to building construction and internal fit out. Expected typical levels of noise associated with the key stages of work are discussed below. For the purposes of this assessment the various phases of construction have been split into two distinct phases the more noise intrusive site clearance works and the general construction anticipated to take place on a development of this nature.

9.9.1.2.1 Site Clearance and Ground Preparation Works

For site clearance, building construction works, road works and landscaping works typical plan items will include excavators, loaders, dozers, concreting works, mobile cranes and generators. Noise source levels are quoted in the range of 70 to 80 dB L_{Aeq} at distances of 10 m within BS 5228-1. For the purposes of this assessment, a combined sound pressure level of 85 dB $L_{Aeq,T}$ at 10m has been used for construction noise calculations. This would include, for example, 2 no. items of construction plant with a sound pressure level of 80 dB L_{Aeq} at 10 m and 3 no. items of plant with a sound pressure level of 75 dB L_{Aeq} at 10 m, resulting in a total noise level of 85 dB L_{Aeq} at 10m along the closest works boundary.

Given the nature of the proposed works which will include standard house and apartment building techniques across the site, a cumulative construction noise level of 85 dB L_{Aeq} at 10m represents a conservative noise level used to assess construction activities associated with the earlier stages of construction when site clearance, excavation, and foundation work will be employed. This worst-case scenario is a robust assumption made for developments of this size, on the basis that it is unlikely that more than 5 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other at all times. In reality items of construction plant and machinery will be operating at varying distances from any one NSL.

9.9.1.2.2 General Construction

Once the ground preparation and foundation works have been completed, a large portion of the work will involve manual labour and cranes with lower overall noise levels. For the purpose of this assessment a combined sound pressure level of 78 dB $L_{Aeq,T}$ at 10m has been used for construction noise calculations during ongoing site works and compounds once site clearance and excavation works are completed. This would include, for example, one item of plant at 75 dB L_{Aeq} and three items of plant at 70 dB L_{Aeq} operating simultaneously within a work area resulting in a total noise level of 78 dB L_{Aeq} along the closest works boundary.

9.9.1.3 Construction Noise Calculations

Construction noise levels have been calculated at the closest NSLs, assuming the construction noise levels discussed above. For the purpose of the assessment, partial site screening (5 dB) has been assumed from the use of a standard site hoarding of 2.4 m high for noise sensitive boundaries. The calculations also assume that the equipment will operate for 66% of the working time over a construction working day. Table 9.12 summarises the result of this assessment.

Table 9.12 Indicative Construction Noise Levels at Varying Distances

Construction Phase	Cumulative Sound Pressure, dB $L_{Aeq,T}$ at 10m	Calculated Noise Levels at Varying Distances, dB $L_{Aeq,T}$								
		10m	20m	30m	40m	50m	100m	150m	200m	250m
Site Clearance and Preparation	**85**	78	72	68	66	64	57	53	50	48
General Construction	**78**	71	65	61	59	57	50	46	43	41

9.9.1.3.1 Phase 1a Construction Noise

The construction noise levels detailed in Table 10-12 indicate that construction activities can operate within the adopted CNT of 65 dB $L_{Aeq,T}$ at distances of ≥50m from construction works with higher noise emissions associated with site clearance, excavations, foundations and road works etc.

The closest NSLs during the phase 1a construction are NSLs 1,2,3 and 4. The closest dwellings in this development are at distances of 10m at NSLS 1,2 and 3 extending out to greater than approximately 300m from Phase 1a works at NSL7. The impact at the properties closest to the construction works is determined to be temporary to short term, negative and significant to very significant.

Other existing NSLs are at varying distances from approximately 120 to 300m from Phase 1a residential development construction works. At these distances construction noise levels are below the significance threshold 65 dB $L_{Aeq,T.}$ Reference to Table 9.2 determines the construction noise effect associated with site clearance, excavations, foundations and road works is short term, negative and slight to moderate at these NSLs.

During general construction works associated with house, apartment and duplex façade and fit out works, construction activities can operate within the adopted CNT of 65 dB $L_{Aeq,T}$ at distances of ≥20m. Reference to Table 9.2 determines the construction noise effect associated with general site works at the closest NSLs within 10m is temporary to short term, negative and significant to very significant reducing to short term, negative and slight to moderate at the remaining NSLs beyond 20m.

9.9.1.3.2 Phase 1b Construction Noise

The closest NSLs during the phase 1b construction are NSLs 1,2,3 and 4. The closest dwellings in this development are at distances of 10m at NSLS 2,3 and 5 extending out to greater than approximately 300m at NSL4. The impact during the site clearance and preparation phase at the properties closest to the construction works is determined to be temporary to short term, negative and significant to very significant.

Other existing NSLs are at varying distances from approximately 50 to 300m from Phase 1b residential development construction works. At these distances construction noise levels are below the significance threshold 65 dB $L_{Aeq,T.}$ Reference to Table 9.2 determines the construction noise effect at these NSLs to be short term, negative and slight to moderate.

During general construction works associated with house, apartment and duplex façade and fit out works, construction activities can operate within the adopted CNT of 65 dB $L_{Aeq,T}$ at distances of ≥20m. Reference to Table 9.2 determines the construction noise effect associated with general site works at the closest NSLs within 10m is temporary to short term, negative and significant to very significant reducing to short term, negative and slight to moderate at the remaining NSLs beyond 20m.

9.9.1.3.3 Phase 1c Construction Noise

The closest NSLs during the phase 1c construction are NSLs 3 and 4. The closest dwellings in this development are at distances of 10m at NSLS 3 and 4 extending out to greater than approximately 500m at NSL7. The impact during the site clearance and preparation phase at the properties closest to the construction works is determined to be temporary to short term, negative and significant to very significant.

Other existing NSLs are at varying distances from approximately 100 to 500m from Phase 1b residential development construction works. At these distances construction noise levels are below the significance threshold 65 dB $L_{Aeq,T.}$ Reference to Table 9.2 determines the construction noise effect at these NSLs to be short term, negative and slight to moderate.

During general construction works associated with house, apartment and duplex façade and fit out works, construction activities can operate within the adopted CNT of 65 dB $L_{Aeq,T}$ at distances of ≥20m. Reference to Table 9.2 determines the construction noise effect associated with general site works at the closest NSLs within 10m is temporary to short term, negative and significant to very significant reducing to short term, negative and slight to moderate at the remaining NSLs beyond 20m.

9.9.1.3.4 Phase 2 Construction Noise

During Phase 2 of the construction works, the closest existing NSLs are NSLs 8 and 1 at a distances 25 and 40m. The remaining existing NSLs are at distances ranging from 75 to 300m. The impact during the site clearance and preparation phase at the properties closest to the construction works is determined to be temporary to short term, negative and moderate to significant.

At other NSLs during the site clearance and preparation phase construction noise levels are predicted to be below the significance threshold 65 dB $L_{Aeq,T}$. Reference to Table 9.2 determines the construction noise effect at these NSLs to be short term, negative and slight to moderate.

During general construction works associated with house, apartment and duplex façade and fit out works, construction activities can operate within the adopted CNT of 65 dB $L_{Aeq,T}$ at distances of ≥20m. Reference to Table 9.2 determines the construction noise effect at all NSLs to be short term, negative and slight to moderate.

9.9.1.3.5 Phase 3 Construction Noise

During Phase 3 construction works, the closest existing NSLs are NSLs 6 and 7 to the north of the site. These NSLs are at distances of 30 and 70m. The remaining existing NSLs are at distances ranging from 70 to 300m. The impact during the site clearance and preparation phase at the properties closest to the construction works is determined to be temporary to short term, negative and moderate to significant.

At other NSLs during the site clearance and preparation phase construction noise levels are predicted to be below the significance threshold 65 dB $L_{Aeq,T}$. Reference to Table 9.2 determines the construction noise effect at these NSLs to be short term, negative and slight to moderate.

During general construction works associated with house, apartment and duplex façade and fit out works, construction activities can operate within the adopted CNT of 65 dB $L_{Aeq,T}$ at distances of ≥20m.

Reference to Table 9.2 determines the construction noise effect at all NSLs during phase 3 to be short term, negative and slight to moderate.

9.9.1.3.6 NSLs Within Proposed Development During Construction

During the construction of various phases of the proposed development, residential units from subsequent phases may be occupied. These units would, in turn, become the most affected NSLs as they will be closest to the construction works. Where site clearance and preparation occur within 50m of residential NSLs within the proposed development, the effect will be temporary to short-term, negative, and moderate to significant to very significant, depending on the distance from the works. Where general construction occurs within 20 meters, the effect at residential NSLs within the proposed development will be short-term, negative, and moderate to significant to very significant, depending on the distance from the works. Beyond these distances, the effect will be short-term, negative, and slight to moderate.

9.9.1.4 Construction Phase – Vibration

The main potential source of vibration during the construction of any residential development is associated with piling and any initial groundbreaking or demolition activities. It is not anticipated that groundbreaking or piling will be undertaken in relation to the proposed development based on site investigation works. Due to the standard construction techniques anticipated to be incorporated for the proposed development the anticipated effect in relation to construction vibration will be brief to temporary, negative and not significant.

9.9.1.5 Construction Phase – Traffic

During the construction phase, traffic associated with the proposed development would consist of a mix of Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) travelling to and from the site.

In terms of the additional construction traffic on local roads that will be generated as a result of the proposed development, the following comment is presented: As stated in the DMRB Noise and Vibration (UKHE 2020), Volume 11, Section 3, Part 7, in order to increase traffic noise levels by 1 dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction phase associated with various phases of the development will introduce a level of traffic that will not result in a significant noise impact. However, a series of mitigation measures within Section 9.10 will be implemented to ensure that noise from vehicle movements during construction are reduced to a minimum.

9.9.2 Operational Phase

9.9.2.1 Mechanical Plant and Services

There are no sources of mechanical or electrical plant associated with the building types across the proposed development with potential to emit audible noise levels beyond the buildings themselves. (i.e., individual heat recovery systems serving the residential units where proposed). Any plant rooms required to serve the proposed Interpretive Centre will be enclosed. Any required plant items serving development buildings will be designed and located so that there is no negative impact on sensitive receivers within the proposed development itself.

BS 4142 (BSI 2019) sets out a method for assessing the impact of a new continuous noise sources to a residential environment such as plant items used to service the Interpretive Centre within the proposed development. BS 4142 (BSI 2019) 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 lowest background noise levels at the boundaries and throughout of the site were determined through baseline noise surveys. Average background noise levels during the day were in the range 39 to 41 dB $L_{A90,T}$ whilst average night time levels were 29 dB $L_{A90,T}$ at monitoring location UN1.

BS 4142 (BSI 2019 also states that where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background.

Based on the above, it is recommended that cumulative plant noise associated with the development does not exceed the absolute levels of 45 dB $L_{Aeq,15min}$ during the daytime periods and 35 dB $L_{Aeq,15min}$ during the night time periods. It is also recommended that the proposed plant does not contain audible tones at NSLs outside of the site. This is set to ensure no significant increase in the prevailing background noise level occurs at existing NSL's.

Once noise emissions from operational plant are designed to not exceeded the noise criteria at the new residential units within the proposed development, the related noise impact to existing NSLs offsite will be imperceptible. The overall outward noise impact of mechanical and electrical services on site to existing surrounding NSLs is determined to be neutral, not significant and long-term.

9.9.2.2 Additional Traffic on Public Roads

For the purposes of assessing the potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without the proposed development, given that traffic from the development will make use of the existing road network.

A traffic impact assessment relating to the proposed development has been prepared as part of this EIAR (refer to Chapter 11 (Traffic and Transport))

Traffic flows along the surrounding road network in terms of Annual Average Daily Traffic (AADT) for the Do Minimum and Do Something scenarios have been reviewed to calculate the change in traffic noise. The junctions used for the assessment are highlighted below in Figure 9-5.

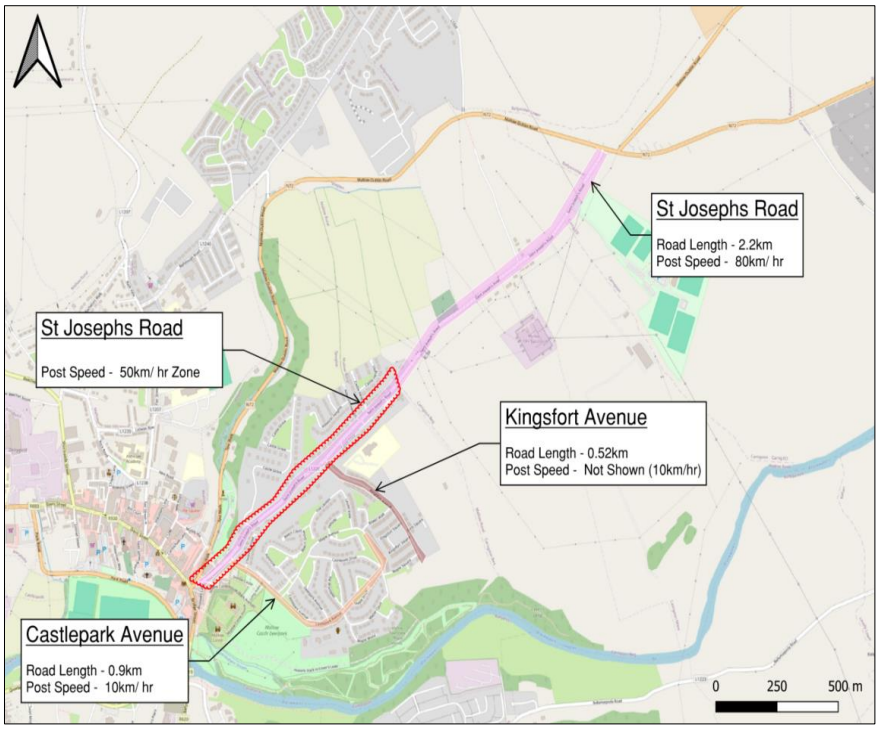

Figure 9-5 Traffic Assessment Junctions

The calculated change in noise levels between the Do Nothing and Do Something scenarios for the future years of 2026 and 2041 are assessed below. The traffic assessment for 2026 considers phase 1 of the proposed development whilst 2041 considers all phases of the proposed development. All calculations are assessed against the criteria within Table 9.6.

Table 9.13 Potential Impact in relation to Operational Traffic 2026

Road Section	Total Vehicle AADT (2026 Do Nothing)	HGV% (2026 Do Nothing)	Total Vehicle AADT (2026 Do Something)	HGV % (2026 Do Something)	Calculated Change in Noise Levels, dB	Significance
St Joseph's Road	8,700	4%	10,400	4%	0.8	Not Significant
Kingsfort Avenue	3,100	1%	3,950	1%	1.1	Not Significant
Castlepark Avenue	4,600	2%	5,450	2%	0.7	Not Significant

The calculated change in noise level between the Do Nothing and Do Something for a future design year of 2041 are summarised below in Table 9.14.

Table 9.14 Potential Impact in relation to Operational Traffic 2041

Road Section	Total Vehicle AADT (2026 Do Nothing)	HGV% (2026 Do Nothing)	Total Vehicle AADT (2026 Do Something)	HGV % (2026 Do Something)	Calculated Change in Noise Levels, dB	Significance

St Joseph's Road	10,100	5%	15,200	4%	1.8	Not Significant
Kingsfort Avenue	3,500	1%	6,050	1%	2.4	Not Significant
Castlepark Avenue	5,200	2%	7,750	2%	1.7	Not Significant

The resultant change in noise level in relation to operational traffic of the development is calculated to increase from less than 1dB to 2.4dB (A). The resulting impact of operational traffic is determined to be long term, negative and not significant.

9.9.3 Cumulative Effects

9.9.3.1 Construction Phase

In the event that construction activities at nearby sites are taking place concurrently with the construction of the proposed development, there is potential for cumulative noise impacts to occur. Due to the nature of construction works associated with the proposed development, noise levels from this site will dominate the noise environment when occurring in proximity to the noise sensitive locations along its immediate boundary. The noise contribution from other construction sites would need be equal to those associated with the proposed development in order to result in any cumulative effect.

In the event of the two construction phases of the proposed development overlapping predicted construction noise levels within Section 9.9.1.3 may rise by the order of +3 dB.

9.9.3.2 Operational Phase

The noise limits set for on-site buildings are designed to avoid any significant increase in the prevailing background noise environment external to the site. Operational noise limits included in this report refer to cumulative noise from all fixed installations on site. The design of plant and other fixed installations will be progressed during the design stage to ensure the noise limits at off-site noise sensitive locations are not exceeded.

Traffic volumes assessed take account of the additional traffic from other permitted developments and therefore the traffic noise assessment presented is already assessing the cumulative impact. This assessment has concluded there will be no significant noise impact due to operational traffic.

9.10 Mitigation and Monitoring

9.10.1 Construction Phase Mitigation

The assessment detailed in Section 9.4.3.1 has determined that construction activities can operate within the adopted construction noise threshold levels at NSLs 50m and beyond for the Site Clearance and Preparation phase and 20m and beyond for the general construction phase of the proposed development. At NSLs situated close to the site there is a high potential for the CNT to be exceeded during both phases of works.

Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 9.3 to avoid any cosmetic damage to buildings.

A suite of noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant;
- Noise control at source;
- Screening, and;
- Liaison with the Public

Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, hours of work and noise monitoring, where required.

9.10.1.1 Selection of Quiet Plant

The potential for any item of plant to result in exceedance of construction noise thresholds will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g., plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative.

The appointed contractor will evaluate the choice of excavation, breaking, piling or other working methods taking into account various ground conditions and site constraints. Where alternative lower noise generating equipment are available that will provide equivalent structural / excavation results, these will be selected to control noise within the relevant thresholds, where it is practicable to do so.

9.10.1.2 Noise Control at Source

The following measures will be implemented, by the appointed contractor to control noise at source. These measures relate to specific site considerations:

- For mobile plant items such as dump trucks, cranes, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and / or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant will be switched off when not in use and not left idling.
- For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker ‘tool’ and ensuring any leaks in the air lines are sealed;
- Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and

- Resonance effects in panel work or cover plates can be reduced through stiffening or the application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact.
- For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.

9.10.1.3 Screening

Screening is an effective method of reducing CNLs at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver. Standard construction site hoarding (2.4 m in height) with a mass per unit of surface area greater than 7 kg/m2 can provide adequate sound insulation. This is recommended, as a minimum around all site boundaries of the proposed development site.

Erection of localised demountable enclosures or screens will be used around particularly noisy equipment as required, when in operation in proximity to NSLs with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and enclosures that can be constructed on-site from standard materials. A well placed and designed mobile temporary screen around a pile, breaker or excavation can effectively reduce noise emissions by 10 dB(A).

In addition, careful planning of the construction site layout will also be considered. The placement of site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening.

9.10.1.4 Hours of Work

Working hours will be restricted to 08:00 to 18:00 Monday to Friday & 08:00 to 14:00 on Saturdays. Sunday or Bank Holiday work will only take place periodically at the agreement with Cork County Council. Similarly, any other out of hours working will be only permitted by arrangement with site management and Cork County Council.

9.10.1.5 Liaison with the Public

A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity, the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

9.10.1.6 Monitoring

During the construction phase the contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017).

9.10.1.7 Vibration Control

On review of the likely vibration levels associated with construction activities, construction activities associated with the proposed development are not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to buildings.

Vibration from construction activities will be limited to the values set out in Table 9.3 to avoid any form of potential cosmetic damage to buildings and structures. Monitoring will be undertaken at sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values in Table 9.3.

9.10.2 Operational Phase Mitigation

9.10.2.1 Traffic Along Surrounding Road Network

Changes to traffic flows will result in a not significant increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary in this case.

9.10.2.2 Building Services Noise

With consideration at the detailed design stage, the selection and location of plant items within the proposed development and associated buildings will ensure that noise emissions from any mechanical and electrical building services plant do not exceed the relevant noise criteria within Section 9.9.2.1, therefore no further mitigation is required. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements.

Once operational noise emissions are controlled within the development site, there will be no perceptible noise impact at sensitive receivers off-site.

9.10.3 Cumulative Mitigation

To ensure that construction activities associated with the proposed development are controlled at the closest NSLs, a series of mitigation measures have been included within Section 9.10.1. Any planned development within the vicinity of the proposed development will require similar measures to ensure that cumulative noise levels from construction do not result in a significant effect.

Mitigation in relation to the operational phase will be in the form of detailed design to ensure that the operational from proposed development operate within the outlined criteria. Any other proposed development near the proposed development site will also be required to prepare an EIAR where in operational noise and associated cumulative impacts will also be considered.

9.11 Residual Impact Assessment

9.11.1 Construction Phase

The use of best practice noise control measures, hours of operation, scheduling of works within appropriate time periods, and noise monitoring during this phase will be implemented. With the

inclusion of the various noise and vibration control measures on site discussed in Section 9.10, it is expected that calculated noise levels in Table 9.12 can be reduced by 5 to 10 dB.

After the implementation of mitigation measures, residual construction noise levels at the closest NSLs within 10m are expected to be up to 8 dB above the CNT of 65 dB $L_{Aeq,T}$ during site clearance and ground preparation works. This will affect the nearest NSLs within 10m of the construction site during phases 1a, 1b and 1c for intermittent periods of construction. Referring to Table 9.2 there is a potential for a residual temporary to short term, negative, significant to very significant impact at these NSLs during the site clearance and preparation phase. This will reduce to a short term, negative, moderate to significant impact during the general construction phase.

During phases 2 and 3 of the proposed development, the NSLs closest to the construction boundary — both during the site clearance and preparation phase and the general construction phase—are at distances where, after the implementation of mitigation measures, it is expected that construction noise levels will fall within the adopted CNT. This will result in a residual, temporary to short-term, negative impact that is slight to moderate.

It is important to note that construction activities are inherently transient, meaning noise intrusive works will only affect the nearest NSLs for brief periods. The construction noise calculations are highly conservative, representing a worst-case scenario. In practice, it is likely that the actual noise levels and associated residual impacts will be lower than predicted.

The residual effect of construction vibration is short term, negative, and not significant.

9.11.2 Operational Phase

Noise levels from any building services plant within the development site will be controlled to not exceed the noise levels outlined within section 9.9.2.1.

Once operational noise emissions are controlled within the development site, noise emissions outside the site will be imperceptible. The residual noise effect is neutral, not significant and long Term.

Traffic along the surrounding road network will not lead to a change in noise level that would pose any significant effect. The resultant impact is long-term, negative and not significant.

9.11.3 Cumulative Impact

There is potential for a temporary increase in cumulative construction noise if multiple phases or other developments occur at the same time. Residual cumulative effects related to the construction phase, post-mitigation, are likely to be not significant. This is also true for the operational phase, provided that the operational noise levels outlined in section 9.9.2.1. are adhered to during the detailed design, and the mitigation measures specified in section 9.10 are followed.

9.12 Risk of Major Accidents or Disasters

The assessment of noise and vibration during both the construction and operational phases of the project has been conducted in accordance with relevant regulations and guidelines.

During the construction phase, the primary risks associated with noise and vibration include equipment failure, which can lead to unexpected high noise levels and potential disturbances or harm to nearby residents and workers, and accidental spills or explosions, which can result in sudden, high-intensity noise and vibration, posing risks to human health and structural integrity. Mitigation measures outlined within section 9.10 decrease the chances of these events taking place.

In the operational phase, the risks are generally lower but still present, such as operational malfunctions, where failures in noise control systems or unexpected operational changes can lead to increased noise levels. Mitigation strategies involve continuous monitoring, adherence to operational noise limits as specified in section 9.9.2.1, and implementation of the mitigation measures outlined in section 9.10.

Overall, with the application of these mitigation measures, the risk of major accidents or disasters resulting in significant noise and vibration impacts is considered to be low.

9.13 Significant Interactions

The potential interaction between noise and vibration and other specialist chapters in the EIAR is primarily limited to Chapter 4 (Population & Human Health), Chapter 11 (Traffic & Transport) and Chapter 13 (Biodiversity). This chapter has been prepared in consideration of and in conjunction with the relevant elements of these chapters. For example, noise and vibration impacts associated with the Proposed Development have been fully considered within this Chapter of the EIA Report. The traffic flow projections associated with the development provided by the traffic consultants in Chapter 11 (Traffic & Transport) has been utilised in the operational noise calculations in this Chapter of the EIAR report.

9.14 References & Sources

- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (BSI 2014b);
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385–2). (BSI 1993);
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (BSI 2008);
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BSI 2019);
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (UKHA 2020);
- S.I. No. 549/2018 – European Communities (Environmental Noise) Regulations 2018
- S.I. No. 241/2006 - European Communities Noise Emission by Equipment for Use Outdoors (Amendment) Regulations 2006;

- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (ISO 1996);
- ISO 1996-1: 2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (ISO 2016);
- ISO 1996-2:2017 - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels (hereafter referred to as ISO 1996 – 2) (ISO 2017), and;
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1998).

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 10

Landscape & Visual Impact

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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10 Landscape & Visual Impact

10.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on landscape and visual impact. Other effects of lower significance have been included in this assessment to better inform the decision-making process.

This chapter should be read in conjunction with the architectural and landscape architectural plans and verified photomontages produced by external consultants as well as the Biodiversity and Cultural Heritage chapters of this report for references to and descriptions of relevant designations.

10.2 Expertise & Qualifications

JBA Consulting Engineers and Scientists Ltd has been commissioned to conduct a Landscape and Visual Impact Assessment (LVIA) of the site and environs. The chapter has been prepared by Christos Papachristou (Chartered Senior Landscape Architect), Maria Ines Timoteo (Landscape Architect), and Jemima Kivikoski (Assistant Environmental Scientist).

Christos is a Chartered Member of the Landscape Institute (CMLI) in the UK. Christos has carried out LVIAs and been involved in the preparation of LVIAs for EIARs as well as standalone in Ireland and the UK. Maria holds a master's degree in landscape architecture. She is a Corporate Member of the Irish Landscape Institute (MILI) and has led and carried out numerous standalone and EIAR LVIA reports. Jemima holds a Pg. Dip. in Environmental Science and has prepared LVIA chapters as part of wider EIARs for Flood Relief Schemes and standalone reports a number of residential and linear infrastructure developments in Ireland.

Below is an indicative list of projects the team members have been involved with the production of the LVIA reports for:

- Ballibin, Ratoath LRD, Co. Meath
- Barrow Canal Maintenance Works, Co. Carlow, Co. Laois and Co. Kildare
- Dunboyne LRD, Co. Meath
- Brownsbarn Citywest LRD, SDCC
- Residential development in Raitneachan, Co. Wicklow
- Carpark development at the Rock of Dunamase, Co. Lois
- Industrial development in Greenogue, Unit C, SDCC
- N17 Knock to Collooney
- N72/ N73 Mallow traffic relief scheme
- N3 Virginia bypass
- Grand Canal Dock outfall

10.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Site Location and Project Description' of this EIAR.

The proposed development includes the construction of 469 no. residential units, a creche, an interpretive centre/café, and all associated site development works.

10.3.1 Aspects Relevant to this Assessment

This assessment is relevant to elements of other disciplines that contribute to the amenity of the areas surrounding the site. These are sites visited for recreational purposes relating to Biodiversity, such as SAC and SPA and Cultural Heritage such as World Heritage Sites, demesnes, and sites with visitor centres.

10.4 Methodology

10.4.1 Assessment Methodology

The Landscape and Visual Impact Assessment in the EIAR takes into consideration aerial photography, emerging design drawings, relevant publications and reports, together with visits to the site and environs of the proposed development. The Assessment is carried out in accordance with:

- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Guidelines for Landscape and Visual Impact Assessment (GLVIA) as published by the Landscape Institute (UK) and the Institute of Environmental Management and Assessment (3rd Edition, 2013); and
- Cork County Draft Landscape Strategy (2007).

Verified photomontages in accordance with the GLVIA guidance are included in Appendix 10.1 to facilitate the assessment of visual impacts. The locations for the photomontages have been agreed following liaison with the local planning authority.

The landscape and visual amenity chapter examines the potential effects of the proposed development on views of receptors within the Zone of Theoretical Visibility including residential properties and nearby open spaces, in terms of visual intrusion and visual obstruction. It also examines the impact on the landscape character from the permanent physical changes to the site brought about by the development.

10.4.1.1 Landscape Impact Assessment Criteria

When assessing the potential impacts on the landscape resulting from a proposed project, the following criteria are considered:

- Landscape character sensitivity;
- Magnitude of likely impacts; and
- Significance of landscape effects.

10.4.1.2 Sensitivity of the Landscape

The sensitivity of a landscape is the degree to which it can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape Character Areas (LCAs) are landscapes that share essential characteristics.

Landscape Sensitivity, often referred to as 'value', is classified using the following criteria which have been derived from a combination of industry guidelines from the Landscape Institute for Landscape and Visual Impact Assessment and professional judgement.

- Very high - Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are very high value landscapes, protected at an international level e.g., World Heritage Site, where the principal management objectives are likely to be protection of the existing character;
- High - Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national level e.g., National Park, where the principal management objectives are likely to be protection of the existing character;
- Medium - Areas where the landscape character exhibits a medium capacity for change in the form of development. Examples of which are medium value landscapes, protected at a Local or Regional level e.g., Open space areas mentioned within a County Development Plan, where the principal management objectives are likely to be protection of the existing character;
- Low - Areas where the landscape character exhibits a high capacity for change and has very few or no designated landscapes or open space areas; and
- Negligible - Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

10.4.1.3 Magnitude of Likely Landscape Impacts

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed project. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the boundary of the proposed project that may have an effect on the landscape character of the area.

- Very high - Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality;
- High - Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality;

- Medium - Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality;
- Low - Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements;
- Negligible - Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable;
- Neutral - Changes that do not involve the loss of any landscape characteristics or elements and will not result in noticeable changes to the prevailing landscape character; and
- Positive - Changes that restore a degraded landscape or reinforce characteristic landscape elements.

10.4.1.4 Significance of Landscape Effects

The significance of the landscape impact will be the combination of the sensitivity of the landscape against the magnitude of the change. It is summarized in Table 10.1 below.

Table 10.1: Significance of Landscape and Visual effects based on Magnitude and Sensitivity (Adapted form GLVIA, 2013)

Magnitude	Sensitivity				
	Very high	**High**	**Medium**	**Low**	**Negligible**
Very high	Profound	Very significant	Significant	Moderate	Slight
High	Very significant	Significant	Moderate	Slight	Slight
Medium	Significant	Moderate	Slight	Slight	Imperceptible
Low	Moderate	Slight	Slight	Imperceptible	Imperceptible
Negligible	Slight	Slight	Imperceptible	Imperceptible	Imperceptible
Neutral	Imperceptible	Imperceptible	Imperceptible	Imperceptible	Imperceptible
Positive	Positive	Positive	Positive	Positive	Imperceptible

10.4.1.5 Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric (or human-centric) basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape.

Visual receptors most susceptible to changes in views and visual amenity are;

- Very high - Residents in properties within protected landscapes and travellers on a Scenic route where awareness of views is likely to be heightened;
- High – Residents in properties with predominantly open views from windows, garden or curtilage. People, whether residents or visitors, who are engaged in outdoor recreation including use of public rights of way, whose attention or interest is likely to be focused on the

landscape and on particular views, and those on a scenic route where the view is not specifically in the direction of the proposed development;

- Medium - Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience, and communities where views contribute to the landscape setting enjoyed by residents in the area.
- Low - People engaged in outdoor sport or active recreation on a local scale, which does not involve or depend upon appreciation of views of the landscape; and people at their place of work whose attention may be focused on their work or activity, not their surroundings and where the setting is not important to the quality of working life, and people travelling in vehicles where their view is limited to a few minutes at any viewpoint; and
- Negligible - Changes affecting restricted viewpoints.

10.4.1.6 Magnitude of Visual Impacts

The magnitude of a visual effect is determined on the basis of several factors: the relative numbers of viewers, the distance from the viewpoint, the visual dominance of the proposed development within a view and its effect on visual amenity, as follows:

- Very high - The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene;
- High - The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene;
- Medium - The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity;
- Low - The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene; and
- Negligible - The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene.
- Magnitude can also be described as:
- Neutral - Changes that are not discernible within the available vista and have no bearing the visual amenity of the scene; and
- Positive - Changes that enhance the available vista by reducing visual clutter or restoring degraded features.

10.4.1.7 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix as used earlier in respect of landscape effects, see Table 10.2.

10.4.1.8 Impact Classification Terminology

Table 10.2 overleaf presents the Impact Classification Terminology as published in the EPA guidance document (EPA, 2022). Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a proposed development on the receiving environment.

Each impact is described in terms of its quality, significance, extent, duration & frequency and type, where possible.

Table 10.2 Impact Classification Terminology

Impact Characteristics	Term	Description
Quality of Effects	**Positive**	A change that improves the quality of the environment.
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation within the margin of forecasting error.
	Negative/ Adverse	A change that reduces the quality of the environment.
Significance of Effects	**Imperceptible**	An effect capable of measurement, but without significant consequences.
	Not significant	An effect which causes noticeable changes in the character of the environment, but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound	An effect which obliterates sensitive characteristics.
Extent and Context of Effects	**Extent**	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Probability of Effects	**Likely**	The effects that can reasonably be expected to occur because of the planned project, if all mitigation measures are properly implemented.
	Unlikely	The effects that can reasonably be expected not to occur because of the planned project, if all mitigation measures are properly implemented.
Duration and Frequency of Effects	**Momentary**	Effects lasting from seconds to minutes.
	Brief	Effects lasting less than a day.
	Temporary	Effects lasting less than a year.
	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.
	Reversible	Effects that can be undone, for example through remediation or restoration

Impact Characteristics	Term	Description
	Frequency	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Types of Effects	**Indirect/ Secondary)**	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do-Nothing'	The environment as it would be in the future should the subject project not be carried out.
	`Worst case'	The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable	When the full consequences of a change in the environment cannot be described.
	Irreversible	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents.

10.4.1.9 Cumulative Impact Assessment

The cumulative effect of a set of developments is the combined effect of all the developments taken together.

Cumulative effects on visual amenity consist of combined visibility and sequential effects.

Combined visibility occurs where the observer is able to see two or more developments from one viewpoint.

- Combined visibility may either be in combination (where several developments are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the developments).
- Sequential effects occur when the observer has to move to another viewpoint to see different developments. For example, this could be when travelling along roads or paths. The occurrence of sequential effects may range from frequently sequential (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to occasionally sequential (long time lapses between appearances, because the observer is moving very slowly and / or there are large distances between the viewpoints).

Cumulative landscape effects affect the physical fabric or character of the landscape, or any special values attached to the landscape.

- Cumulative effects on the physical fabric of the landscape arise when two or more developments affect landscape components such as woodland, dykes or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments.
- Cumulative effects on landscape character arise from two or more developments. Housing developments introduce new features into the landscape. In this way, they can so change the

landscape character that they can create a different landscape character type. That change need not be negative; some derelict or industrialised landscapes may be enhanced as a result of such a change in landscape character. The cumulative effects on landscape character may include other changes, for example trends or pressures for change over long time periods, which should form part of any consideration of a particular project.

The area in which the proposals site is located contains other housing developments and therefore there is potential for cumulative effects on landscape and visual amenity.

10.4.2 Relevant Legislation & Guidance

The landscape assessment undertaken is made with regard to the sensitivity of the landscape and its ability to undergo change. The methodology is based on national and local policy guidelines and best practice methodology as outlined in the references below:

- Guidelines on Landscape and Visual Assessment (2002); Irish Landscape Institute (ILI)
- Guidelines for Landscape and Visual Impact Assessment (GLVIA), third edition (2013), Landscape Institute (UK)
- Guidelines on Information to be Contained in Environmental Impact Assessment Reports (2022); Environmental Protection Agency (EPA)
- Environmental Impact Assessment of Projects: Guidelines on the Preparation of the Environmental Impact Assessment Report (EIAR) (2017); European Commission (EC)
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013); EC
- Guidelines on Landscape and Landscape Assessment (2000); Department of the Environment, Community and Local Government (DOE)
- National Landscape Strategy 2015-2025; DOE
- National Biodiversity Action Plan (2023-2030)
- Cork County Development Plan 2022-2028; Cork County Council
- Kanturk Mallow Municipal District Local Area Plan 2017 – 2022;
- Mallow Town Development Plan Local Area Plan 2010 – 2016;
- Southern Regional Assembly Regional Spatial and Economic Strategy 2019 - 2031
- LCA and LVIA of Specified Infrastructure Projects – Overarching Technical Document (Dec 2020); Transport Infrastructure Ireland (TII)
- Visual Representation of Development Proposals, Landscape Institute (UK, 2019); Technical guidance notes for photomontages
- Amenity Trees and Woodland: A Guide to their Management in Ireland (2010); Tree Council of Ireland

In addition to the above documents, Ordnance Survey and National Monuments Service historical maps were used to help identify past land uses, landscape components and historic landscape evolution. In a modern context, aerial images from 1995 to the present also informed landscape changes.

10.4.3 Site Surveys/Investigation

A walkover site visit was undertaken of the proposed development site and visual receptors to the north, northeast, and southeast on the 20/02/2024. The foliage of deciduous vegetation was not present at the time of the site visit and therefore views were observed at their most open.

10.4.4 Consultation

The assessors have consulted with the planning authority indirectly, by providing guidance to the planners and the Client. Main topics of consultation were existing identified sensitive receptors and the locations for the production of the verified photomontages.

10.5 Difficulties Encountered

The site visit took place during daytime in February 2024. No night-time views were observed. This is not expected to reduce the accuracy of this assessment as no significant light nuisance is expected outside the site boundary.

The surveys took place in winter, when screening effects from deciduous tree foliage were not present. The level of screening seen on site will therefore be higher during summer. The assessment has accounted for both summer and winter views.

Finally, private properties were not accessed during the site visit. Views from private properties were instead approximated to the best possible publicly accessible viewpoint. The assessment of private views from residential properties falls under a different, more specific assessment that is the Residencial Visual Amenity Assessment (RVAA). The RVAA is a stage beyond LVIA and focuses exclusively on private views and private visual amenity. The LVIA can only comment on private views.

Photography for they verified photomontages has been carried out from locations where the dominant views are best represented with a focus on the average to worst case scenario. This is to conclude with more certainty on the level of significance of the visual impacts deriving from the proposed development. Where this was not possible due to visual obstructions and/or unsafe site conditions, the next preferred location has been selected to adequately demonstrate the potential visual impacts.

10.6 Description of Existing Environment

10.6.1 Receiving Environment – Site Context

Mallow is one of five Main Towns in the Kanturk-Mallow Municipal District. It holds a strategic location lying on an intersection between the N20 and N72, connecting it with Cork City 30km to the south and Limerick City 60km to the north. The Cork-Dublin intercity rail services also serve the town. Mallow has been designated as a Main Town in the Cork CDP and a “Key Town” in the Regional Spatial and Economic Strategy.

Mallow is also situated within the scenic River Blackwater valley and is bisected by the river into north and south. The historic 13th century walled town centre is located in north Mallow. Having retained

much of its Medieval streetscape and unique 1st floor box dormers, the town centre is home to a high number of buildings listed on the Record of Protected Structures or on the National Monuments Service, including Mallow Castle, Mallow Castle House and Spa House. In recognition of its architectural character and heritage interest, most of the town centre has been designated as an Architectural Conservation Area (ACA). Mallow Castle and the Spa Glen, and Bearforest Demense are two additional areas of townscape value that have been designated as ACAs in the Cork County Development Plan[1].

The proposed development site is situated east of the town centre. Castlelands estate to the west and College Wood estate to the south are residential developments having completed construction within the last 20 years. The rural landscape of Mallow has been transformed to that of a vibrant urban centre.

The river corridor has influenced the settlement and development pattern of Mallow. The extent of the flood plain has limited the types of development along the riverbank to open space amenity. Adjoining the flood plain development has occurred to the east and west of the town centre along the northern and southern banks of the river.

10.6.2 Landscape Character

The Landscape Character Type of Mallow and surrounding environment is a Fertile Plain with Moorland Ridge. Both the landscape value and sensitivity are 'Very High', and this landscape is of county level importance. This is the largest LCT in Cork and is often referred to as the "Golden Vale"[2].

Fertile soils derived from limestone and sandstone bedrock and generally flat topography have provided ideal conditions for agriculture. Many settlements, including Mallow, developed on the basis of high agricultural productivity and remnants of old demesnes are important features of the landscape. The rural areas are a patchwork of rectilinear fields bounded by mature broadleaf hedgerows or scrub.

While predominantly flat, low-lying mountains contain the River Blackwater valley. The Ballyhoura Mountains lie to the north of Mallow, across the county border between Cork and Tipperary, and the Nagles lie to the south.

On a more local level, topological variance is also evident in and around Mallow. There is a gentle gradient in the landform in proximity to the river which follow the meandering river form. The landscape character of the Blackwater Valley makes an important contribution to the setting of the town.

The surrounding rural landscape has fluctuated between classification as non-irrigated arable land and pastures in several Corine periods, while other parcels of rural land now form part of the growing residential areas.

Mallow Racecourse and the River Blackwater are primary visitor attractions in this Landscape Type.

[1] Cork County Development Plan, 2022-2028, Cork County Council.

[2] Cork County Draft Landscape Strategy, 2007.

Greenbelt:

Objectives are to prevent urban sprawl and ensure a clear distinction between urban and rural. It preserves the wider setting of the town and surrounding green landscape and ensure compact and orderly development.

A greenbelt has been designated in the CDP in a ring shape around Mallow. This identifies a transition zone from urban to rural and has zoning objectives focused on amenity and recreation. The proposed development site occupies a small area between urban and greenbelt zones.

10.6.3 Receiving Environment – Site

The site is zoned for new residential development in the Cork CDP. The existing Castlelands residential development is directly adjacent to the west, Mallow Community National School and single residential properties border the northern boundary, while arable lands lay to the east. The River Blackwater SAC and adjoining Mallow Town Park Maple Woods lay directly to the south.

The site is an irregular rectangle with topography that gently slopes upwards from the centre towards the north with a more dramatic southern gradient towards the River Blackwater. It is classified as a greenfield site where scrub and herbaceous are evident. The natural elevation of the site places it outside of flood zones A and B.

10.6.4 Zone of Theoretical Visibility

A Zone of Theoretical Visibility (ZTV) was produced for the assessment. The ZTV shows the areas that the proposed development could be visible from in the surrounding landscape within a radius from the proposed development. This is taken into consideration to form the study area for the assessment of visual impacts. The radius that is considered needs to be proportional to the height and extents of the proposed development. For this proposed development, the ZTV map shows the area with potential visibility within a 2 km radius from the proposed works. The ZTV was based on a viewer eye height of 1.6 m and an average building height of 6m. A total of 189 points placed, on average, at every second house were used to represent residences of the development. The ZTV is based on a digital terrain model (DTM) and represents a bare ground scenario i.e., with no trees, hedgerow or built features present that would provide screening.

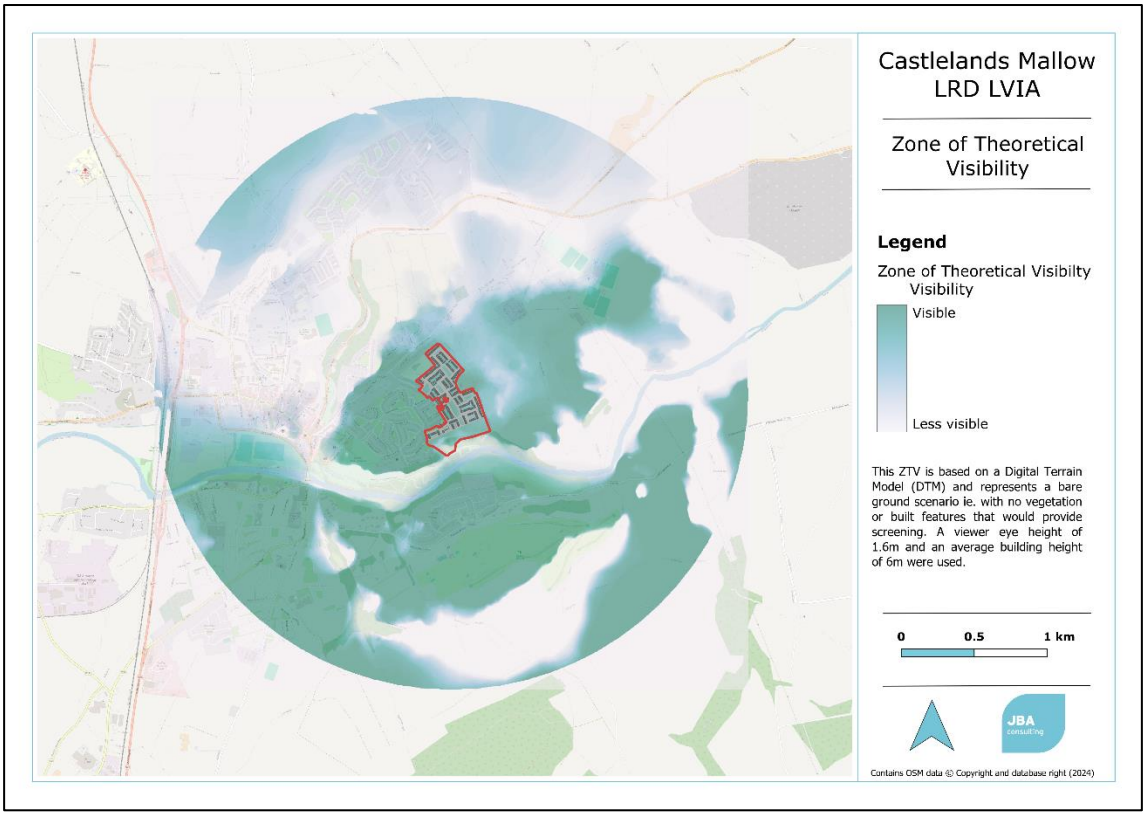

Figure 10.1 Zone of Theoretical Visibility

10.7 Predicted Impacts

10.7.1 Predicted Impact Assessment

As described in the methodology, the impacts to the landscape and visual amenity will be assessed based on the sensitivity of the receptor and magnitude of change. This assessment as part of an EIA will be focusing on potential significant and profoundly significant impacts and secondarily on impacts of lower significance.

Receptor groups were identified during the initial desktop investigation using aerial imagery and verified on site during the site visit. Receptors were grouped in terms of function, i.e., residential buildings, community buildings, etc., and location. See Figure 10.3 for the 'Visual Receptor Plan' which shows the identified receptor groups. These receptor groups are discussed below with an assessment of the effects on their visual amenity.

Nine (9No.) verified photomontages have been produced showing the expected visual impact of the proposed development from selected points around the site. In photomontages where the proposed development is not clearly discernible, an additional image is included where a wireline represents the outline of the extent of proposed buildings. This provides a sense of the degree of screening. The compendium of photomontages is presented at the end of this chapter as a series of images under the title *Verified Photomontages and CGI's*.

Impact Duration was considered permanent if a receptor had a distinct alteration to the horizon line or if views of a structure would continue to remain visible. During assessment, the landscape was also considered in the context of permanency. For example, retained mature trees were considered permanent, with management and evolution. New woodland tree planting at the eastern and northern boundary of the site would in itself become a permanent screening feature due to size and density. Street tree planting was considered to have filtering contribution, but as a single tree layer was not a permanent screening element.

Type of Impact was considered positive only if the proposals contribute to the character of the locality and would not be detrimental to the rural association. A negative *Type of Impact* might occur if for example, the proposals diluted the character or perception of the town of Mallow or had a detrimental impact on large volumes of quality existing trees. Unless otherwise stated, impact is assumed to be negative in the following sections.

10.7.2 Receptor Descriptions

10.7.2.1 Landscape

The Landscape Character Assessment (LCA) for the Cork County Development Plan 2022-2028 describes the landscape character surrounding Mallow as being 'Fertile Plan with Moorland Ridge' which is high in sensitivity and value. Within Volume 3 of the Cork County Development Plan (CCDP). Mallow is a diverse and rich landscape. The eastern side of the town of Mallow is described as being of high landscape value in the Plan. Distant scenic views are present and include views of the river, Mallow Racecourse and some period residences. The greenbelt surrounding Mallow serves as transitional zone from urban to rural with a focus on recreation and amenity. The Mallow Town Park, located south of the proposed development contains a wide range of activities mainly for recreational and amenity use. The River Blackwater located further south of the Mallow Town Park is known for its important flood plain, and value of not only a central green infrastructure feature within Mallow and its hinterlands, but also for its habitat value. The river supports otter, freshwater pearl which qualifies it as an SAC site (002170). The landscape of Mallow is also home to monuments of architectural and historical heritage sites. Examples include to the west of the proposed site is the Mallow Castle and heritage centre. The site is a catalyst for rejuvenation of Mallow Town Centre. Works proposed within this site are the renovation of the Castle and its walled garden.

The location of the proposed development is within the fringe of Mallow East of Kingsfort Ave. Road. The development is expected to promote sustainable development through the preservation of the heritage of Castlelands and creating a greenway between the development and into the existing Mallow Park allowing for connectivity. Sections of the existing forested strip south of the development are expected to be removed to open access routes into the Mallow Park.

According to the methodology and taking account to the proposed design, the overall impact to the landscape is expected to be *slight, temporary, negative* during construction phase, to *slight, permanent, negative* during operational phase.

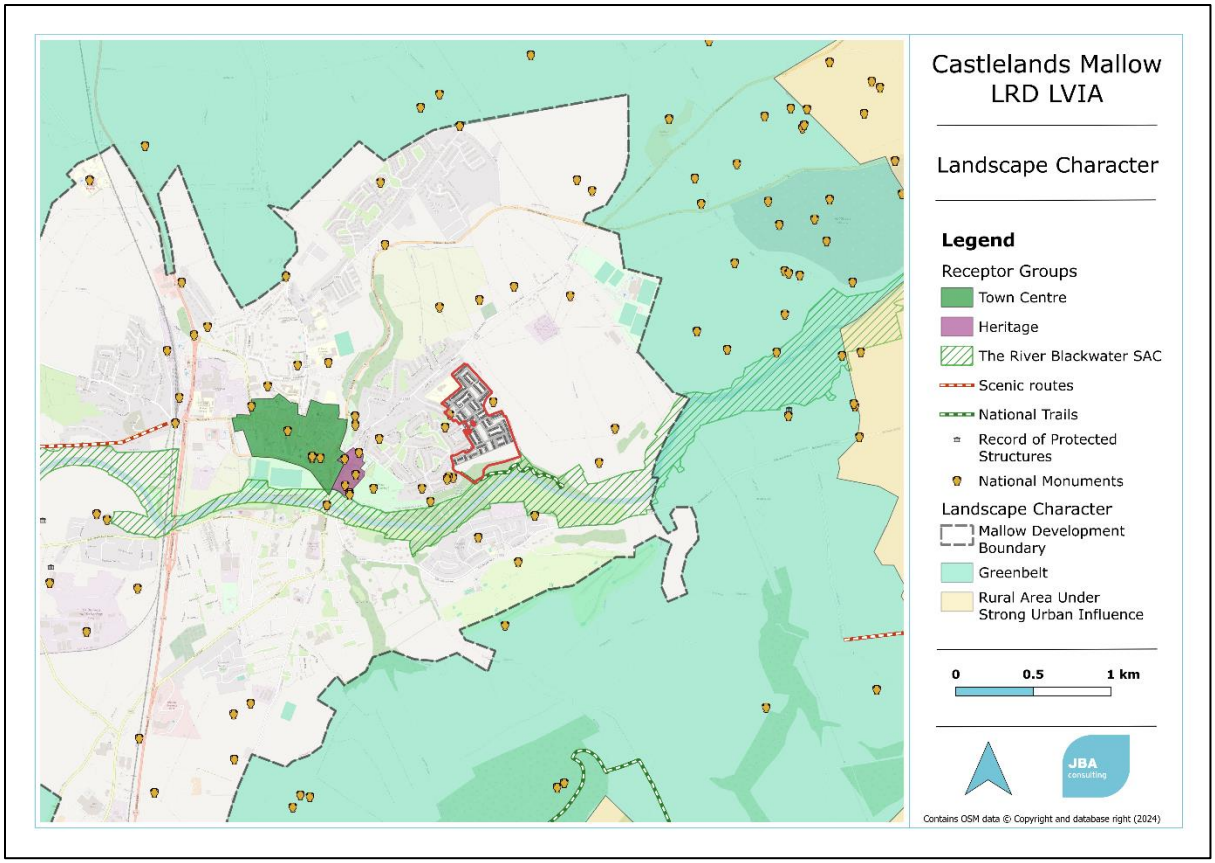

Figure 10.2 Landscape Character

10.7.2.2 Visual

There are no protected views designated within the CDP which could be impacted by the proposed development.

Visual amenity is primarily on a local or household scale, with residences in close proximity to the development site enjoying views over the mixed rural and urban landscape of Mallow residential areas and the river valley. Broadly, the impact to views diminishes with distance from the proposed development site which is largely influenced by the topography of Mallow.

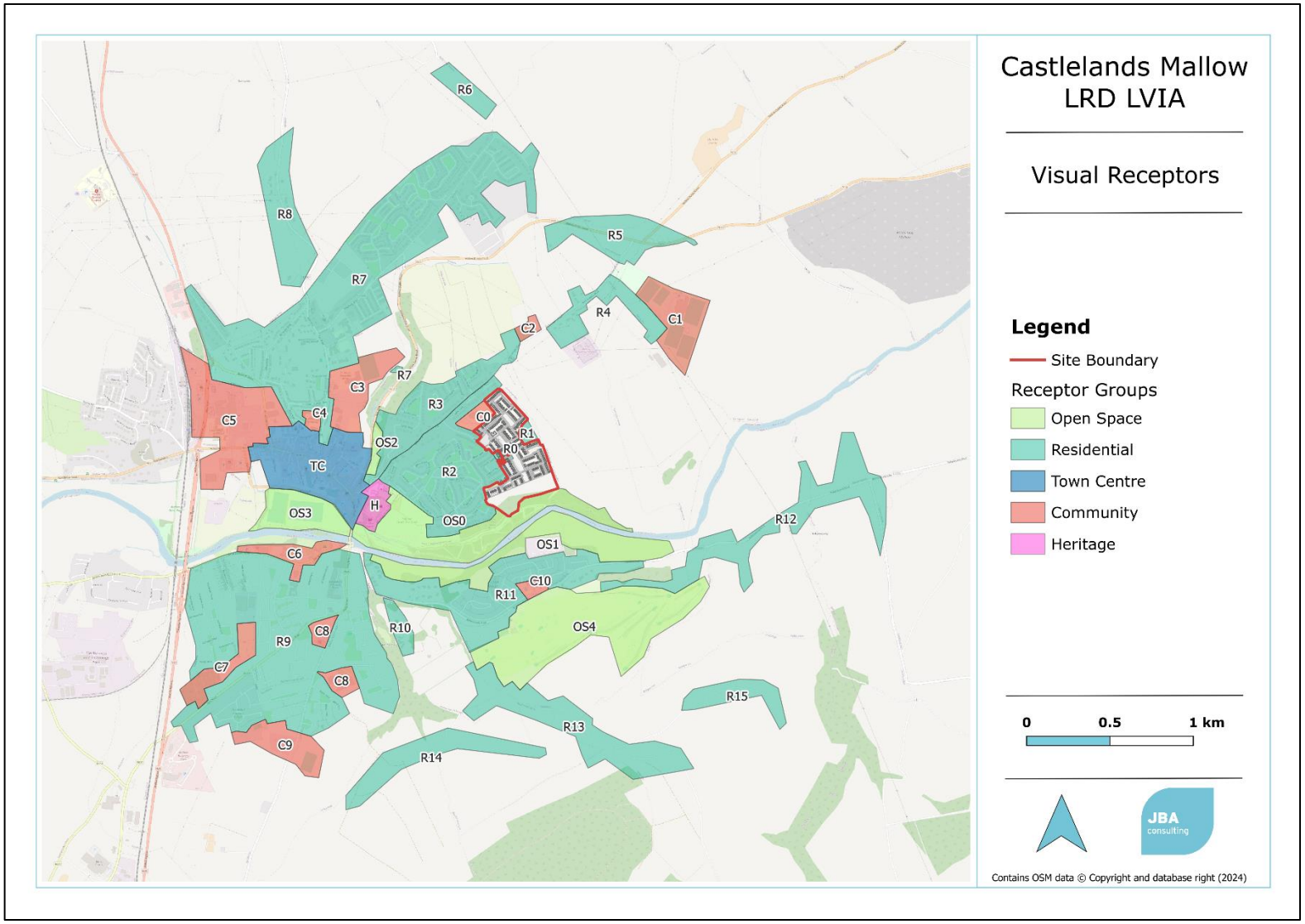

Figure 10.3: Visual Receptors Plan

Table 10.3 Visual Receptors

Receptor No.	Title of receptor	Distance from site	Sensitivity	Magnitude of change	Predicted impact and duration	
					Construction	Operation
R0	12 no. Houses within the site boundary	0m	High	High	Temporary, moderate	Permanent, moderate
R1	Castlelands House	0 m	High	High	Temporary, moderate	Permanent, moderate
R2	Castlepark Estate and southeastern houses along L1220	0 – 580 m	High	Medium	Temporary, moderate	Permanent, slight
R3	Castle Grove, Aldworth Heights, and Castle Heights estates	110 – 750 m	High	Low	Temporary, slight	Permanent, slight
R4	20 no. houses northeast of development site	500 – 925 m	High	Low	Temporary, slight	Permanent, slight
R5	16 no. houses northeast of development site	1075 – 1450 m	High	Negligible	Temporary, slight	Permanent, slight
R6	4 no. houses north of R7	1750 – 1950 m	High	Negligible	Temporary, slight	Permanent, slight
R7	Residential areas west of N72	850 – 1850 m	High	Negligible	Temporary, slight	Permanent, slight-imperceptible
R8	16 no. houses along L1207	1450 – 2100 m	High	Neutral	Imperceptible	Imperceptible
R9	Residential areas southeast of the town centre	900 – 2300 m	High	Neutral	Imperceptible	Imperceptible
R10	2 no. houses of Bear Forest	860 – 960 m	High	Neutral	Imperceptible	Imperceptible
R11	Houses south of the River Blackwater along L1223	400 – 950 m	High	Low - Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
R12	Houses east along L1223	750 – 2050 m	High	Negligible	Temporary, slight	Permanent, slight
R13	Houses along rural roads south and southeast of the development site	1000 – 2000 m	High	Negligible	Temporary, slight	Permanent, slight
R14	Rural houses southwest of the development site	1400 – 1900 m	High	Neutral	Imperceptible	Imperceptible
R15	11 no. houses south-southeast of the development site	1500 – 1900m	High	Low	Temporary, slight	Permanent, slight
C0	Mallow Community National School	0 m	Low	High	Temporary, slight	Permanent, slight
C1	Mallow GAA Sports Complex	1050 m	Low	Low	Imperceptible	Imperceptible
C2	St. Joseph's Cemetery	450 m	Low	Negligible	Imperceptible	Imperceptible
C3	St. Mary's Secondary School, Mallow Swimming Pool, Mallow Youth Community Centre and football fields	850 m	Low	Neutral	Imperceptible	Imperceptible
C4	Patrician Academy	750 m	Low	Neutral	Imperceptible	Imperceptible
C5	Dairygold, Cork College of FET Campus, Mallow Fire Station, and commercial	1300 – 1700 m	Low	Neutral	Imperceptible	Imperceptible

Receptor No.	Title of receptor	Distance from site	Sensitivity	Magnitude of change	Predicted impact and duration	
					Construction	Operation
C6	Mallow Search and Rescue, Centre Stage School Mallow, The Arches Bar and Restaurant and Supervalu Mallow.	1000 – 1400 m	Low	Low	Imperceptible	Imperceptible
C7	St. Gobnait's Park – Mallow United A.F.C and St. Gobnait's Cemetery	1600 – 2100 m	Low	Neutral	Imperceptible	Imperceptible
C8	Davis College, Aldi and service stations	1250 – 1400 m	Low	Neutral	Imperceptible	Imperceptible
C9	Eircom AEH, The Big Blue Community Centre and basketball court	1900 – 2100 m	Low	Neutral	Imperceptible	Imperceptible
C10	Cork College of FET Mallow Youthreach Centre and Mallow Community Childcare	520 m	Low	Negligible	Imperceptible	Imperceptible
OS0	Mallow Town Park Maple Woods, Lovers Leap and Mallow Castle Deerpark	0 – 800 m	High	Low	Temporary, slight	Permanent, slight
OS1	Southern riparian bank of the River Blackwater	150 – 800 m	High	Medium	Temporary, moderate	Permanent, slight
OS2	Spa House and Grounds and Tip O'Neill Park	700 m	High	Neutral	Imperceptible	Imperceptible
OS3	Mallow Town Park	1100 m	High	Neutral	Imperceptible	Imperceptible
OS4	Mallow Golf Club	600 – 1200 m	High	Low	Temporary, slight	Permanent, slight
TC	Town Centre	700 – 1400 m	Low	Negligible	Imperceptible	Imperceptible
H	Mallow Castle and Mallow Castle House	650 m	High	Negligible	Temporary, slight	Permanent, slight

10.7.2.3 Residential Receptor Groups

R0 - (12 no. Houses within the site boundary) – Distance from nearest site boundary = 0m.

10 no. houses are located along the western boundary of the site while 2 no. houses are located within the site. The properties are semi-detached and two-storey with front and rear gardens with little to no vegetation present. Hoarding is present, surrounding the receptors and separating the properties from the proposed development.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - From the rear second storey windows and gardens of the boundary properties are direct and open views of the current greenfield state of the site and the landscape towards the east. Immediate environs also comprise of nearby construction sites which had begun previously of the proposed development. Hoarding that has been put up as part of ongoing construction from previously permitted development is restricting views past the site boundary. For the 2 no. houses

within the site, which are oriented north-south, visibility would be expected from both front and rear windows.

Once operational, views from the rear of the boundary properties, having been formerly comprised of pastures with small hedgerows, will be occupied with the residences of the proposed development. Any views of the river valley and southern riverbank enjoyed by the 2 no. houses within the site will be partially screened by the proposed development. During operation, proposed tree planting and landscaping will soften the effect. The magnitude of change is expected to be low to *medium*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, moderate, negative* during construction and *permanent, slight* to locally *moderate, negative* during operation.

R1 - (Castlelands House and ringfort (CO033-012) – Distance from nearest site boundary = 0m.

A private two storey house with a ringfort registered on the National Monuments Service within its lands.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - This house is oriented in a north-south direction with front facing views overlooking the greenfield site and river valley. A hedge forms the boundary between the property and the proposed development; however, the height is low, and it does not screen visibility from first or second floor windows. Hoarding panels currently exist along the boundary of the receptor. During construction, the proximity of the property to construction activities is expected to have a medium, negative visual impact.

Once operational, current front facing views is expected to be screened by the proposed development and will instead comprise a residential landscape. A ringfort and small patch of trees are located adjacent to the southeast within the site of the house and retain an element of scenic value in the landscape. The boundary hedge will contribute to a retention of some privacy, however, views across the landscape are expected to be significantly altered. As the proposed vegetation reaches maturity views will be further softened. The magnitude of change would be *low* to locally *medium*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, moderate, Negative* during construction and *permanent, slight to moderate, negative* during operation.

R2 - (Castlepark Estate and houses along the southeastern side of L1220) – Distance from nearest site boundary = 0 – 580m.

Dwellings are semi-detached and two-storey with front and rear gardens. The houses in the estate are arranged along curved roads and around small green spaces with trees in a diverse range of directions.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - 12 no. houses along the northern boundary of the site which are not part of the Castlepark Estate, have direct south facing views from rear windows and gardens. All 12 are bungalows and rear gardens are separated from the development site by boundary hedges. Trees are only present in front gardens.

Mallow Community National School (C0) occupies the southern views of houses in the western half of the group. As the proposed development site slopes southwards away from these receptors only the northern half of the development site is visible. Therefore, only construction and built features within the northern half of the site is expected to be visible for these receptors. For houses bordering with C0 the magnitude of change will be lower given the built element already present in their views. The highest magnitude of change will be *Medium*.

For houses within Castlepark Estate the highest change is expected to be for those arranged along the boundary with the proposed development site. With increasing distance views are progressively screened by other houses. Any views of the southern side of the river valley currently enjoyed by these receptors will be occupied by houses once operational. The magnitude of change will be *Low – Medium*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Moderate, Negative* during construction and *Permanent, Slight* to *Moderate, Negative* during operation.

R3 - (Castle Grove, Aldworth Heights, and Castle Heights estates and 10 no. residences along L1220) – Distance from nearest site boundary = 110 – 750m.

These estates are oriented along the northwestern side of L1220. Properties of Castle Heights are detached bungalows with front and rear gardens with orientations ranging from north-south to east-west. Properties of Aldworth Heights are detached and two-storey with front and rear gardens with both north-south and east-west orientations. Castle Grove is comprised of detached two-storey properties with front and rear gardens. Houses have northwest-southeast and northeast-southwest orientations.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Castle Heights, Aldworth Heights and single houses along L1220 overlook the proposed development to the south. Castle Grove is further west, and the proposed development site is angled to the southeast. Majority of Castle Grove falls outside of the ZTV and views are assumed to be entirely screened by nature of the topography.

Shrubs, trees, and well-kempt hedges are evident in the front gardens of the houses along L1220 which contribute to screening for houses set further back from the road in each estate. Across this receptor group, houses closest to the development site with north-south orientation are likely to have the highest visibility. Due to the presence vegetation in the front gardens of these properties and houses along L1220 of receptor group R2 the highest magnitude of change will be *Low*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R4 - (20 no. houses northeast of development site) – Distance from the nearest site boundary = 500 – 925m.

The receptor group comprises small clusters of houses situated along St. Joseph's Rd (L1220) northwest of the proposed development site and adjacent to the Mallow substation and Mallow GAA Club (C1). Majority of the properties are bungalows with some dormers also present.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - This receptor group is on the northeastern urban fringe of Mallow and lies within the greenbelt surrounding the urban centre of Mallow. The surrounding landscape, particularly to the north and south, is distinctly more rural. The topography is gently undulating in a way that places this receptor group on a gradient that slopes northward away from the river valley. Houses are either oriented north-south or east-west. Visibility of the proposed development from north-south facing houses is angled towards the west. The ESB substation is a prominent feature of the otherwise open, rural landscape and is most visible from houses along St. Joseph's Rd.

Properties oriented east-west along a laneway off L1220 overlook a tall border hedgerow. This screens views of the proposed development from the front windows of the low-rise properties. Other houses with this orientation are adjacent to the Mallow GAA club (C1). A well-developed hedgerow borders the road which also screens views from front facing windows. Due to the presence of these border hedgerows and those partitioning the surrounding fields, distance from the proposed development site and the topography the magnitude of change will be *Low*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R5 - (16 no. houses northeast of development site) – Distance from nearest site boundary = 1075 – 1450m.

This receptor group includes properties clustered around an area called Oliver's Cross, a fork junction between N73 and N72, and a T-junction between N72 and St. Joseph's Rd. An isolated dwelling situated northwest of Oliver's Cross is also included. The properties are mostly bungalows with large front and rear gardens.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Properties closest to the junctions lie outside of the ZTV. Similarly to R4, the group lies on a gradient gently sloping away from the proposed development. The difference in elevation between the site and the group is approximately 10 – 15m. The proposed development is effectively screened by the land for several houses.

The N72 is framed by a hedgerow with mature trees and well-developed shrubs. Any remaining visibility of the proposed development from houses along N72 is expected to be completely screened by vegetation. The isolated house included in this group is located along a rural laneway bordered by thick, mature hedgerow. Although it lies within the ZTV, views to the proposed development are screened by the hedgerow. The highest magnitude of change for receptors of this group will be *Negligible*.

Effect - In accordance with Table 10.1 and Table 10.2 the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R6 - (4 no. houses north of R7) – Distance from nearest site boundary = 1750 – 1950m.

These 4 no. houses are located along an unnamed rural road of increasing elevation northwards with progressively more open south facing views across the River Blackwater valley. The houses are bungalows oriented in a northeast-southwest direction along the road with front and rear gardens.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Views towards the proposed development site are angled from rear or side windows due to the distance and location of the receptor group. Shrubs and hedges are present around the border of the properties, however, south facing views are not screened. Houses within the residential estates of R7 comprise the southern landscape. The south sloping topography of the proposed development site screens its visibility from this receptor group. Due to distance and screening from other receptors the highest magnitude of change will be *Negligible*.

Effect - In accordance with Table 10.1 and Table 10.2 the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R7 - (Residential areas west forming Mallow urban fringe) – Distance from nearest site boundary = 850 – 1850m.

This receptor group covers an expansive mosaic of residential estates and properties that form the northeastern and northern urban fringe of Mallow. The N72 and pastures separate the proposed development site from the most northern parts of the group. The group also expands across gently undulating topography characteristic of Mallow.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Rural roads of Spa Glen and Brookfield are bordered by mature hedgerows. Residential plots are arranged in orderly sequences around curved residential roads interspersed with small green open spaces. Hedgerows are a common boundary feature to separate houses and distinguish between residential developments.

Approximately half of the properties in this group lie outside of the ZTV and views towards the proposed development are naturally screened by the land. For those situated within the ZTV extent, the topography rises northward creating a subtle gradient. Both the receptor group and the proposed development are situated on south facing slopes. Any areas of visibility are expected to be of the most northern section of the proposed development site. The highest magnitude of change will be *Negligible*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* to *Imperceptible* during operation.

R8 - (16 no. houses along L1207) – Distance from the nearest site boundary = 1450 – 2100m.

The houses are oriented along the Old Cork Road in an east-west direction and are generally bungalows.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*

Magnitude - This receptor group is comprised of rural properties characteristic of ribbon development radiating from a town centre. The Old Cork Road is framed by a mature hedgerow with a high number of trees present both along the road and forming property boundaries. Although the group is within the extent of the ZTV there is no visibility of the proposed development site due to cumulative screening from vegetation, R7, R3 and the sloping topography of the development site. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* operation.

R9 - (Residential areas southeast of the town centre) – Distance from the nearest site boundary = 900 – 2300m.

This receptor group is south of the River Blackwater. C6 forms the northern boundary, Summer Hill and surrounding Bear Forest woodlands form the eastern boundary, the Mallow Bypass forms the western boundary, and open pastures and C9 form the southern boundary.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Topography across the group generally slopes towards the river with a gradient of approximately 30 – 40m between south and north. This part of Mallow has undergone recent urban expansion. Residential estates in the eastern part of the group bordering with Bear Woods were constructed within the last 30 years while the remaining parts of the group are older. The environment comprises a condensed urban fabric with small green spaces typically found in residential areas dotted throughout the group. Views across the landscape are confined by buildings.

Due to the way the terrain across the river slopes and curves, visibility of the proposed development site is screened by the land and R2. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* operation.

R10 - (2 no. houses of Bear Forest) – Distance from the nearest site boundary = 860 – 960m.

One house is set back from the road via a private laneway, the other is located along the Bear Forest Lwr Road.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - The Bear Forest Lwr Road is lined by a stone wall and mature treeline, creating privacy and isolation for the two properties. Neither are visible from the road, and it is assumed that visibility of the road is limited from the properties. Any visibility of the proposed development is screened by the vegetation, the wall, and parts of R11 to the north. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* operation.

R11 - (Houses south of the River Blackwater along L1223) – Distance from the nearest site boundary = 400 – 960m.

Residential areas of this group are bound by L1223 to the south and OS2 and the River Blackwater to the north. Central to the group is the College Wood residential estate having completed construction within the last 15 years, which spans majority of the group area. Older, single dwellings are located to the east and west. This is another area of southern Mallow having undergone urban expansion.

There is a wastewater treatment plant directly opposite the proposed development site which is not included in the group but is a feature of the landscape for some receptors of this group.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - The terrain slopes towards the River Blackwater.

The eastern half of the group directly overlooks the proposed development site, while moving west visibility is increasingly angled and screened by the land. The topography of the opposite bank juts into the river creating a barrier to views further east. For western receptors of this group the highest magnitude of change will be *Negligible* but *Neutral* for most.

Towards the east with rising elevation, visibility is more direct and less screened. Houses within the group oriented towards the proposed development site are likely to have partially filtered views from any second storey windows. However, due to the distance and adjacent housing development of Castlelands, the magnitude of change will be *Low*. The proposed development site is visible from this area, although many of the views are angled through side windows due to the orientation of the houses. Once operational, the development will alter the landscape of the opposite riverbank from an open space to an urban zone and this is expected to be perceptible for some receptors in this area. The presence of the large housing development to the west, the current state of the site, and the distance will soften the magnitude of this change. The highest magnitude of change will be *Low*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* to *Imperceptible* during operation.

R12 - (Houses east along L1223) – Distance from nearest site boundary = 750 – 2050m

Comprised of single private dwellings this group exemplifies typical ribbon development and expands from R11 further east along the river valley. Fields and Mallow Gold Course (OS4) lay to the south and to the north is the riparian vegetation and pastures.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Due to the curve of the river in a zig-zag pattern, parts of the land jut in between each other and screen views down the river valley. For the houses at the eastern extremity, visibility of the proposed development site is screened by the rural landscape. For houses in this group closer to the site, visibility is screened by thick woodland and riparian vegetation present on the northern and southern riverbanks. The highest magnitude of change will be *Negligible* to *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* to *Imperceptible* during operation.

R13 - (Houses along rural road south of OS4) – Distance from the nearest site boundary = 950 – 1800m

These houses are typical of ribbon development along roads radiating from a town centre. The road is oriented in a northwest-southeast direction and houses have northeast-southwest facing views. There is a mix of bungalows and large two-storey buildings. Well-developed hedgerow and gardens are evident across the receptor group.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - The central properties lie outside of the ZTV where views towards the development site are screened by the rise in elevation upon which OS4 is located. Views become progressively more open as the topography rises to the southeast and northwest where these areas fall within the ZTV.

Views towards the proposed development site are screened by OS4 and the vegetation present throughout the golf course and hedgerow treelines present throughout pastures lying in between R13 and OS4. Although the elevation of this group opens up northward views it is not high enough to see clearly across the river valley to the other side. The vegetation present across the landscape lying between this receptor group and the proposed development effectively screens views. The highest magnitude of change will be *Negligible* to *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* to *Imperceptible* during operation.

R14 - (4 no. isolated rural houses and farm buildings southwest of the development site) – Distance from the nearest site boundary = 1400 – 1900m

These buildings are not visible through Google Street View nor were photos taken around this area during the site visit so the visibility and view from these properties were estimated based on nearby receptors, topography, and vegetation visible from satellite imagery.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - These properties are arranged in an arc further west than R13. They are surrounded by pastures and arable lands portioned by thick hedgerows with a high number of trees. Trees and shrubs also appear to form the boundaries around each property. Bear Forest lies north of the group.

The topography is elevated and continues to rise towards the south where Knockaroura Hill lies. Any views from these properties are likely to be angled towards Mallow Town Centre and the adjacent Castlelands residential development. The vegetation present around the properties and throughout the pastures in addition to the forested area of Bear Forest to the north will screen visibility towards the proposed development site. The highest magnitude of change will be *Negligible*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* to *Imperceptible* during operation.

R15 - (11 no. houses south- southeast of the development site) – Distance from the nearest site boundary = 1500 – 1950m

A mix of single and two-storey buildings along a curved rural road in a general east-west direction. Houses are oriented north-south with some slightly angled. The topography is elevated above all receptors lying north.

Sensitivity - Receptors would be residents at home. Sensitivity is *High*.

Magnitude - Due to the elevation of this group the proposed development site is visible as part of the distant landscape. However, due to distance the visual effect of onsite machinery during construction and subsequent development during operation, the magnitude of change will not be significant. Forested areas and the golf course make up landscape views closer to the properties and dominate views. Furthermore, the proposed development will adjoin to an existing development which will also serve to lessen the magnitude of change. One house is surrounded by trees and shrubs which are likely to almost screen visibility entirely. The highest magnitude of change will be *Low*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

10.7.2.4 Community and Commercial Receptor Groups

C0 - (Mallow Community national School) – Distance from the nearest site boundary = 0m

The school is comprised of a large, single two-storey building with parking to the southwest and a large open green space to the east.

Sensitivity - Receptors would be staff and students at the school. Sensitivity is *Low*.

Magnitude - As the school grounds sit at the boundary of the proposed development site, visibility from south or east facing windows are expected to be direct and clear. During both construction and operation views are expected to be negatively altered through the introduction of built features to an empty site. The magnitude of change will be *High*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

C1 - (Mallow GAA Sports Complex) – Distance from the nearest site boundary = 1050m

The sports complex is set back from St. Joseph's Rd via a driveway lined with a hedge. Pitches are arranged around the driveway and building. There is a total of 5 pitches. Car parking and a picnic area are present on both sides of the driveway.

Sensitivity - Receptors would be staff, club members, and guests. Sensitivity is *Low*.

Magnitude - The topography gently rises from St. Josephs Rd to the end of the driveway into the GAA site boundary where is plateaus to give clear open views across the river valley. The proposed development site is located southwest of the club and the gently undulating topography in between comprises pastures with minimal hedgerow partitions. The Mallow ESB substation and part of R4 fall within the landscape views from the club. During construction, tall machinery may be partially visible through angled distant views. Once operational, the tops of some houses along the eastern boundary of the proposed development site may be visible from parts of the grounds. The topography in between rises to limit visibility. The highest magnitude of change will be Low.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Imperceptible* during operation.

C2 - (St. Joseph's Cemetery) – Distance from the proposed development site = 450m

The cemetery is accessed from St. Joseph's Rd northeast of the site boundary adjacent to the most eastern house of R3.

Sensitivity - Receptors would be visitors to the cemetery. The sensitivity is Medium.

Magnitude - Graves are arranged to face south, so visitors would be facing north, away from the development site when visiting graves or wandering through the cemetery. Along St. Joseph's Rd, a think hedgerow of medium height is present and south facing views are screened from within the cemetery. During construction, the tops of tall machinery such as cranes and scaffolding may be visible through angled views towards the southwest. During operation the presence of the hedgerow and onsite trees will screen any views towards the proposed development site. The highest magnitude of change will be *Low – Negligible*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Imperceptible* during operation.

C3 - (St. Mary's Secondary School, Mallow Swimming Pool, Mallow Youth Community Centre and surrounding football fields and a standing stone (CO033-126----)) – Distance from the nearest site boundary = 850m

This receptor group is located northwest of the proposed development site with R7 to the west and N72 adjacent to the east.

Sensitivity - Receptors would be staff, students, and members of the various facilities. Sensitivity is *Low*.

Magnitude - The section of the N72 adjacent to this group is heavily bordered by trees and shrubs creating a narrow woodland strip on either side of the road. Views towards the proposed development site from this location are screened by the undulating topography leaving only R3 visible. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C4 - (Patrician Academy) – Distance from the nearest site boundary = 750m

The Patrician Academy is a secondary school located at the northern part of the town centre.

Sensitivity - Receptors would be students and staff at the school. Sensitivity is *Low*.

Magnitude - The school is surrounded by the built environment of the town centre (TC), R7, and C3 which screens all visibility of the proposed development site. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C5 - (Dairygold, Cork College of FET Campus, Mallow Fire Station, and other commercial buildings) – Distance from the nearest site boundary = 1300 – 1700m

A business complex to the west of the town centre adjacent to the railway line which borders to the group to the west.

Sensitivity - Receptors would be staff and students of the respective enterprises. Sensitivity is *Low*.

Magnitude - The town centre (TC), R3, and R2 screen visibility between this group and the proposed development. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C6 - (Mallow Search and Rescue, Centre Stage School Mallow, The Arches Bar and Restaurant and Supervalu Mallow) – Distance from the nearest site boundary = 1000 – 1400m

This group of businesses is located west of the bridge on the southern side of the river valley along the riverside.

Sensitivity - Receptors would be staff and visitors of the premises. Sensitivity is *Low*.

Magnitude - The buildings are oriented in a north-south direction with direct views across the river overlooking OS3. Due to the bend of the river the topography of R2 and OS0 conceals the proposed development site. During construction there may be some visibility of high construction equipment like cranes, particularly if there is more than one. During operation, the proposed development is expected to be screened by other receptors. The highest magnitude of change will be Negligible.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C7 - (St. Gobnait's Park – Mallow United A.F.C and St. Gobnait's Cemetery) – Distance from the nearest site boundary = 1600 – 2100m

This receptor group is embedded within R9 towards the western boundary. The cemetery lies closest to the railway line.

Sensitivity - Receptors would be staff and members of the football club and visitors of the park and cemetery. Sensitivity is *Medium*.

Magnitude - Surrounded by houses at such a distance from the proposed development site visibility is greatly reduced and views do not span far across the landscape from the receptors. It is unlikely the proposed development will be visible during construction or operation. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C8 - (Davis College, Aldi and service stations) – Distance from the nearest site boundary = 1250 – 1400m

Situated near the southeastern boundary and corner of R9 these two clusters of business were grouped together. Aldi and the service stations are located within R9 while Davis College is closer to the southern boundary.

Sensitivity - Receptors would be staff and students at the college as well as staff and customers of the Aldi and service stations. Sensitivity is *Low.*

Magnitude - Similarly with other receptors to the west of the proposed development site, the topography of the river valley adjacent to the site screens it from western receptors. These businesses are also embedded in a residential environment with built features everywhere. Visibility does not extend far across the landscape. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C9 - (Eircom AEH, The Big Blue Community Centre and basketball court) – Distance from the nearest site boundary = 1900 – 2100m

Located at the southern boundary of R9 this group of receptors lies to the southwest of the proposed development site.

Sensitivity - Receptors would be staff of Eircom and visitors to the community centre and basketball court. Sensitivity is Low.

Magnitude - Thick hedges surround the community centre and basketball courts effectively limiting far reaching views across the landscape. From this location, due to distance and screening from receptor group lying between this one and the proposed development site, visibility of the proposed development is expected to be completely screened. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

C10 - (Cork College of FET Mallow Youthreach Centre, Mallow Community Childcare and Donlouco Ireland Ltd) – Distance from the nearest site boundary = 520m

These facilities lie within R11 on the southern side of the river valley opposite the proposed development site. The buildings are grouped together at the location and are single or two-storey buildings accessed via L1223.

Sensitivity - Receptors would be staff, customers, visitors, and children. Sensitivity is *Low*.

Magnitude - The group sits at a higher elevation than parts of R11 as the topography rises away from the river. Views to the other side of the river valley can be seen through gaps between house of R11 and vegetation of OS1. During construction, the presence of onsite machinery may be occasionally noticeable however the effect will not be significant. During operation, the change of the site from empty to an extension of the built environment laying to the west is expected to be partially visible through filtered and angled views. The highest magnitude of change will be Low.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

10.7.2.5 Open Space Receptor Groups

OS0 - (Mallow Town Park Maple Woods, Lovers Leap and Mallow Castle Deerpark) – Distance from the nearest site boundary = 0 – 800m

This receptors group extends from Mallow Bridge to the end of Lovers Leap occupying approximately 2 km of riparian area on the northern side of the river valley. The Deerpark extends further north and borders with R2 and the castle grounds (H). There are paved tracks are present throughout the spaces which include the short, linear National Trail of Lover's Leap which meanders through a forested area to the finishing point named Lover's Leap which is renowned for beautiful, elevated views of the River Blackwater. The Coherduggan Stream also flows from the bridge to a discharge point south of Mallow Castle Deerpark.

Sensitivity - Receptors would be people using the parks and trails recreationally. Sensitivity is *High*.

Magnitude - The eastern half of this open space likes on a section of land jutting into the river which then bends back northwards. This zigzag shape of the river valley results in highly variable visibility across the landscape. The receptor group slopes towards the river much like the proposed development site does. The group curves around southern parts of R2 creating a difference in visibility between eastern and western parts of the group. During construction, tall machinery maybe partially visible from Mallow Castle Deerpark as it sits at a higher elevation that areas closer to the river. Screening from houses of R2 and vegetation of the park will result in angled and filtered views. During operation, the new residential development may be partially visible through gaps in houses of R2 although these are likely to be heavily screened.

Areas of the receptor group directly to the south and southeast of the proposed development site are expected to have their visual amenity affected, both during construction and operation due to the lack of screening features. The views from the elevated position of Lover's Leap east and west along the river valley will not be significantly impacted by the proposed development due to its distance from the riverbank and the zigzag shape of the river in both directions. The highest magnitude of change will be *Medium*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Moderate, Negative* during construction and *Permanent, Moderate – Slight, Negative* during operation.

OS1 - (Southern riparian bank of the River Blackwater) – Distance from the nearest site boundary = 150 – 800m

Extends 1.9km from Mallow Bridge to an eastern point along L1223 past Lover's Leap across the river. There appears to be some grassy tracks and the area is less forested than the northern bank. There are some fields, but no formal park/space.

Sensitivity - Receptors would be people engaged in activity where the landscape is an important element. Sensitivity is High.

Magnitude - The area of the group closest to the proposed development is directly south across the river. Visibility of the proposed development site is clear and direct. Movement east of this point visibility is still clear but views are more angled. The existing vegetation is retained screening

effectively the majority of the proposals in this location. The magnitude of change will therefore be *Low*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, imperceptible, Negative* during operation.

OS2 - (Spa House and Grounds and Tip O'Neill Park) – Distance from the nearest site boundary = 700m

The park and house ground lie at the northeastern boundary of the town centre adjacent to the western boundary of R2. There are some paved walkways and fountains in the park and treeline comprises the eastern border of the group.

Sensitivity - Receptors would be visitors to the park and house grounds. Sensitivity is High.

Magnitude - The park is situated on the back slope of the undulating topography of Mallow and surrounding environment. The park is nestled in the foothills of R2 and visibility towards the proposed development site is completely screened by houses and the terrain. The highest magnitude of change will be *negligible*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

OS3 - (Mallow Town Park) – Distance from the nearest site boundary = 1100m

Located west of Mallow Bridge extending along approximately 550m of the northern riparian corridor of the River Blackwater. There are two pitches within the receptor group and a forested riparian area along the western boundary surrounding a small stream that discharges at the southwestern corner of the receptor group.

Sensitivity - Receptors would be visitors to the park. Sensitivity is High.

Magnitude - Visibility of the proposed development from this receptor group is fully screened by the topography that OS0, R2 and H are situated upon. R2 and OS0 comprise the views east across the river valley. The highest magnitude of change will be Negligible – Neutral.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

OS4 - (Mallow Golf Club) – Distance from the nearest site boundary = 600 – 1200m

The golf club is located south of R11 across a south sloped landscape.

Sensitivity - Receptors would be staff and members of the golf club. Sensitivity is *High*.

Magnitude - Views across the northern landscape can be enjoyed from the elevated position of the golf course. Some screening from roadside hedgerows with trees and other small, forested areas within the golf course will result in filtered views of the proposed development site. Due to distance and partial views over Mallow visibility will not be clear. The difference between construction and operation will not be significant and the highest magnitude of change will be *Low*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

10.7.2.6 Town Centre Receptor Group

TC - (Town Centre) – Distance from nearest site boundary = 700 – 1400m

Mallow town centre is located west of the proposed development site, a short distance from the northern riverbank. Being a historic town there are numerous NIAH and NMS sites throughout the receptor group. The main street is Davis Street with many small roads and laneways leading off it.

Sensitivity - Receptors would be people visiting the amenities and businesses in the town. Sensitivity is Low.

Magnitude - The topography throughout the town centre is undulating and rises towards the east. Visibility of the proposed development site is screened by the Castle and R2 as a result of the elevated terrain in which they are located. There are no views of the site from the main street and buildings lining the streets and laneways block all views farther than the street. The highest magnitude of change will be *Neutral*.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *Imperceptible* during construction and *Imperceptible* during operation.

10.7.2.7 Heritage Receptor Group

H - (Mallow Castle and Mallow Castle House) – Distance from the nearest site boundary = 650m

Mallow Castle (NIAH Ref. 20815013; NMS Ref. CO033-009001) and Mallow Castle House (NIAH Ref. 20815015; NMS Ref. CO033-009002) are situated to the west of the proposed development. Several other features on the grounds are listed on the NIAH and NMS including Mallow Castle Garden (NIAH Ref. 20815014), two outbuildings (NIAH Ref. 20815018, 20815017), and an icehouse (NMS Ref. CO033-009003-). The castle is located west of the centre of Mallow, adjacent of the border of R2. Ton top of the highest slope of the surrounding undulating topography. Within the castle grounds are tall, mature mixed trees which densely surrounds the area. The castle playground located immediately north of the castle grounds is a large greenfield bordered by mainly tall mature deciduous trees with a border of younger deciduous trees along Castlepark Ave north of the playground.

Sensitivity - Receptors would be visitors to the Castle and Castle House. Sensitivity is High.

Magnitude - The Castle is situated on high ground within the undulating topography of the surrounding environment. Visibility towards the proposed development site is heavily restricted by existing residential properties followed by dense mixed vegetation of tall mature trees. Views from elevated locations within the Castle may be allowed. These are expected to be narrow glimpses of the highest elements of the proposed development. The highest magnitude of change will be Negligible.

Effect - In accordance with Table 10.1 and Table 10.2, the significance of the visual effect will be *slight* during construction and *slight* during operation.

10.8 The 'Do nothing' Scenario

In the event the proposed development is not constructed there would be no change to the landscape of the area. The site would remain empty and herbaceous species and scrub would continue to grow. The site currently has a low visual quality, and this would remain largely the same. A negative contrast between the empty site and surrounding urban, rural, and riparian environments. Houses currently bordering the site to the north would continue to have south facing views across the river valley.

10.9 Potential Significant Effects

10.9.1 Construction Phase

10.9.1.1 Landscape

The proposed development is likely to alter the landscape fabric within the boundaries of the site as well as sections of existing forested areas such as the OS0 receptor where tree removal is expected to accommodate the proposed walkway. Other changes during construction phase would include the addition of welfare units and machinery. Therefore, the visual impact is expected to be moderate at highest.

10.9.1.2 Visual Impact

The factors of visual changes upon the views include the alteration of the existing landform, the temporary addition of welfare units and machinery equipment during the construction phase. These visual impacts would negatively impact receptors directly adjacent to the proposed development such as receptors R0 and R1. However, due to the presence of existing hoarding panels surrounding these receptors the expected visual impact is expected to be moderate at the highest.

10.9.2 Operational Phase

10.9.2.1 Landscape

The proposed development is likely to change the fabric of the landscape within its boundaries by converting the existing vacant greenfield into a residential area. This can moderately alter the landscape, extending the urban fabric of Mallow and increasing built density. This impact is likely to be softened after the new vegetation planted during construction phase have established, extending naturalised vegetation corridors.

Therefore, the visual impact during operational phase is *moderate* at highest.

10.9.2.2 Visual Impact

During the operational phase the surrounding receptors are expected to be affected moderately. The replacement of open wide space allowing for long ranging views into the River with new residential properties is expected. The newly established vegetation is expected to help soften the impact of a newly urbanised landscape as well as softening the visual impact seen by surrounding receptors.

Therefore, the visual impact during operational phase is *slight* at highest.

10.9.3 Cumulative effects

Planning application 226225 (Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork) Nearest distance to site boundary = 918m

Situated southwest from the proposed Castlelands development. The Ballydahin development aims to construct 52 no. residential units ranging in height from 2 to 3 storeys. Three commercial units are also proposed within the boundary site, with 96 no. bicycle parking spaces and 57 no. car parking spaces.

Landscape - The surrounding landscape of the Ballydahin development is generally urban, comprised of existing two storey residential properties that are densely built together. The Ballydahin development is not expected to have a considerable negative landscape impact as it is expected to add to an already urbanized fabric. Therefore, the landscape impact is *low* at most. In accordance with methodology the impact of change on the landscape would be *slight, negative, permanent.*

Visual - The visual impact the Ballydahin development is expected to be *low.* This is due to the existing urban fabric being comprised of two storey residential properties and commercial buildings. The Ballydahin development proposes 2 to 3 storeys height of residential units. Partial views of roofs may be seen but are not expected to substantially impact the visual amenity enjoyed by the surrounding townscape. Therefore, in accordance with methodology the visual impact would be *imperceptible, negative, permanent.*

Effect - Highest cumulative effect in conjunction to Castlelands Development is *imperceptible.*

Planning application 244243 (Spaglen residential development) Nearest distance to site boundary = 765m

Located northwest from the proposed Castlelands development, within the Spaglen region along the N72. The Spaglen residential development proposes a Large-scale Residential Development (LRD), comprising the demolition of an existing farmhouse/buildings and the construction of 186 no. residential units. This also includes the provision of 1 no. creche, 2no. vehicular access points, 1 no. toucan and 3 no. of uncontrolled pedestrian and cycle crossing points on the L5331.

Landscape - The Spaglen development sits within Spaglen, within the boundary of the site contains hedgerows and existing buildings/farmhouses. The surrounding landscape is comprised of semi-urban landscape, with one to two storey residential properties surrounding the proposed development. Other landscape types include large agricultural fields bordered by dense mainly deciduous hedgerows to the south. The development proposes remove sections of hedgerows within the boundary, as well as a building that is no longer used. The surrounding hedgerows bordering the site are being retained. Therefore, according to methodology, the magnitude of change would be *slight, negative, permanent.*

Visual - The Spaglen development is located at a long distance from existing viewpoints towards Castlelands developments. Followed by the retention of existing hedgerows surrounding the proposed site and other existing residential properties, this would soften the visual impact. Existing receptors surrounding the Spaglen development are expected to be only slightly affected due to the existing screen and vegetation surrounding each residential property.

Effect - Highest cumulative effect in conjunction to Castlelands Development is *slight.*

Planning application 224676 (Old Course, Spaglen, Mallow, Co. Cork) Nearest distance to site boundary = 1063m

Located northwest from the proposed Castlelands development, the Old Course development proposes 96 no. of residential units, comprised of 2-bed apartment units, semi-detached housing, 3 storey apartment blocks and townhouses. Vehicular access is proposed via the existing entrance from the L1207, as well as bicycle parking facilities. The Old Course development includes open spaces and landscaping.

Landscape - The existing landscape is semi-urban, comprising of residential estates with large fields designated for pastoral and agricultural use. The site is currently under development by other residential schemes. The Old Course development is expected to replace the remaining vacant Greenfields and populate it with new residential properties that range from two to three storeys. This can negatively impact the existing fabric of the landscape but is likely to not be considerable as it is already within a semi-urban landscape. Therefore, in accordance with methodology the magnitude of change on the landscape would be *slight, negative, permanent.*

Visual - The proposed development is at a long distance from the proposed Castlelands site. Followed by the proposed screening of the development such as the inclusion of deciduous trees and the preservation of existing vegetation within the site. The majority of the development proposes to follow the same storey height of the surrounding semi-urban landscape, with the apartments serving as the tallest units being three storeys. Because of this possible observation of roofs are likely to be seen from a distance albeit partially.

Therefore, in accordance with methodology, the magnitude of visual change would be *slight, negative, permanent.*

Effect - Highest cumulative effect in conjunction to Castlelands Development is *slight.*

Planning application 226156 (Scoil Aonghusa CNS, Kingfort Avenue, Castlepark Village, Castlelands, Mallow, Co. Cork) Nearest distance to site boundary = Immediately north of Castlelands development site

Located within proximity of the Castlelands development site to the north. While the proposal is not similar to the Castlelands development, the proximity of the Scoil Aonghusa development warrants possible cumulative effect. The Scoil Aonghusa development proposes a single storey extension to the existing school. The works also includes a soft fall play area and retaining wall with fencing.

Landscape - The surrounding landscape of the Scoil Aonghusa development shares much of the same of the Castlelands site. Comprised of semi-urban landscape with two storey residential properties. The extension proposes to remove a small section of existing greenfield to accommodate a single storey extension followed by soft fall area and 1.8m high bow top fence enclosure. This is likely to negatively impact the existing landscape fabric. However, new amenity is expected to be created within the landscape, offering positive urban connectivity. Surrounding receptors are expected not be able to view the majority of the extension but are more affected when viewing from second storey views.

Therefore, in accordance with methodology the magnitude of change upon the landscape would be *slight, negative, permanent.*

Visual - The surrounding receptors such as R0, R1, R2 and R3 are expected to be slightly affected by the Scoil Aonghus development. This can be mostly visible from rear view windows, observing the newly constructed 1.8m enclosure wall and one storey extension. Existing vegetation that may be screening the view include mainly evergreen trees within the rear gardens that moderately screen some residential properties. Despite this, the proposed works are expected to only impose minor changes.

Therefore, in accordance with methodology, the magnitude of visual change would be *slight, negative, permanent.*

Effect - Highest cumulative effect in conjunction to Castlelands Development is *slight.*

Planning application 235952 (Hazel Brooke, Spaglen, Mallow, Co. Cork) Nearest distance to site boundary = 808m

The proposed development within Hazel Brooke is a Strategic Housing Development (SHD) comprising of 148 no. residential units. Other works include 1 no. creche, 3 no. local play areas and 3 no. neighbourhood play areas.

Landscape - Sharing the same landscape as with the planning application **244243** immediately east of the Castlelands development. Unlike **244243**, the landscape is mainly comprised of brownfields, as well as within a predominantly urbanized landscape, with existing residential estates surrounding the site. The disturbance of existing landscape fabric is likely to result in negative impact, with the introduction of increased urban density of new residential properties within an existing semi-urban landscape. However, the production of new deciduous trees along the border of the proposed development is expected to soften the landscape impact. Therefore, in accordance with methodology the magnitude of impact on the landscape would be *slight, negative, permanent.*

Visual - The surrounding receptors closest to the proposed development such as R7, R5, R3, R4 are expected to be *slightly* impacted due to the existing nature of the semi-urban landscape. R7 would be largely screened by the existing vegetation bordering nearby fields of the proposed site, with rear windows being able to view the site expecting to be impacted *slightly* at most. Remaining receptors surrounding the site are expected to be impacted *slightly* due to existing vegetation bordering distant nearby fields such as agricultural and pastoral fields. Wintering periods may worsen the screen effect, which can lead to partial narrow views through branches of vegetation.

In accordance with methodology the magnitude of visual change would be *negligible to slight, negative, permanent.*

Effect - Highest cumulative effect in conjunction to Castlelands Development is *slight*

Planning application 245530 (Annabella, Mallow, Co. Cork) Nearest distance to site boundary = 2384m

The Annabella development is within a small area, under permission to construct a creche facility adjacent to other permitted residential developments (15/6119, extended under 20/6130). Other works include a vehicular access, parking, footpaths, landscaping and amenity areas.

Landscape - The surrounding area is comprised of a mix of rural and semi-urban landscapes. The site itself is set within an existing agricultural field, bordered by dense mainly deciduous hedgerows and sparse, tall trees. Impacts upon the existing landscape are expected to be *low* due to the size of works of the proposed development. The distance from Castlelands site is also beyond the 2km study site boundary, making it very difficult to spot from chosen viewpoints surrounding the Castlelands site. Therefore, the magnitude of change upon the landscape is expected to be *slight, negative, permanent.*

Visual - Changes include the new facility being installed within a vacant area of land. This would be observable within nearby residential estates of the site. This is expected to be screened however due to the existing bordering hedgerows and sparse tall deciduous trees bordering the neighbouring residential estates. Distances beyond the immediate surroundings are expected to be very difficult to be seen.

Therefore, in accordance with methodology the magnitude of visual change would be *imperceptible.*

Effect - Highest cumulative effect in conjunction to Castlelands Development is *imperceptible.*

Planning application ABP 321640-22 (Anabella, Mallow, Co. Cork) Nearest distance to site boundary = 2460m

Located west from the proposed Castlelands Development, the Annabella SHD development aims to construct 299 no. residential units comprising of 185 no. of houses and 50 no. apartments/duplex units and 64 no. apartments in 2 no. 4 storey blocks over lower ground floor level car parking and a 450sqm childcare facility.

Landscape - The Annabella SHD development is expected to change the landscape within the sites boundaries by introducing increased density of residential estates. This can negatively impact the existing landscape fabric but is proportionate to the surrounding semi-urban landscape. It is therefore considered to be *slight, negative, permanent.*

Visual - Visual changes include the addition of residential properties within a previously vacant agricultural field. This is expected to only bring moderate impact to those that are closest to the proposed site. Beyond the immediate surrounding area, it is expected to be full screened due to existing residential and commercial facilities fully screening the site.

Therefore, in accordance with methodology the magnitude of visual change would be *imperceptible.*

Effect - Highest cumulative effect in conjunction to Castlelands Development is *imperceptible.*

Overall, no significant negative cumulative effects are expected to occur from the proposed works in conjunction with other proposed developments. With combined cumulative effects being moderate at most.

10.10 Mitigation and Monitoring

10.10.1 Construction Phase Mitigation

Temporary moderate impacts are expected during the construction phase as a result of the proposed development to the visual amenity of receptors R0 and R1.

At these locations the combination of the magnitude of change of the existing view and the visual noise expected to be created from the construction traffic are expected to locally significantly reduce the visual amenity.

It is proposed that during construction hoarding is put in place around the site boundary to reduce the perceived movement of heavy pant and construction activity. This should be in the form of timber solid panels, 2 to 2.5m in height, allowing no viewing gaps between them. These panels should be painted one of the following colours: dark green, dark blue, grey or brown or should be left in their natural colour.

In addition, it is advised that the existing 2.4m high paladin fence along the southern and western boundaries are retained for the construction period.

10.10.2 Operational Phase Mitigation

No significant impacts are expected during operation. Therefore, no mitigation is required.

10.10.3 Cumulative Mitigation

No significant cumulative impacts are expected. Therefore, no mitigation is required.

10.11 Residual Impact Assessment

10.11.1 Construction Phase

The existing hoarding is already screening views towards the proposed development from public locations. The same hoarding is recommended to be retained in place to avoid the possibility of elevating the visual noise to the high sensitivity visual receptors in the vicinity of the proposed development. These receptors are:

Table 10.4 Construction Phase Residual Impacts

Receptor No.	Title of receptor	Distance from site	Sensitivity	Magnitude of change	Predicted impact and duration
R0	12 no. Houses within the site boundary	0m	High	Medium	Temporary, moderate
R1	Castlelands House	0 m	High	Medium	Temporary, moderate

The residual impacts are not significant and therefore no further mitigation is required.

10.11.2 Operational Phase

No mitigation is proposed during the operational phase. Therefore, no residual impacts are expected.

10.11.3 Cumulative Impact

No mitigation is proposed as a result of the cumulative impact assessment. Therefore, no residual impacts are expected.

10.12 Risk of Major Accidents or Disasters

No risks of major accidents or disasters have been identified during this assessment.

10.13 Significant Interactions

Elements of the Cultural Heritage chapter and Biodiversity chapter are expected to interact with the Landscape and Visual amenity offered in this location and are affected by the proposed development. These are the Blackwater SAC and the Mallow Castle and Castle House. The interaction is not expected to be significant.

10.14 References & Sources

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;

Guidelines for Landscape and Visual Impact Assessment (GLVIA) as published by the Landscape Institute (UK) and the Institute of Environmental Management and Assessment (3rd Edition, 2013);

Cork County Draft Landscape Strategy (2007);

Cork County Development Plan 2022-2028.

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 11

Material Assets: Traffic & Transport

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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11 Traffic & Transport

11.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed Large-Scale Residential Development (LRD) consisting of 469 no. residential units on a site located at Castle Park, Castlelands (townland), Mallow, Co. Cork and to assess the impact of the Proposed Development on the surrounding road network and transport infrastructure (including pedestrian, cycling and transport facilities) on the Mallow Road network in Cork County.

This section is written as a concise summary of the Traffic and Transport Assessment, included with the planning application submission. Rather than repeat the detailed traffic assessments carried out within the Traffic and Transport Assessment, it is referred to throughout this chapter, with the impact assessment findings discussed below.

11.2 Expertise & Qualifications

This chapter was prepared by Julie Tiernan BE(Civil) (Hons) MSc CEng MIEI of PUNCH Consulting Engineers.

PUNCH Consulting Engineers have been involved in the preparation of EIARs for numerous projects including the following:

- Horizon Mixed Use Development, Limerick.
- SHD at Lands at Former Greenpark Racecourse, Limerick City.

11.3 Proposed Development

The full description of the proposed LRD is outlined in Chapter 2 'Site Location and Project Description' of this EIAR.

The subject site is located within lands at St. Joseph's Road, Mallow, Co. Cork. The proposed development is a residential development consisting of 469 no. residential units with some supporting non-residential facilities including a creche and an interpretive centre/café.

The subject site is mostly greenfield apart from some existing building footings which were constructed as part of a previously planned development. The site is located approximately 800m east of Mallow town centre and the site area is 18.2ha (gross) and 12.7ha (net). The site is bordered by existing residential developments to the west and north and green fields to the south and east. Mallow GAA complex is located approximately 1.2km northeast of the site. The land use in the area is generally a mix between residential and agricultural.

11.4 Aspects Relevant to this Assessment

11.4.1 Existing Road Network

The site location in relation to the local road network is detailed in Figure 11.1 below.

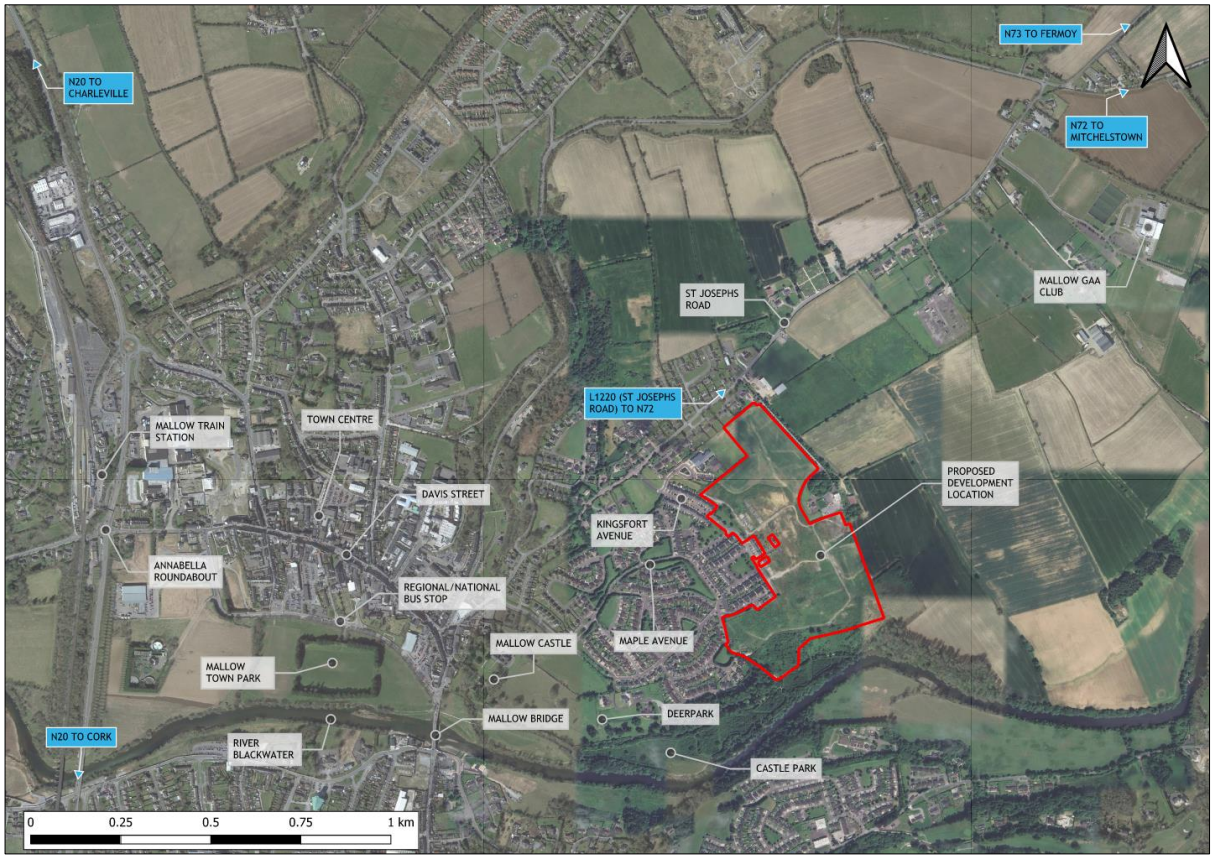

Figure 11.1: Site location and surrounding road network

11.4.1.1 St Joseph's Road

St Joseph's Road is a local road which runs between Mallow Town Centre and Oliver's Cross on the N72. St Joseph's Road is a single lane two-way carriageway with a wide footpath on the eastern side of the carriageway and no existing designated cycle lanes.

11.4.1.2 N72

The N72 is a national road which connects Mallow to Killarney in the east and Dungarvan to the west. The N72 is a single lane two-way carriageway which St Joseph's Road connects to at Oliver's Cross (to the north) and Mallow Town Centre (to the south).

11.4.1.3 Bridewell Lane

Bridewell Lane is a one-way street which connects St Joseph's Road to the N72. Vehicles enter the N72 from Bridewell Lane and primarily travel westbound on the N72 from this point as the Infirmary Lane Junction is used for Traffic heading eastbound. There is an existing footpath on the eastern side of Bridewell Lane.

11.4.1.4 Infirmary Lane

Infirmary Lane is a short (approx. 15m long) 2-way street which connects St Joseph's Road and the N72. All traffic wishing to access St Joseph's Road from the Town Centre must utilise Infirmary Lane, while traffic wishing to travel eastbound on the N72 also primarily uses Infirmary Lane. There is no left turn from Infirmary Lane on to the N72. There is an existing footpath on the south side of Infirmary Lane.

11.4.1.5 Oliver's Cross

Oliver's Cross is a priority Junction which connects St Joseph's Road and the N72. The N73 connects to the N72 approximately 50m east of the St Joseph's Road junction. There are no existing pedestrian facilities at this end of St Joseph's Road.

11.5 Methodology

11.5.1 Relevant Legislation & Guidance

The assessment is based on the Traffic and Transport Assessment and the following documents:

- TII's Traffic and Transport Guidelines PE-PDV-02045 (May 2014)
- Cork County Council Development Plan (2022-2028)
- NTA Cycle Design Manual; and
- Design Manual for Urban Roads and Streets

11.5.2 Site Surveys/Investigation

Site visits were made at various dates to review the character and issues associated with the surrounding road network.

Traffic Surveys were carried out on 5th October 2023 to determine the mean morning peak hour traffic flow that occurred between 08:00 and 09:00 (AM). The evening peak hour traffic flow was found to be between 17:30 and 18:30 (PM).

11.5.3 Consultation

The scope of the TTA was discussed and agreed with Cork County Council Engineering representatives. Traffic surveys were undertaken at the following junctions to determine the baseline capacity of each junction:

- Junction 1 denoted as J1 - St Joseph's Road, L-1220-0/N-72-389/N-73-0 Junction at Olivers Cross.
- J2 – Aldworth Heights Entrance to St. Josephs Road, L-1220-0 (Proposed CCC Housing Development).
- J3 – Existing Castlepark entrance (Northern) to St. Josephs Road, L-1220-0 Kingsfort Avenue.
- J4 – Existing Castlepark entrance (Southern) to St. Josephs Road, L-1220-0 Castlepark Avenue.

- J5a – St. Joseph Road, L-1220-0/N-72-385 Junction at Spa Square.
- J5b – N72 & Infirmary Lane.
- J6 – Thomas Davis Street, R-883-0/ N-72-385 Junction at Spa Square.
- J7 – Bridewell Lane, L-9016-0/ Bridge Street, N-72-385 Junction.
- J8 – Bridge Street, N-72-385/ Park Road, N-72-380/ Mallow Bridge, R-620-28 Junction at Mallow Bridge North.
- J9 – Mallow Bridge & Ballydaheen, R620-28/ Mill Street, R-619-399/ Bearforest, L-1223-0 Junction at Mallow Bridge South.

The impact of the proposed LRD was assessed by comparing the baseline traffic flows to the Design Years of 2041 and compared with the proposed LRD added up to the Design Year. TRL traffic modelling package Junctions 9 was used for priority junction analysis and Linsig for signalised junctions.

In addition, Transport Infrastructure Ireland (TII) were contacted as part of the consultation process for this EIAR. Their response has been taken into account in the preparation of this EIAR chapter.

11.6 Difficulties Encountered

There were no major limitations and difficulties encountered in compiling the required information for preparation of the report

11.7 Baseline Environment

11.7.1 Site Location

The proposed LRD is located at Castle Park, Castlelands (townland), Mallow, Co. Cork. The site is located approximately 800m east of Mallow town centre. Access to the site will be via the existing entrance to Castlepark from St Joseph's Road via Kingsfort Avenue.

11.7.2 Existing Pedestrian Facilities

Existing pedestrian facilities are good in the vicinity of the site. They provide full connectivity to the surrounding roads.

The internal footpath network for the proposed LRD will tie into Maple Square, Maplewood, and Kingsfort Avenue in several locations, in addition to these connections there will be a dedicated pedestrian link from the south of the site to the existing river walk which links to Mallow town park.

11.7.3 Existing Cycling Facilities

There are no designated cycling facilities in the vicinity of the proposed LRD. However, according to the Map of CycleConnects Proposals, it is envisaged that an Inter-Urban cycle route be developed along St Joseph's Road directly to the north of the proposed LRD as well as an Urban Secondary route that would link to the aforementioned Inter-Urban cycle route via Kingsfort Avenue.

11.7.4 Public Transport

11.7.4.1 Train Service

Mallow is one of the best served towns in Ireland for rail services. The proposed LRD is located just over 2km (less than a 30-minute walk) from Annabella Mallow Train Station, which will promote a convenient and attractive, and therefore a realistic alternative to use of the private car.

11.7.4.2 Bus Service

Existing public transport facilities are poor in the vicinity of the proposed development. The nearest bus stop is 1.6km (20 minutes' walk) away from the proposed site. The general area does not have a TFI Town Bus service and is primarily served by Bus Éireann.

The local area surrounding the development is served by existing Bus Éireann services. The following Bus lines serve the nearest bus stops:

- Bus Éireann Line 51: Galway to Cork – Mallow Town Park Bus Stop 631061 and Mallow Hospital Bus Stop 232311
- Bus Éireann Line 243: Cork to Newmarket – Mallow Town Park Bus Stop 631061

11.7.4.3 Taxi Service

Local taxi services are available for collecting and depositing passengers. This will facilitate taxi use by providing a safe and convenient means of accessing this form of transport. The objective is to encourage lift sharing in taxis to help reduce the demand on parking and congestion at peak times.

11.7.4.4 Proposed Transport Infrastructure

Several road improvement schemes in the area are in the early stages of design. Each project will have a significant impact on the surrounding traffic levels, should they proceed. These include the Mallow Relief Road and the M20 project.

The Mallow Relief Road scheme proposes to free up the town centre road network for access and local traffic, and to enable national road traffic to travel more efficiently to other surrounding destinations.

The National Development Plan (NDP) 2021-2030 sets out that the N/M20 Cork to Limerick scheme would provide better connectivity between Ireland's second and third largest cities, Cork and Limerick. Currently in Phase 2, the preferred route passes to the east of the proposed LRD site near Oliver's Cross.

11.8 The 'Do nothing' Scenario

If the proposed LRD does not proceed there would be no additional demand or loading on the existing road network other than the naturally growing baseline traffic figures on the existing road network.

11.9 Potential Significant Effects

11.9.1 Construction Phase

Construction traffic travelling to the site will use the existing St. Joseph's Road and Kingsfort Avenue to access the site. Overall, there will be a negative short-term not significant impact to local traffic during the construction phase.

The traffic volume associated with the construction phase site is not considered to be excessive and will be spread out over the duration of the construction of the development. As the construction works are off-line and due to the designated access point, which allows delivery vehicles to pull off into the site, there will be no significant disruption to the traffic flows on the along St. Jospeh's Road as a result of the construction of the development. There may be diversions required for when work takes place adjacent to Maple Square, Maplewood, and Kingsfort Avenue. Existing public footpaths are unlikely to be impacted by the project as all works are proposed within the site boundaries.

11.9.2 Operational Phase

A comprehensive traffic survey was conducted for the existing residential development adjacent to the proposed site, which has a comparable number of units. To estimate the anticipated traffic volumes generated by the new residential units, trip rates were calculated based on traffic counts taken at the Castlepark residential development on Thursday, October 5th, 2023. Castlepark comprises approximately 500 residential units.

Additionally, trip rates for the proposed development were generated using TRICS data for comparison. The analysis revealed that the trip rates derived from the TRICS database were significantly lower than those obtained from the actual survey counts. This discrepancy highlights the importance of using site-specific data where available, as it provides more accurate and reliable trip rate estimates. Consequently, the calculated trip rates from the survey were utilised for further analysis.

Table 11. 1 Estimated AM and PM peak hour traffic (PCUs) generated by proposed development

Land Use		Calculation Factor		Trip rate				Additional Number of Trips			
				AM Peak		PM Peak		AM Peak		PM Peak	
		GFA	No. of Units	AM Arrive	AM Depart	PM Arrive	PM Depart	AM Arrive	AM Depart	PM Arrive	PM Depart
Opening year 2026	Phase 1 (a + b) Private Houses/Apartments		98	0.385	0.650	0.439	0.269	38	64	43	26
	Creche	788.6		3.123	2.226	1.740	2.485	25	18	14	20
	Phase 1 Total (*planning application 24/04519)							**62**	**82**	**57**	**46**
Design year 2031	Phase 1c Private Houses/Apartments		90	0.385	0.650	0.439	0.269	40	24	40	24
	Interpretive Centre/Cafe	58.7		3.835	2.065	1.282	3.205	2	1	1	2
	Phase 1(a + b + c) Total							**104**	**107**	**97**	**72**
	Phase 2 Private Houses/Apartments		161	0.385	0.650	0.439	0.269	61	103	69	43
	Phase 1 & 2 Total							**166**	**211**	**168**	**115**
Design year 2041	Phase 3 Private Houses/Apartments		120	0.385	0.650	0.439	0.269	46	78	53	32
	LRD Total (Phase 1,2,3)							**212**	**289**	**221**	**148**

The proposed development does not significantly impact the junctions within the existing road network local to the proposed development.

Modelling results show that by the 2041 Design year, the junction capacity remains below the design threshold for most junctions apart from J5a (1.18 Degree of Saturation), J5b (1.22), J6(1.14), J7 (1.25) and J9(1.17). J6 also shows congestion without any of the developments in operation by design year 2041. These congested junctions are within the town centre and are currently of poor geometric design carrying high baseline traffic. Junctions 6, 8 and 9 are signalised junctions while the remaining junctions are priority junctions.

Table 11. 2 Junction Analysis Summary

Junction	2041 Without Development RFC/DOS (%)	2041 With Full Proposed LRD Development (Phase 1,2,3)	2041 With Proposed Full LRD Development & Aldworth Heights
J1 Olivers Cross	0.39	0.54	0.64

Junction	2041 Without Development RFC/DOS (%)	2041 With Full Proposed LRD Development (Phase 1,2,3)	2041 With Proposed Full LRD Development & Aldworth Heights
J2 Aldworth Heights	0.06	0.08	0.46
J3 Castle Park North	0.19	0.35	0.37
J4 Castle Park South	0.4	0.74	0.84
J5a Infirmary Lane & St Josephs Rd	0.79	1.18	1.21
J5b N72 & Infirmary Lane	0.68	1.22	1.43
J6 Thomas Davis & N72	1.08	1.14	1.21
J7 Bridewell Lane & N72	0.73	1.25	1.25
J8 Mallow Bridge North	0.79	0.85	0.87
J9 Mallow Bridge South	0.74	1.17	1.20

In an urban environment, it is expected that there may be congestion during peak times. There are always opportunities to improve signal control operation by adjusting cycle times to respond to changing traffic conditions. The above predicted traffic analysis assumes a conservative development trip generation based on the following assumptions:

1. No reduction in surveyed trips rates for the existing school surveyed traffic.
2. No reduction in trip rates for the creche which may be accounted for in the local residential trips.
3. No reduction in trips towards the town centre due to future transport proposals with potential to be delivered within the design year assessment.
4. No allowance for realistic future modal transport shift towards sustainable modes of transport.

11.9.3 Cumulative Effects

Cork County Council have informed PUNCH Consulting Engineers of a proposed housing development consisting of 138 no. housing units and a creche at Aldworth Heights which has been submitted to An Bord Pleanála. The impact of this development was also assessed.

A planning submission has been made for a Large-Scale Residential Development of 186 new units and a creche 1km Northwest of the proposed site. At the instruction of Cork County Council during a consultation, the TTA prepared for the Spa-Glen development was examined and the proposed development traffic has been incorporated into the assessment report. The Castlelands generated traffic at primarily 3no. junctions, Junction 6, Junction 8, and Junction 9. The Spa Glen generated traffic was included in the background traffic at the existing junctions. The TTA notes that the development is proposed to open in 2026, the same year as the LRD.

St Mary's Secondary School development was also considered in the traffic impact analysis. It was concluded that the proposed upgrading of the school would have no impact to the surrounding road network.

The proposed LRD is not likely to result in significant adverse impacts either alone or in combination with the existing planned or likely future projects.

11.10 Mitigation and Monitoring

11.10.1 Construction Phase Mitigation

The following mitigation measures are proposed for the construction phase of the proposed LRD.

To address the Construction Phase impacts raised, the appointed Contractor shall prepare a Construction Transport Management Plan (CTMP) prior to the commencement of development. It is proposed that construction vehicles will access the site from the N72 at Oliver's Cross and enter via the laneway from St Joseph's Road to Castlelands House, for which the Applicant has a right of way permitting access to the development site. Construction Traffic will exit the development at the same point. Construction Traffic will use this route in order to minimise construction traffic at the junctions of St. Joseph's Road/N72/Infirmary Lane/Bridewell Lane. The proposed route will also ensure that there is no conflict between construction traffic and existing residents in the area, especially the nearby primary school. Deliveries shall be scheduled outside of peak commuting hours.

Construction operations on site and deliveries to the site will be in accordance with the Construction and Environmental Management Plan (CEMP).

The preparation of the CTMP will entail an assessment of existing nearby employment, educational, recreational and commercial facilities to establish the peak times for vehicles, cyclists and pedestrians. This information would be used to develop the optimum start/finish/delivery times to minimise impact on these existing facilities.

The CTMP issued at construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority. There will also be a requirement for comprehensive measures as part of the construction management.

To address the Construction Phase impacts raised, the construction vehicle movements will be minimised through:

a) Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak traffic periods;

b) Use of precast/prefabricated materials where possible;

c) Cut material generated by the construction works will be re-used on site where possible, through various accommodation works;

d) Adequate storage space on site will be provided;

e) A strategy will be developed to minimize construction material quantities as much as possible;

f) Construction staff vehicle movements will also be minimized by promoting the use of public transport, shared use of vehicles, cycling and walking;

g) A Construction & Demolition Plan shall be prepared and implemented by the appointed contractor before the commencement of the works on the development.

h) Provision of temporary warning signs and Banksmen controlling access and egress from the site;

i) All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads;

j) Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal;

k) All loads to be properly stowed and secured with a tarpaulin, where appropriate;

l) Routine sweeping/cleaning of the road and footpaths in front of the site;

m) No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity;

n) Hoarding will be provided along the site frontage to protect pedestrians using the footpaths;

o) Existing public lighting will be maintained.

The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP. The traffic liaison officer will be available to receive complaints, comments and queries about the traffic generated by the construction site and traffic issues associated with the site. Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with:

a) Cork County Council including Elected Members.

b) An Garda Siochana.

c) Irish Rail.

d) Bus Eireann.

e) Other relevant statutory bodies.

f) Members of the community.

g) Adjacent contractors.

The traffic liaison officer/traffic manager will be sufficiently senior in position and will be responsible for dealing with any complaints and remedying any non-compliance and developing solutions to prevent re-occurrence.

11.10.2 Operational Phase Mitigation

The following mitigation measures are proposed for the operational phase of the proposed LRD.

1. Provision of bike parking spaces above minimum requirements, including dedicated cargo bike spaces.
2. Opting for fewer car parking spaces than the maximum allowed under the Cork County Council Development Plan. This reduction, coupled with initiatives promoting cycling as a viable alternative mode of transport, will significantly contribute to sustainability by diminishing reliance on private cars while fostering increased usage of more eco-friendly transportation options, notably cycling and bus services for commuting.
3. Enhancing pedestrian and cyclist connectivity within the development and its adjacent residential areas to public transport, the nearby River Walk, and public parks. This will be achieved through the construction of Part-M compliant links and improvements along the existing Greenway.
4. Establishing a 4m wide amenity route dedicated to cyclists throughout the development.
5. Installing four cycle priority crossings within the development as part of the aforementioned amenity route.
6. Undertaking improvement works on the existing pedestrian paths to the Town.
7. Ensuring all footpaths within the development adhere to Part M compliance standards, incorporating crossing points in accordance with DMURS and Traffic Management Guidelines.
8. Implementation of a number of initiatives and active monitoring within the development to promote modal change.
9. There is a significant opportunity to optimise the cycle times of signalised junctions. They are currently modelled with a 90 second cycle time to accurately reflect the existing scenario queuing. By increasing the cycle time to an acceptable 120 second cycle time, the modelled throughput on heavily congested approaches can be enhanced, which will also help to reduce queuing and improve overall traffic flow.
10. Phasing of the proposed development to allow for future infrastructure improvements to be implemented outside of the control of the applicant.

11.10.3 Cumulative Mitigation

The proposed development is not likely to result in significant adverse impacts on roads and traffic either alone or in combination with the existing planned or likely future projects.

11.11 Residual Impact Assessment

11.11.1 Construction Phase

There will be no significant residual impacts on the surrounding traffic and transportation during the construction phase as construction traffic will be timed so as to minimise interface with peak traffic hours and construction traffic generated as a percentage of existing traffic will be minor.

11.11.2 Operational Phase

Residual impacts on the surrounding roads and traffic during the operational phase is considered to be moderate long-term neutral impact. The volumes of traffic generated from the currently proposed development will have a moderate effect on the road network traffic volumes and can be considered within the norms for urban developments.

11.11.3 Cumulative Impact

The proposed development is not likely to result in significant adverse impacts on roads and traffic either alone or in combination with the existing planned or likely future projects.

11.12 Risk of Major Accidents or Disasters

11.12.1 Construction Phase

There will be no significant risk of major accidents or disasters during the construction phase of this development. Transport hazards that exist in the workplace must be assessed as part of this risk assessment and appropriate steps taken to eliminate or reduce any risks found. Vehicles are defined as a Place of Work under the Act. Hence, under Section 8 of the Act, the successful contractor must ensure so far as reasonably practicable that:

- Vehicles are designed, provided and maintained in a condition that is safe and without risk to health;
- Safe means of access and egress to and from the vehicle is designed, provided and maintained;
- Systems of work are planned, organised, performed, maintained, and revised as appropriate, for example safe systems of work must be available for vehicle loading and unloading activities; and
- Information, instruction, training, and supervision is provided for all employees who operate work related vehicles.

Regarding the construction phase, the contractor should employ a work-related vehicles safety plan and program for the duration for the works.

11.12.2 Operational Phase

During the operational phase the potential for increased accidents since this development is bringing additional vehicles into the vicinity of the proposed development. It should be noted that the

successful contractor should ensure that the development is constructed in accordance with the design as set out by the consultants.

The following is a non-exhaustive list of risk factors affecting the operational phase of this development:

- Speeding;
- Driving under the influence of alcohol and other psychoactive substances;
- Non-use of motorcycle helmets, seatbelts, and child restraints;
- Distracted driving; and
- The use of unsafe vehicles.

With reference to the operational phase, residents and other people using the road shall adhere to the Rules of the Road is published by the Road Safety Authority (RSA).

11.13 References & Sources

TII's Traffic and Transport Guidelines PE-PDV-02045 (May 2014)

Cork County Council Development Plan (2022-2028)

NTA Cycle Design Manual; and

Design Manual for Urban Roads and Streets

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 12

Material Assets: Service Infrastructure & Utilities

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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12 Material Assets: Service Infrastructure & Utilities

12.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the material assets that could potentially be impacted by the proposed development including services, utilities, and infrastructure, within and around the site during the construction and operational phases. Impacts can be both positive and negative, direct, and indirect, temporary, and permanent in nature.

12.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Stephen O' Grady of DOSA Consulting Engineers.

Stephen O' Grady, BEng, CEng, MIEI has carried out this assessment and been involved in the preparation of EIARs for the following projects:

- Residential Development at Carleton, Castletreasure, Douglas, Cork
- Residential Development at Janeville, Shannonpark, Carrigaline, Co. Cork
- Residential Development at Greenfields, Ballincollig, Cork

12.3 Proposed Development

The proposed development includes the construction of 469 no. residential units, a creche, an interpretive centre/café, and all associated site development works. A full description is provided in Chapter 2 of this EIAR and in the statutory notices.

12.4 Methodology

The significance of the impact of the proposed development on the existing environment will be described in this chapter. A desktop study investigating existing services, infrastructure, and utilities serving the development area was conducted.

12.4.1 Relevant Legislation & Guidance

The assessment of the elements within this chapter has been completed in line with the relevant standards and guidelines associated with each element. In addition to EPA guidelines, the following standards and guidelines have informed the assessment process:

- Greater Dublin Strategic Drainage Study (GDSDS) Volume 2 – New Developments
- CIRIA report C753 The SuDS Manual-v6
- Nature-based Solutions to the Management of Rainwater and Surface Water Runoff in Urban Areas – Water Sensitive Urban Design
- Department of the Environment's Recommendations for Site Development Works for Housing Areas

- Department of the Environment's Building Regulations, "Technical Guidance Document Part H Drainage and Waste Water Disposal"
- BS EN 752: 2008 Drain and Sewer Systems Outside Buildings Part 4: Hydraulic Design and Environmental Considerations.
- Irish Water Code of Practice for Wastewater Management Doc IW-CDS-5030-03.
- Irish Water Code of Practice for Water Infrastructure Doc IW-CDS-5020-03.
- EN 13201 Road Lighting – European Standard.
- BS 5489 Design of Road Lighting – British Standard.
- Housing Schemes: Guidebook for ESB Networks Standards for Electrical Services.

12.4.2 Site Surveys/Investigation

Cork County Council Stormwater Asset Records

Irish Water Asset Records (Foul Sewer and Watermain Networks).

Site Survey (Feature & Topographical Data)

ESB Networks Records (Electricity Supply).

Telecommunications Providers - Eir,

Ordnance Survey Ireland (OSI) Mapping.

Aerial Photography.

Office of Public Works (OPW) Flood Hazard Mapping; (floodinfo.ie)

12.4.3 Consultation

Information received was further supplemented by a series of site visits/investigations and consultations with Roads Department, Water Services Department, and the Estates Department of the Local Authority – Cork County Council. Consultations were also held with the Connection and Developer Services (CDS) section of Uisce Éireann.

12.5 Difficulties Encountered

The were no notable difficulties encountered when compiling information.

12.6 Baseline Environment

12.6.1 Description of Existing Environment

The subject site (currently greenfield) is located within the Mallow town boundary. The site is a greenfield site characterised by its sloping topography. The site is directly bound on the west by the existing Castlepark residential estate, the existing L-1220-0 and individual dwellings to the north, the River Blackwater to the south and greenfield unzoned lands to the east.

12.6.2 Access

Access to the site is available from the existing Castlepark estate via the L-1220-0/St, Joseph's Road to the north.

12.6.3 Surface Water Drainage

There are existing stormwater connections to the River Blackwater to the south of the site serving the existing Castlepark estate which will be utilised for this proposed development.

The main hydrological feature of the area is the Blackwater River which flows in an easterly direction to the south of the site before discharging into Youghal harbour. The Caherduggan & Spa streams join the Blackwater River Lee in Mallow town. Refer to Figure 12.1 below.

Figure 12.1 Hydrological Features of the Area

The site is within hydrometric area 18 (Blackwater (Munster)). Hydrometric area No. 18 includes the surface catchment drained by the River Blackwater and all streams entering tidal water in Youghal Bay.

The site itself is in the catchment of the Blackwater River (EPA Sub Catchment SC-090). The surface water catchment divide is shown on Figure 12.2.

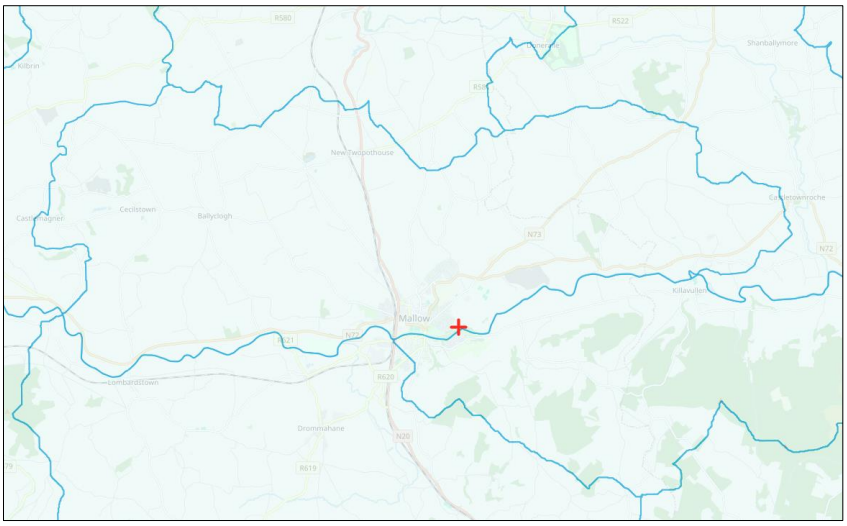

Figure 12.2 Catchment.

OPW Flood Hazard Mapping indicates that there are no instances of historic flooding within the subject site. The nearest recoded flooding event is to the west, in Mallow Town Park and the vicinity of Mallow bridge. Refer to Figure 12.3 below for an extract of the OPW www.floodmaps.ie recorded flood incidences for the area.

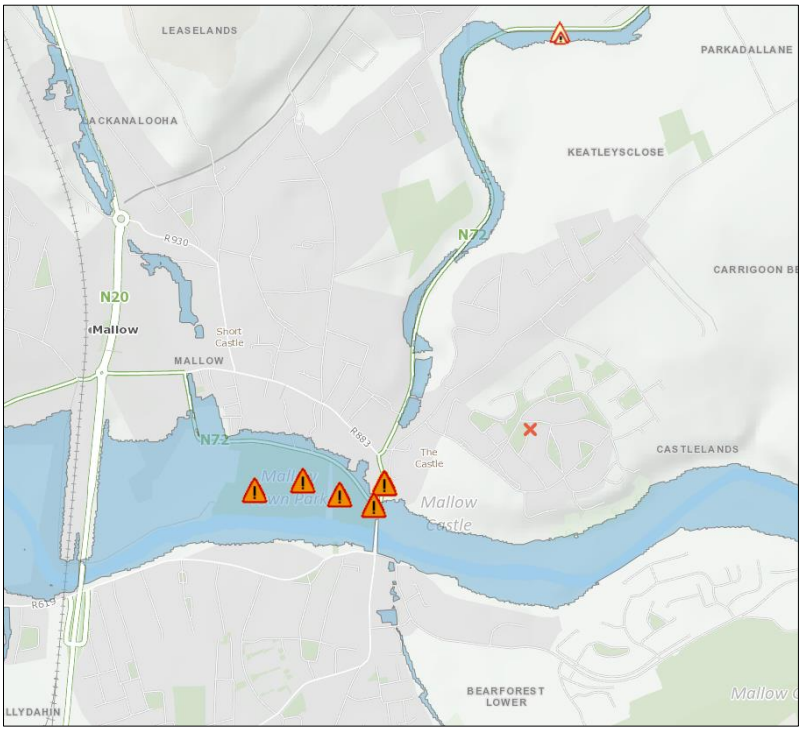

Figure 12.3 Floodmaps.ie Map

Whilst it is noted that the site of the proposed development itself has not been affected by historical flood events nor is it vulnerable to predicted flood events as part of the Lee CFRAMS Study a Site-Specific Flood Risk Assessment by DOSA Consulting Engineers has also been undertaken as part of the Surface Water Management Plan and accompanies this planning application. Refer to Figure 12.3above for an extract of the OPW www.floodmaps.ie recorded flood incidences for the area.

12.6.4 Foul Sewer Drainage

There are no records or evidence indicating the presence of any constructed foul water drainage infrastructure within the site.

The nearest foul water drainage system to the site is the public network in the adjoining Castlepark estate to the west. It is located directly adjacent to the site. Existing foul sewer asset drawings have been obtained from Irish Water and are depicted in Figure 12.4 below.

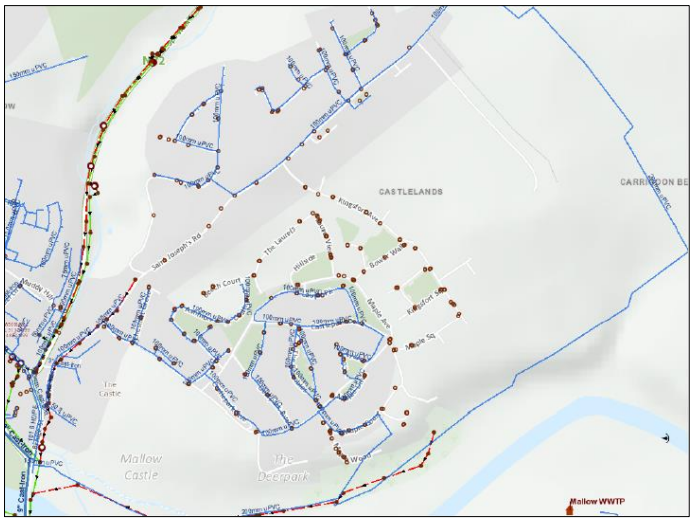

Figure 12.4 Irish Water Foul Assets

12.6.5 Potable Water

From available water main records and liaison with Irish Water, the following existing watermains have been identified within the site:

100mm diameter watermain feeding the existing Castlepark estate.

Existing watermain asset drawings have been obtained from Irish Water and are depicted in Figure 12.5.

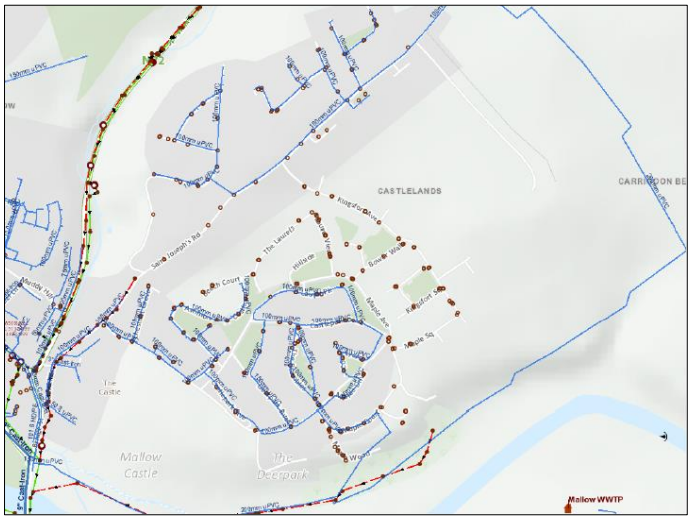

Figure 12.5 Irish Water Watermain Assets

12.6.6 Electrical Supply

Based on information received from ESB Networks, the existing Castlepark estate adjacent to the proposed development are served by extensive networks of Low Voltage and Medium Voltage power supplies, routed both overhead and under- ground. There are a number of overhead lines currently traversing along the northern portion of the site which are depicted in Figure 12.6. These lines will be diverted and undergrounded.

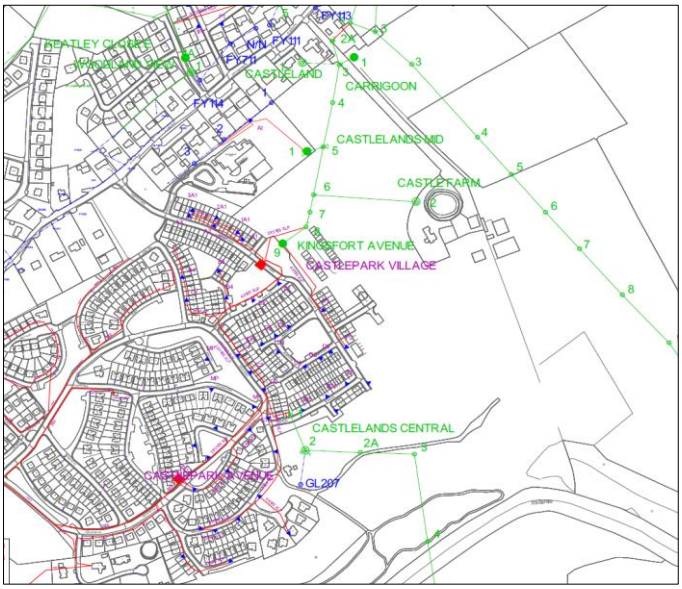

Figure 12.6 Low & Medium Voltage Supplies

12.6.7 Telecommunications

From utility maps received from EIR, there are telecommunications networks in the vicinity of the proposed development.

The National Broadband Ireland online network mapping indicates that the site is served by commercial providers which is highlighted in Figure 12.7.

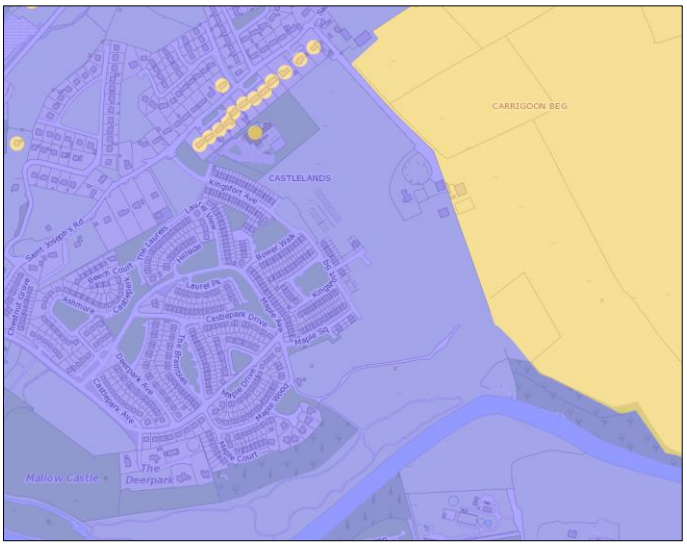

Figure 12.7 Telecommunications Assets

12.6.8 Public Lighting

The existing Castlepark estate is served by public lighting which will be extended into the proposed development.

12.7 Proposed Development Works

12.7.1 Proposed Storm Water Drainage

The proposed surface water drainage system, refer to Appendix 12.1, is in accordance with Sustainable Urban Drainage Systems (SUDS) principles.

The development site is divided into three separate catchments. Groundwater flow direction is interpreted to be to the south, providing baseflow to the Blackwater River.

The runoff from the site will be offset by the use of infiltrating-type SuDS infrastructure. This will maintain recharge to the aquifer on the site, which provides baseflow to the Blackwater River. The increased runoff flows will be attenuated to greenfield runoff rates prior to discharging to the Blackwater River. There are no anticipated negative impacts from the proposed design methodology.

Discharge from the site will utilise the existing outfall serving the Castlepark estate.

The proposed storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc. The development has been split into several catchment areas.

Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS and attenuated / managed on site prior to final discharge at Qbar greenfield run-off rates.

Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control devices (Hydrobrakes or equivalent) and associated attenuation tanks and detention basins. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site). The storm sewer network was designed using Innovyze MicroDrainage modelling software. Outputs from the storm sewer design can be found in the Appendices of the Infrastructure Report in Appendix ?.

The proposed surface water drainage network will collect surface water runoff from the site via a piped network prior to discharging off site via the attenuation tanks, detention basins, flow control devices and separator arrangement as noted above. Prior to entering the system, the stormwater generated will be treated through a number of nature-based solutions in line with adopted SuDs measures. Design details of the proposed SuDS measures are contained in the Surface Water Management Plan contained in Appendix 12.5.

All flow velocities within the network fall within the limits of 0.75 and 3m/sec as set out in “Recommendations for Site Development Works” as published by the Department of Environment. The storm water network and infiltration basin are designed to accommodate the 100-year return period plus an additional 20% to account for the effects of climate change. A schematic overview of

the proposed stormwater network is depicted in Figure 5.8 below. Drawings for the proposed Storm Water Network are contained in Appendix 12-1.

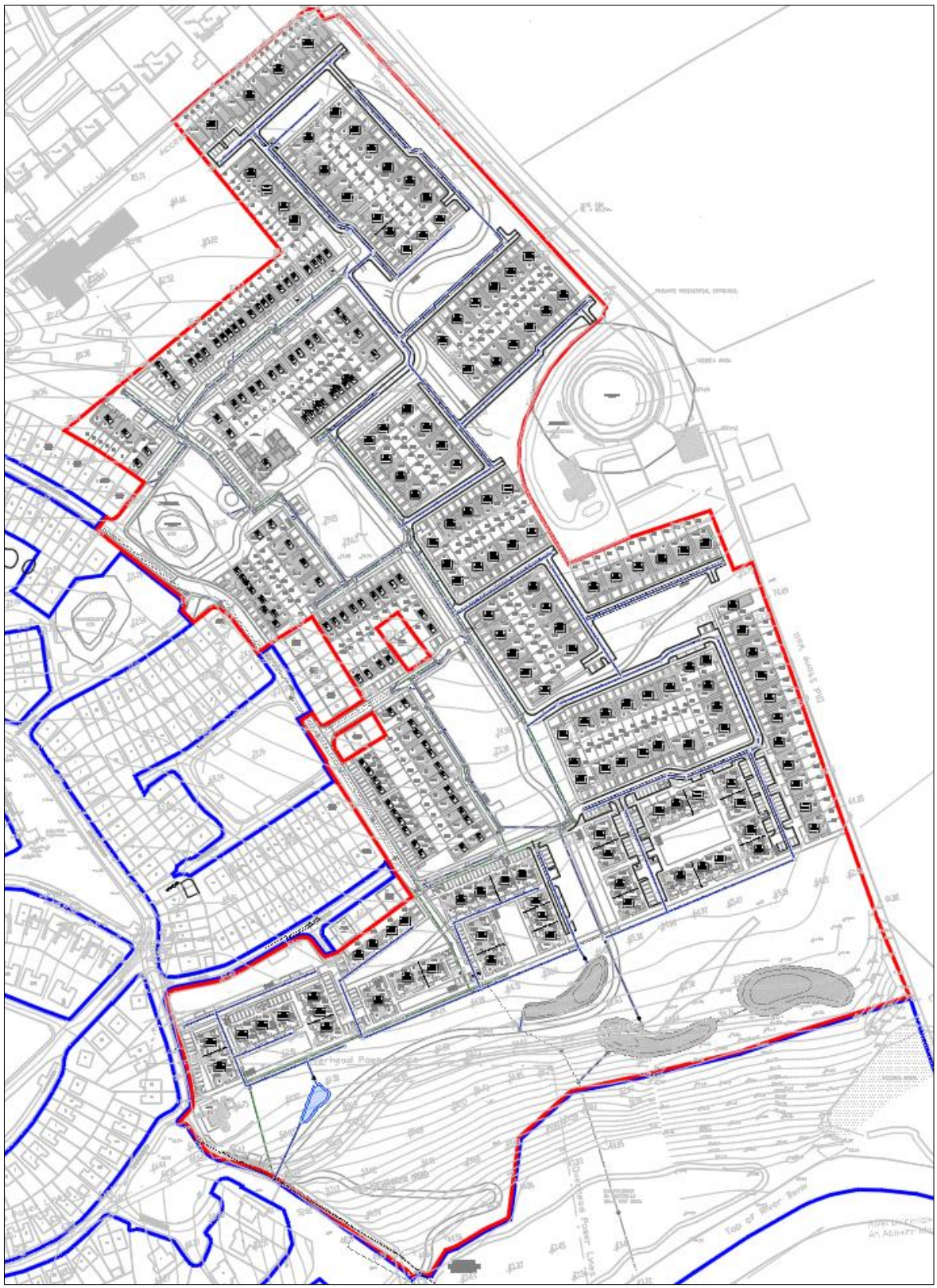

Figure 12.8 Proposed Storm Water Network

Upon reviewing the Flood Risk Assessment, the proposed development is not subject to flooding presently (pre-development). Refer to Specific Flood Risk Assessment chapter covered in the Surface Water Management Plan in Appendix 12.5

12.7.2 Proposed Foul Sewer Drainage

The proposed development will require a new separate drainage network to collect and convey the effluent generated by the proposed development. Gravity sewers are designed using Micro-Drainage WINDES design software to ensure self-cleansing velocities will be achieved on all pipe runs. For each pipe run the accumulative number of households contributing to that section of pipework is used to calculate the design flow. The drainage network for the proposed development has been designed in accordance with:

- Irish Water Code of Practice for Wastewater Infrastructure Doc IW-CDS-5030-03.
- Wastewater Infrastructure Standard Details' (Irish Water)
- Building Regulations, Technical Guidance Document Part H 'Drainage and Waste Water Disposal'
- IS EN752, "Drain and Sewer Systems Outside Buildings"

Within that area of the development, 225mm and 150mm diameter sewers will collect discharges from houses and apartments and flow by gravity to the north-eastern corner of the site. It is proposed to connect the foul drainage system serving the existing Castlepark estate. Foul Water from the proposed development will enter the collection network and ultimately discharge to Mallow WWTP for treatment and disposal.

A schematic overview of the proposed Foul Sewer network is depicted in Figure 12.9 below.

Figure 12.9 Proposed Foul Sewer Network

A Pre-Connection Enquiry was lodged with Irish Water to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Irish Water reverted to this enquiry confirming feasibility to connect.

A Confirmation of Feasibility letter has been received from Irish Water for the proposed network.

Refer to the Infrastructure Design Report in Appendix 12.4 for copies of the Confirmation of Feasibility and Statement of Design Acceptance from Irish Water. The proposed Wastewater Drainage Drawings for the development are contained in Appendix 12.2

12.7.3 Proposed Water Supply

The proposed development will require a new separate watermain network to serve the proposed development. The network for the proposed development has been designed in accordance with:

- Irish Water Code of Practice for Water Infrastructure Doc IW-CDS-5020-03
- Building Regulations, Technical Guidance Document Park B 'Fire Safety'

The proposed development will be served by a network of 150mm and 100mm diameter watermains laid out as shown on the engineering drawings in Appendix 12.3. The mains will be connected to the existing watermain in the adjoining Castlepark estate and connected to the public watermain.

The new site watermain network has been designed to adequately serve the firefighting requirements of the development. Fire hydrants will be provided such that each house will be within 45m of a hydrant and these hydrants will be provided so as to be fully accessible to the fire service. Sluice valves will be installed on all principal watermain connections to ensure that sections of the development can be isolated for maintenance and repaired as required. Appropriate positioning of scour valves is at low points within the design. A water-meter will be installed on the main connections, subject to detailed agreement with Irish Water/Cork County Council.

A schematic overview of the proposed Watermain network is depicted in Figure 12.10 below.

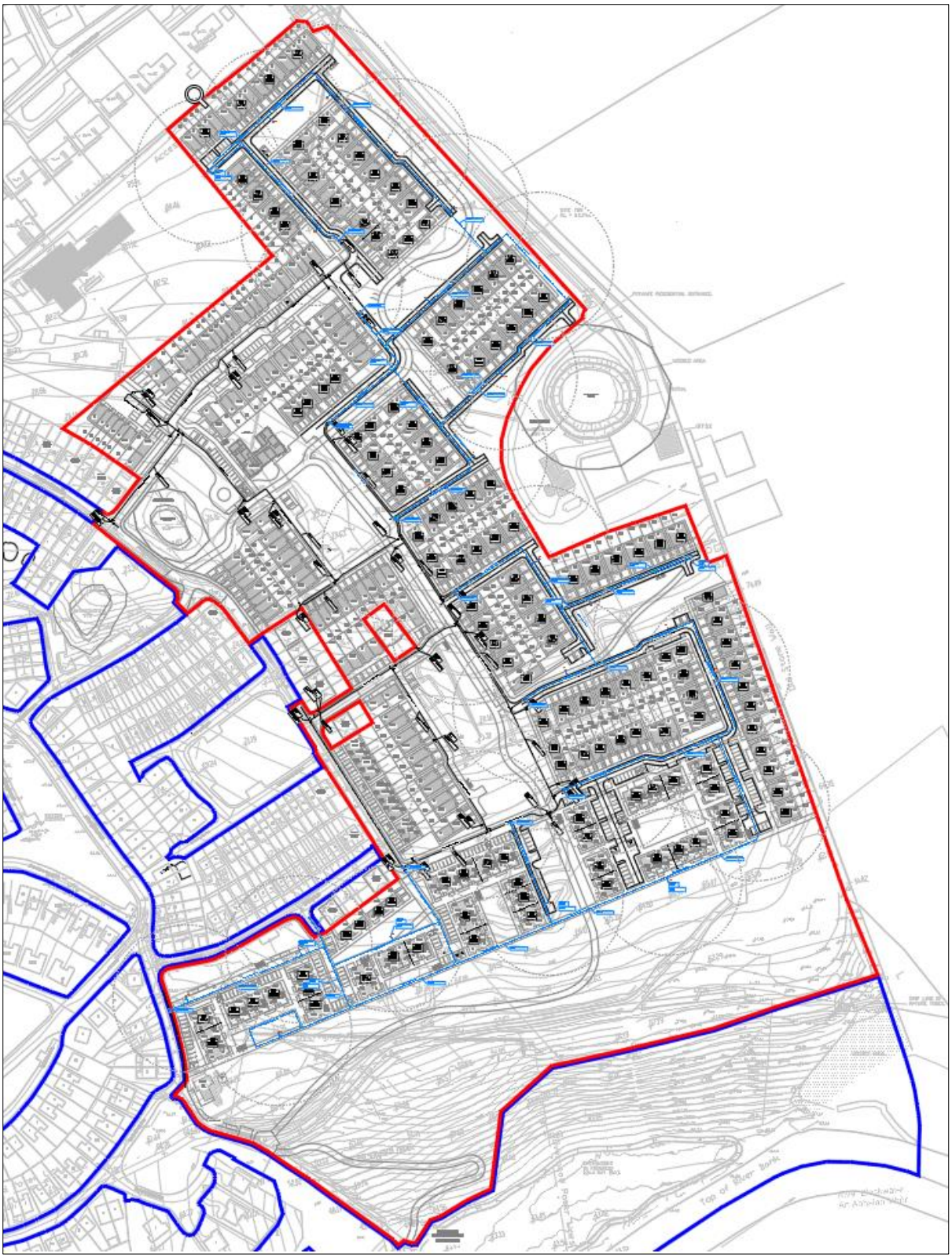

Figure 12.10 Proposed Watermain Network

A Pre-Connection Enquiry was lodged with Irish Water to allow an assessment of the local & regional infrastructure to accommodate the proposed development. Irish Water reverted to this enquiry confirming feasibility to connect.

A Confirmation of Feasibility letter & Statement of Design Acceptance has been received from Irish Water for the proposed network.

Refer to the Infrastructure Design Report in Appendix 12.4 for copies of the Confirmation of Feasibility from Irish Water.

12.7.4 Proposed Electrical Supply

The proposed development is to be served by the ESB via a new network connection to be agreed upon with the ESB prior to construction. An underground LV network will be provided for by the developer along with the supply of mini pillars are required to serve all units within the development.

12.7.5 Proposed Telecommunications

The proposed development is to be served by a new telecommunications network. This network with be constructed in a series of underground cabling and chambers (located primarily within footpaths and under roads) All buildings will be connected to this system with appropriate ancillary ducting.

12.7.6 Proposed Public Lighting

The scheme proposes public lighting to all roads and paths within the development. The public road lighting is designed to EN 13201 and British Standard BS 5489 utilising the software package "Lighting Reality Pro". This design package is used to select an appropriate lantern type and to optimise the lighting design. The selected lantern is designed and manufactured to comply with EN 13201 with IP65 optic and 10 joules shock resistant gear housing. To meet with ecology requirements, in particular regarding local bat activity, the lighting scheme has been designed to minimise light spillage nuisance at retained/new woody features of the study site (i.e. hedgerow, tree line/groups, woodland/woodland edge) by using shielded, downward directed lighting where necessary; using narrow spectrum lighting types with no UV and luminaire accessories (e.g. shielding plates). The proposed public lighting strategy prepared by Kellihers Electrical is included as Appendix 12.6 of this EIAR.

12.8 The 'Do nothing' Scenario

The 'Do Nothing' scenario refers to what would occur should the proposed development not be progressed. In this scenario, the impacts described in this chapter would not emerge meaning that the 'Do Nothing' scenario is considered to have a neutral effect with regards to utilities. The 'Do Nothing' scenario is therefore not addressed any further in this chapter.

12.9 Potential Significant Effects

The construction phase of the proposed development has the potential to result in slight and temporary impacts to the existing population in the local area.

12.9.1.1 Earthworks & Civil Works

The bulk earthworks and excavations required within the development will result in both the importation and exportations of some material. It is anticipated excavations quantities will be greater than the expected material to be generated within the development from excavation. Excavation for grading within the development will disturb the existing ground and has potential to introduce suspended solids into water run-off from the site.

12.9.1.2 Asset Installation

The construction of below-ground services such as watermain, storm & foul pipeline, telecommunication conduits, ESB conduit will require excavation works for trenching. Similar to bulk earthworks, the excavation work required for the trenches has the potential to introduce suspended solids to water run-off from the site.

Road openings and associated licenses will be required to connect the proposed watermain, and foul, networks to the existing networks in the Castlepark estate road. This will require minor local traffic management measures for the duration of the works.

Regarding the surface water run-off from the site, there is potential for this to become contaminated from construction activities leading directly to a negative impact on the receiving waters to the south of the development. This could result in a moderate short-term negative impact on the water quality in the Blackwater River.

12.9.1.3 Construction Personnel

The activities during the construction phase will generate effluent and sanitary waste from workforce facilities provided for the duration of the proposed works. A site compound will be provided, and a temporary foul connection and potable water connection will be required for the duration of construction works. These have the potential for a direct negative impact on the existing water/wastewater infrastructure in the area of the development and may result in a slight short-term impact on the capacity of the existing water/wastewater networks.

12.9.1.4 Foul and Water

The operation of the proposed development will result in the generation of additional foul effluent an increase in water demand. This has the potential, in the absence of any mitigation, to have a direct negative impact on the water/ wastewater infrastructure serving the development resulting in a significant long-term impact on the capacity of the water/wastewater infrastructure.

12.9.1.5 Surface Water

Surface water run-off from the development site during the operation phase has the potential to be contaminated with extra organic material. Inadequate control measures within the development could result in large quantities of surface water discharge from the development lands into the Blackwater River. This could lead to significant long-term negative impacts on the water quality and quantity entering the surrounding watercourses.

12.9.2 Cumulative Effects

The potential cumulative impacts on material assets have been assessed having considered other permitted and planned developments in the surrounding area. The nearby proposed and permitted developments considered are as follows:

Table 12.1 Proposed and Permitted Developments in Surrounding Area

Application Reference	Applicant(s)	Description	Outcome/Current Status
ABP Reference: JP04.320648	Cork County Council	Proposed construction of 138 residential units and all associated site works at Spa Glen, Mallow, Co. Cork	Case is due to be decided by 17/02/2025
21/5714	The Board of Management of St Mary's Secondary School Mallow	The construction of new prefabricated school building incorporating 4 general classrooms, office and toilet facilities, connection of foul and surface water sewer systems, relocation of existing car parking to existing tennis court along with all ancillary site works.	Application granted and currently under construction.
24/5530	Hallmark Building Services Ltd.	Construction of Creche to serve development at Annabella to replace previously permitted creche. Submitted 13/08/2024	Currently being assessed by Cork County Council.
23/5952	Stringblue Limited	Strategic Housing Development (SHD) Extension of Duration Application for 148 no. residential units and a creche. Original application: ABP 301429-18, amended by ABP 311986-21	Granted 17th January 2024.
22/6156	Scoil Aonghusa CNS, Kingfort Avenue, Castlepark Village, Castlelands, Mallow	Extension to Scoil Aonghusa CNS, Kingsfort Avenue, Castelpark Village, Castlelands	Appeal withdrawn 22 March 2024)
22/4676	Brookhill Investments Mallow Limited	96 no. dwelling units at Old Course Spa Glen, Mallow	Appeal withdrawn 22 March 2024)
244243; ABP-320525-24	O'Flynn Construction Co. Unlimited Company	186 no. residential units at Spa Glen, Mallow, Co. Cork	Granted July 2024, Appealed. Decision Due: 02/12/2024
ABP 312640	Reside Capital Limited	299 no. residential units at Annabella	Development permitted

226225	Boar's Head Limited	53 no. residential units at Ballydaheen Road, Ballydahin, Mallow	Development permitted

The cumulative operational impact of the proposed development and other consented development are considered to be slight with regards to services, infrastructure, and utilities with the proposed mitigation measures being implemented and monitored.

12.10 Mitigation

This section addresses the measures to be implemented during the construction and operational phases of the development to mitigate the potential impacts outlined earlier in this chapter.

12.10.1 Construction Phase Mitigation

A Construction and Environmental Management Plan (CEMP) has been prepared and submitted with this application. The final CEMP, which will include any additional construction phase mitigation measures required pursuant to conditions attached to any grant of permission, along with all measures currently set out in the CEMP, will be implemented in full. Site inductions for all construction staff and sub-contractors aim to ensure all are aware of the procedures and best practices as outlined in the CEMP.

Control measures shall be put in place to protect surface waters from contamination prior to the commencement of any site works. Control measures will also be provided to control surface run-off during the construction phase. These proposed measures follow best practice and are set out in full in the CEMP.

12.10.2 Operational Phase Mitigation

All installed assets including watermain, foul, storm and utility services will be and surveyed prior to being made operational. In relation to stormwater assets this will include pressure testing. Irish Water assets (i.e. – foul sewer and watermain) will be tested in accordance with the codes of practice prior to being commissioned by Irish Water. The purpose of this will be to identify any possible defects. Any defects will be made good prior to operation.

Waste generated by the development during operation will be removed by licensed waste contractors only and in accordance with the Operational Waste Management Plan, submitted with the application.

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into the proposed dwellings to reduce water volumes entering the foul water network. This measure will also reduce the demand on the public water supply.

The proposed storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc.

Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS measures and an attenuation system on site prior to final discharge at Qbar greenfield run-off rates. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site). Surface

water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control devices (Hydrobrakes or equivalent) The storm water network and infiltration basin are designed to accommodate the 100-year return period plus an additional 20% to account for the effects of climate change.

12.11 Residual Impact Assessment

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium, and long-term permanent, temporary, positive, and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

12.11.1 Construction Phase

In the absence of mitigation, potential impacts associated with the construction phase of the proposed development would be expected to include potential disruption to local natural and human material assets resulting in both short-term and long-term impacts. In circumstances where the proposed mitigation measures referenced in this chapter are effectively implemented for this development, the residual impacts on material assets will be short term and slight during the construction phase.

12.11.2 Operational Phase

The proposed development will have a long-term positive impact on the existing environment by creating high quality residential units to cater for the needs of a growing population and responding to a significant housing need and demand in the locality and the region, while occupying a presently underutilised zoned site at an appropriate location for sustainable development.

The predicted wastewater generation of the proposed development will be adequately accommodated in the local foul sewer network, as confirmed in the Confirmation of Feasibility from Irish Water.

In relation to water supply, the Confirmation of Feasibility from Irish Water confirms a water connection is feasible.

A 'Design Acceptance Statement' from Irish Water has been received for both the foul sewer design and water supply design and is submitted with the application.

In relation to stormwater the proposed development is designed to comply with the provision of SUDS and is therefore unlikely to have any residual impacts in terms of the impact on surface water drainage.

The proposed development is unlikely to have any significant impact on the local electricity, telecommunications, or public lighting supply.

Where the proposed mitigation measures referenced in this chapter are effectively implemented for this development, the residual impacts on these material assets will be long-term and neutral.

12.11.3 Cumulative Impact

Cumulatively with other surrounding, permitted, planned and existing development, it is predicted that the proposed development will contribute to the improvement of the overall urban structure and fabric, will benefit the surrounding area through improvements to the public realm and both cyclist and pedestrian infrastructure. Where the mitigation measures referenced in this chapter have been implemented the cumulative effects of development on electrical supply, telecoms, wastewater generation, water supply and stormwater runoff are anticipated to be long-term and neutral.

12.12 Risk of Major Accidents or Disasters

The were no Major Accidents or Disasters in the proposed development site.

12.13 Significant Interactions

All interactions covered in previous section of the chapter.

12.14 References & Sources

Proposed DOSA Surface Water Drainage Drawings

Proposed DOSA Wastewater Drainage Drawings

Proposed DOSA Water Supply Drawings

DOSA Infrastructure Report

DOSA Surface Water Management Plan

Kelliher Electrical Public Lighting Drawings & Report

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 13

Biodiversity

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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13 Biodiversity

13.1 Introduction

Enviroguide Consulting was commissioned by Reside (Castlepark) Ltd to prepare this Biodiversity Chapter in relation to an Environmental Impact Assessment Report (EIAR) prepared for Castlelands Large-Scale Residential Development (LRD) (hereafter referred to as the 'Proposed Development'), at Castlelands, Mallow, Co. Cork (hereafter referred to as 'the Site'). Where referring to the applicant's entire landholding, this will be clearly stated in text.

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on lands at Castlelands, Mallow, Co. Cork. It should be read in conjunction with the other relevant Chapters of the EIAR to be submitted with the planning application for this project.

13.2 Expertise & Qualifications

All surveying and reporting for this chapter have been carried out by qualified and experienced ecologists and environmental consultants with Enviroguide Consulting. CBH, Ecologist with Enviroguide, undertook the initial habitat & flora, fauna surveys, desktop research and report writing for this Report. Enviroguide Ecologists GK and EJD assisted CBH in undertaking the bat surveys at the Site. TR carried out an additional site survey in July 2024, and SH provided updates to the report in accordance with the findings.

CBH is an experienced Ecologist with Enviroguide and has a BSc. (Hons) in Wildlife Biology from Munster Technological University (formerly ITT). CBH has a wealth of experience in desktop research, literature review and reporting, as well as practical field and laboratory experience including experience in surveying habitats, plants, bats, birds, mammals, and invasive species. CBH has prepared several Stage I and Stage II AA Reports, as-well as ornithology reports for wind and solar projects. Additionally, CBH has prepared and supported the preparations of several Biodiversity Chapters for Environmental Impact Assessment Reports (EIAR) and is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

GK is a former Graduate Ecologist with B.Sc. (Hons) in Zoology from University College Cork who has experience in data collation, field surveys and report writing (including experience with GIS). GK has experience in completing Stage I AA Reports and has supported the preparation of various ecological reports.

EJD, is a former Project Ecologist with Enviroguide, is an experienced ecologist with an extensive breadth of experience in habitat surveying, plant and ecosystem science and research, and environmental sustainability. EJD completed a PhD in Plant Nutritional Variation, Climate Change, and Consumer Ecology at Leiden University in the Netherlands, holds an MSc in Environmental Archaeology (Botany) from University College London, an MSc in Environmental Sustainability from University College Dublin, and ecological and environmental research experience at the University of Cambridge, University College Dublin, TU Dublin, the Nutritional and Isotopic Ecology Lab at the University of Colorado Boulder, and environmental policy/Sustainability/ESG experience at the Department of Environment, Food and Rural Affairs (DEFRA), the Office of Electricity and Gas Markets

(Ofgem), and various other institutions. EJD has a wealth of experience in desktop research, literature scoping-review, and report writing, as well as practical field experience (habitat surveys, invasive species surveys and botanical surveys and bat surveys). Additionally, EJD both has experience, and is academically trained, in compiling Biodiversity Chapters of EIARs, full EIARs (including archaeology, natural/cultural heritage, landscape assessment alongside ecology/biodiversity considerations), AA reports and NIS reports, and in the overall assessment of potential impacts to ecological receptors from a range of developments.

TR has a B.Sc. in Environmental and Natural Resource Management (Hons) and a Post-Graduate Diploma in Environmental Management with GIS. TR is an experienced Ecologist who has specialised in ornithology and terrestrial mammals with over 8 years' experience in ecological consultancy along with a lifetime of personal interest and experience in wildlife management. TR has extensive field experience with further experience and competencies in desktop research, preparing AA Screening Reports (AA), Ecological Impact Assessment Reports (EcIAs), Bird Activity Reports and detailed Species-Specific Maps. His ability to deal with and understand a range of species, survey methods and habitats is excellent, having an in-depth knowledge and understanding of EU and Irish legislation.

SH has a B.Sc. (Hons) in Zoology and a Ph.D. in Marine Ecology from University College Dublin, and a wealth of experience in desktop research, bioinformatics analyses, literature review and reporting, as well as practical field and laboratory experience including habitat mapping, invasive species surveys, terrestrial fauna surveys (incl. mammal presence and bat activity surveys), freshwater and marine fish surveys and environmental DNA analysis. SH has prepared several Stage I and Stage II Appropriate Assessment Reports and Ecological Impact Assessments (EcIA). Additionally, SH has authored and supported the preparations of several Biodiversity Chapters for Environmental Impact Assessment Reports.

13.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Site Location and Project Description' of this EIAR.

The Proposed Development will include the construction of c. 469 no. residential units, a creche, an interpretive centre/café, and all associated site development works including landscaping, amenity spaces, boundary treatments and parking.

The Site's surface water management infrastructure has been designed by DOSA Consulting Engineers in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) which requires that the following design criteria be applied to all sites:

1. River water quality protection
2. River regime protection
3. Level of (surface) flooding for the Site
4. River flood protection

Following a comprehensive review of the above, the design approach for this project is detailed in the Infrastructure Report (DOSA, 2024), and includes the following Sustainable Drainage Systems (SuDS) embedded in the project design:

- Permeable Pavements
- Greenroofs
- Rainwater Harvesting
- Tree Pits
- Attenuation Tanks
- Flow Control Device
- Petrol Interceptor
- Swales
- Management Train

(DOSA Consulting Engineers, 2023a)

13.3.1 Aspects Relevant to this Assessment

13.3.1.1 Site Location

The Site of the Proposed Development comprises a greenfield site located at Castle Park in the townland of Castlelands, Mallow, County Cork. The Site lies just east of Mallow town centre and is situated 26km northeast of Cork City. The Site currently comprises several agricultural fields and associated vegetated boundaries. The national road N20 runs ca.1km to the west of the Site, connecting the cities of Cork and Limerick, with St. Joseph's (L1220) local road present to the north. The Site is bound by agricultural fields to the northeast, east, and residential lands to the north and west. The applicant's landholding comprises a public park which runs adjacent to the Blackwater River to the south, however it should be noted that this park is not within the developable area of the application Site. To the west of the Site, there is an existing housing estate which provides an access point into the scheme via Kingsfort Avenue. St. Joseph's local road will provide a second access point to the scheme further north.

The Site of the Proposed Development is located within Land Use Zoning consisting of residential zoned land parcel MW-R-01, 'Residential' zoned land and 'Green Infrastructure' zoned Land within the Cork County Development Plan 2022-2028.

The location of the Site is presented in Figure 13-1 below.

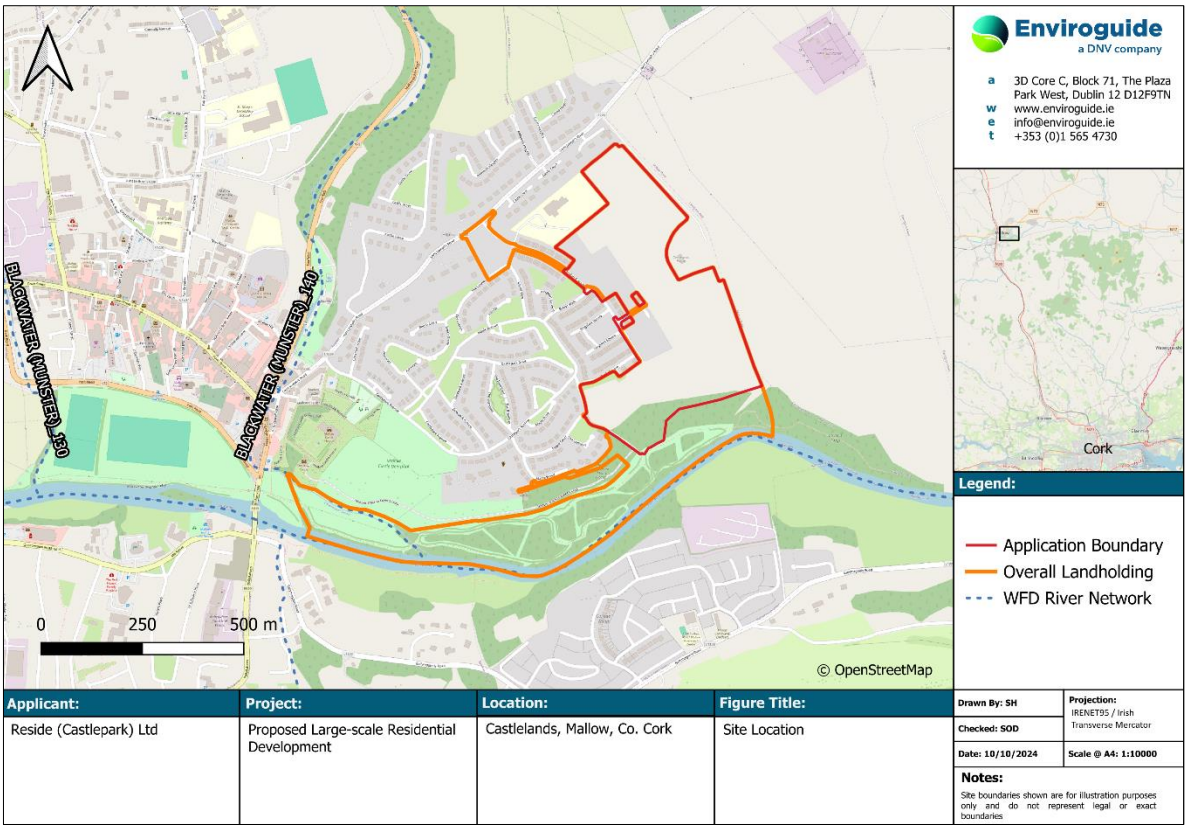

Figure 13-1: Showing the Location of the Proposed Development Site.

13.3.1.2 Description of the Construction Phase

Given the size of the Proposed Development, all construction works will occur in a phased process. However, the entire Construction Phase will comprise the following elements:

- The works will involve the excavation of materials to facilitate the works.
- A site compound containing; site offices, canteen and toilet/changing facilities, temporary water supplies and wastewater disposal to the existing foul sewer network.
- Site access for the entirety of the Construction Phase will be via St. Joseph's Road, per the Site compound location shown in Figure 13-2.
- A secure compound and containers for storage of materials and plant;
- Temporary vehicle parking areas.
- A contained area for machinery refuelling and construction chemical storage.
- A contained area for washing out of concrete and mortar trucks.
- Security/heras fencing will be provided at the main site entrance and around all boundaries as required.
- Appropriate signage will be positioned at approach roads to the Site area so as to inform the public of the Site activities. Public access will not be permitted to the Site.
- All vehicles and personnel will be checked on entry to ensure no unauthorised access or fly-tipping.
- Water supply for the construction facilities will be taken from the mains supply which is adjacent to the Site in the existing Castlelands estate. Power for the pumps and small power requirements for construction activities will be supplied from diesel generators until the permanent site power supply is available.

For the duration of the Construction Phase, it is envisaged that the maximum working hours shall be 08:00 to 17:30 Monday to Friday (excluding bank holidays) and 08:00 to 14:00 Saturdays, and 08:00 to 14:00 periodically on Sundays & Bank Holidays.

On occasion, it may be necessary to carry out noisy activities outside of normal working hours. In such instances, prior consultation will be carried out with Cork County Council and local residents outlining the nature and reason for the works and their expected duration.

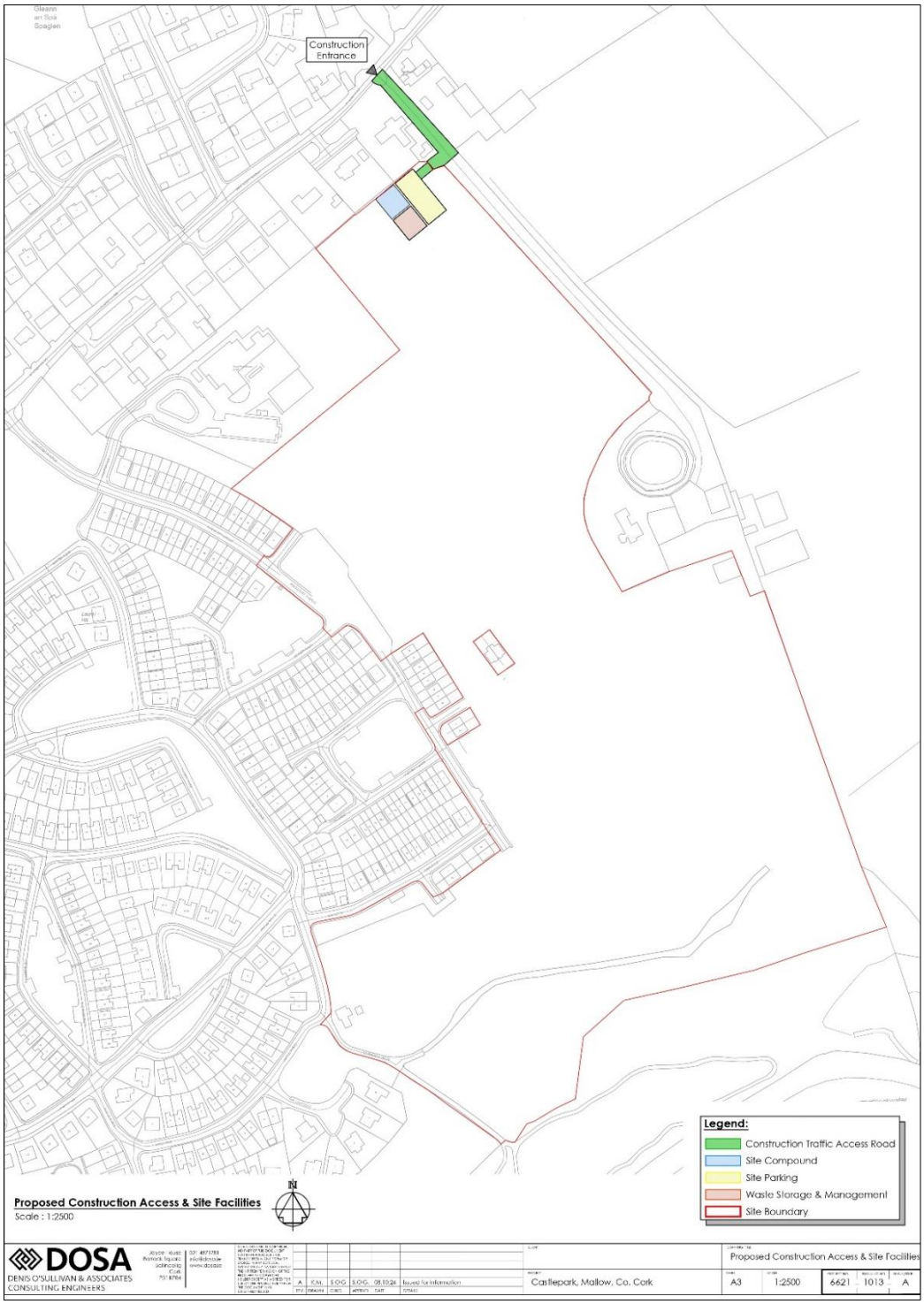

Figure 13-2. Site access point and location of Site compound (source: DOSA drawing 6621-1013-A)

13.3.1.3 Description of the Operational Phase

The Operational Phase will comprise residential and commercial use that is consistent with the neighbouring land use in the area.

13.3.1.4 Drainage and Water Supply

13.3.1.4.1 Surface Water

The Site slopes naturally to the south, towards the Blackwater River. The subject lands are drained naturally and have the benefit of direct access to the public stormwater network in the existing estate. The lands directly abut a stormwater network already laid within the existing estate along Kingsfort Avenue, Maple Square and Maple Avenue which outfalls directly into the River Blackwater as outlined in Figure 13-3 below. Prior to entering the existing system, the stormwater generated will be treated through a number of nature-based solutions in line with adopted SuDs measures.

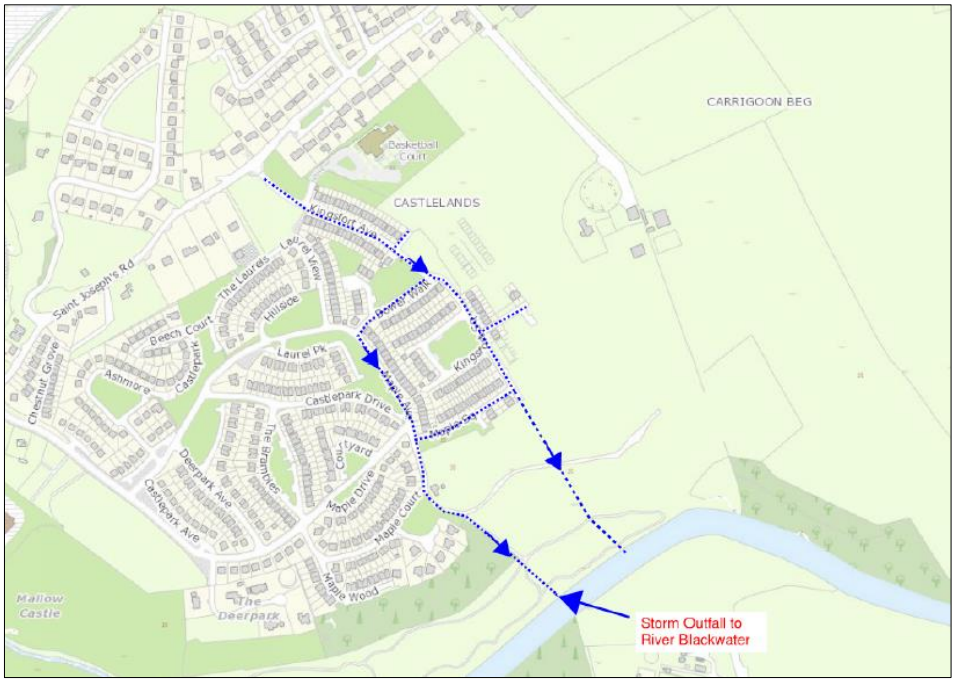

Figure 13-3: Showing the location of the Stormwater Outfall to the Blackwater River from the residential estate adjacent to the Proposed Development (DOSA Consulting Engineers, 2024a).

The proposed surface/storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc.

Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS and attenuated/managed on site prior to final discharge at Qbar greenfield run-off rates.

Surface water discharge rates from the proposed surface water drainage network will be controlled by a vortex flow control device (Hydrobrakes or equivalent) and associated attenuation tanks. Surface water discharge will also pass via a full retention fuel/oil separators (sized in accordance with permitted discharge from the site).

The proposed surface water drainage network will collect surface water runoff from the Site via a piped network prior to discharging off site via the attenuation tanks, flow control devices and separator arrangement as noted above. Prior to entering the existing system, the stormwater generated will be treated through a number of nature-based solutions in line with adopted SuDS measures**.**

13.3.1.4.2 SuDS Measures

The Site's surface water management infrastructure has been designed by DOSA Consulting Engineers in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) which requires that the following design criteria be applied to all sites:

1. River water quality protection
2. River regime protection
3. Level of (surface) flooding for the Site
4. River flood protection

Following a comprehensive review of the above, the design approach for this project is detailed in the Infrastructure Report, and includes the following Sustainable Drainage Systems (SuDS) (DOSA Consulting Engineers, 2024a):

- Permeable Pavements
- Greenroofs
- Rainwater Harvesting
- Tree Pits
- Attenuation Tanks
- Flow Control Device
- Petrol Interceptor
- Swales
- Management Train

The above SuDS measures are incorporated into the surface water design of the Proposed Development as standard practice and as required by the current Cork County Development Plan (CDP) 2022-2028 objective WM 11-10.

13.3.1.4.3 Foul Drainage

The Proposed Development will be connected to the foul sewer network that is already laid within the existing estate along Kingsfort Avenue, Maple Square and Maple Avenue. There is a 225mm gravity foul sewer south of Castlelands estate, terminating at Riverbank Walk. All foul waters entering the network will be treated at Mallow WWTP.

As noted in the conclusions of the assimilative capacity assessment of Environmental Limit Values (ELVs) for the Wastewater Treatment Plant (WwTP): "*Given the proposed stringent ELV's and the network upgrades, the operational discharges will support appropriate water chemistry conditions and will therefore not hinder the restoration of the conservation objectives (and FPM Regulation standards) for macroinvertebrates, filamentous algae, phytobenthos, macrophytes and siltation. Thereby ensuring that the Ecological Quality Objectives as set out in the fourth schedule of the European Communities Environmental Objectives (Fresh Water Pearl Mussel) Regulations (S.I. No. 296 of 2009) can be maintained.*" Thus, it should be noted that the Mallow WWTP upgrade works are complete and

have capacity for the Proposed Development connection to the existing network. The facility is currently operational with the upgrades in place and is pending their amended licence from the EPA.

13.3.1.5 Landscape Plan

The proposed landscaping of the Site has been prepared by Simon Ronan Landscape Architects (SRLA, 2024). The landscape plan incorporates three design pillars, which respond to the uniqueness of place and the existing site sources, these are: Ecology and Biodiversity, Connectivity, and Community.

The masterplan showcases an ecological approach, incorporating sustainable features such as rainwater harvesting, native plantings, and wildlife-friendly habitats, promoting a harmonious coexistence between residents and the environment. Community spaces, including the Central Park and the Great Lawn, provide a vibrant heart for social interactions and shared experiences. With its emphasis on preserving the rich heritage of Castlelands, the landscape offers an idyllic and sustainable living experience for residents. The Greenway is the central spine of the entire project, bringing nature in the core of the Development and allowing a fluent interconnection between all the different landscape moments. The landscape design provides for the following key features, all of which are connected throughout:

- The perseveration of an Archaeological Site to the West;
- Inclusion of lawns and meadow grassland;
- Urban park;
- Playground;
- Shared surfaces;
- Nature park;
- Greenway;
- North park;
- Private gardens;
- Allotments, and;
- A sports area.

The Landscape Plan includes the reinstatement of trees and grassland habitat lost due to Construction works. Whilst higher value trees will be retained, the majority of new trees planted as part of the Proposed Development will be native species and will comprise a mix of species already present on Site (Figure 13-4). In addition, the Proposed Development Site is located at a setback of 80m from the Blackwater River, and associated SAC, with the existing public park to the south intervening. The proposed nature park to the south of the Development, and the intervening public park directly south effectively provide a natural buffer between the Proposed Development Site and this important watercourse.

Figure 13-4: Proposed Landscape Master Plan (SRLA, 2024).

13.3.1.6 Lighting Plan

The Operational Phase Lighting Plan for the Proposed Development is prepared by Kelleher Electrical is provided Figure 13-5 (north) and Figure 13-6 (south) below.

Figure 13-5: Proposed Lighting Plan (North) (1 of 2) (DOSA, 2024).

Figure 13-6: Proposed Lighting Plan (South) (2 of 2) (DOSA, 2024).

13.4 Methodology

13.4.1 Relevant Legislation & Guidance

EIA Directive 2011/92/EU was enacted as a means to assess the effects of projects on the environment, and to ensure that any potential significant effects are assessed before a project proceeds. Annex I of Directive 2011/92/EU, as amended by Directive 2014/52/EU defines mandatory projects that require an EIAR (formerly EIS) and Annex II lists projects which do not necessarily have significant effects but can be subject to case-by-case analysis or thresholds to be determined by member states. Section 172 of the Planning and Development Act 2000, as amended, provides the legislative basis for mandatory EIA. It states the following:

"An environmental impact assessment shall be carried out by the planning authority or the Board, as the case may be, in respect of an application for consent for proposed development where either —

(a) the proposed development would be of a class specified in —

(i) Part 1 of Schedule 5 of the Planning and Development Regulations 2001, and either —

(I) such development [would equal or exceed, as the case may be,] any relevant quantity, area or other limit specified in that Part, or

(II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

(ii) Part 2 [(other than subparagraph (a) of paragraph 2)] of Schedule 5 of the Planning and Development Regulations 2001 and either —

(I) such development [would equal or exceed, as the case may be,] any relevant quantity, area or other limit specified in that Part, or

(II) no quantity, area or other limit is specified in that Part in respect of the development concerned,

or

(b) (i) the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 but F594 [does not equal or exceed, as the case may be,] the relevant quantity, area or other limit specified in that Part, and

(ii) it is concluded, determined, or decided, as the case may be, —

(I) by a planning authority, in exercise of the powers conferred on it by this Act or the Planning and Development Regulations 2001 (S.I. No. 600 of 2001),

(II) by the Board, in exercise of the powers conferred on it by this Act or those regulations,

(III) by a local authority in exercise of the powers conferred on it by regulation 120 of those regulations,

(IV) by a State authority, in exercise of the powers conferred on it by regulation 123A of those regulations,

(V) in accordance with section 13A of the Foreshore Act, by the appropriate Minister (within the meaning of that Act), or

(VI) by the Minister for Communications, Climate Action, and Environment, in exercise of the powers conferred on him or her by section 8A of the Minerals Development Act 1940, that the proposed development is likely to have a significant effect on the environment."

In some cases, Member States have also established "exclusion" or "negative" lists specifying thresholds and criteria below which EIA is never required or below which a simplified EIA procedure applies. There may be exceptions to the negative thresholds, for example, for projects in defined sensitive locations. Such exceptions will apply in the case of Habitats Directive assessments. The use of exclusion lists, defining thresholds below which EIA is never required, is extremely limited in the EU Member States. In Ireland, the thresholds are defined in Article 120 of the Planning and Development Regulations 2001-2022.

Schedule 5 of the Planning and Development Regulations 2001-2022 outlines the legislative requirements deeming whether a project requires a mandatory EIA. Projects that automatically require an EIA included in Annex 1 are listed in Part 1 of Schedule 5 to the Planning and Development Regulations. Projects that are assessed either on a case-by-case examination or on the basis of set mandatory thresholds are defined under Annex II of the Directive, and these are transposed in Irish legislation in Schedule 5, Part 2 of the Planning and Development Regulations.

13.4.1.1 National Legislation

13.4.1.1.1 The Wildlife Acts 1976, and amendments

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. With regard to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all wild birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

The current list of plant species protected by Section 21 of the Wildlife Act, 1976 (and amendments) is set out in the Flora (Protection) Order, 2022 (S.I. No. 235/2022). The Flora (Protection) Order affords protection to several species of plant in Ireland. This Act makes it illegal to cut, uproot or damage the listed species in any way, or to offer them for sale. This prohibition extends to the taking or sale of seed. In addition, it is illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.

13.4.1.1.2 EC (Birds and Natural Habitats) Regulations 2011

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats Directive, any person who, in regard to the listed species, *"Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence."*

13.4.1.1.3 Designated Nature Conservation Sites

Sites of national importance for nature conservation include Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs). According to the National Parks and Wildlife Services (NPWS, 2023);

- *"Prior to statutory designation, pNHAs are subject to limited protection, in the form of:*
- *Agri-environmental farm planning schemes such as Rural Environment Protection Scheme (REPS 3 and 4) and Agri Environmental Options Scheme (AEOS) continue to support the objective of maintaining and enhancing the conservation status of pNHAs.*
- *Forest Service requirement for NPWS approval before they will pay afforestation grants on pNHA lands.*
- *Recognition of the ecological value of pNHAs by Planning and Licencing Authorities. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation."*

Sites designated for international importance are discussed in Section 13.6.3 below

13.4.1.1.4 Invasive Species Legislation

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to 3 years, or both.

Extracts from the relevant sections of the regulations are reproduced below.

"49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht], any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace [a restricted non-native plant], shall be guilty of an offence.

49(3) … it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.

50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she […] offers or exposes for sale, transportation, distribution, introduction, or release—

(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,

(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or

(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material."

13.4.1.2 International Legislation

13.4.1.2.1 EU Birds Directive

The Birds Directive constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland and a total of 153 Special Protection Areas have been designated.

13.4.1.2.2 EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approximately 1000 species throughout Europe. The habitats and species are listed in the Directives annexes, where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive form a network of protected sites called Natura 2000. An Appropriate Assessment is required under Article 6 of the Habitats Directive where a project or plan may give rise to significant effects upon a European site. This is dealt with further in the AA Screening Report and accompanying this application.

13.4.1.2.3 Water Framework Directive (WFD)

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second cycle ran from 2016 – 2021, and the third cycle (current) runs from 2022-2027.

The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least 'good' ecological status, through River Basin Management Plans (RBMP), by 2027. The latest 'Water Action Plan: A River Basin Management Plan for Ireland', was published on the 3rd of September 2024[1]. The Plan is required under the Water Framework Directive for the period 2022-2027

[1] River Basin Management Plan 2022 – 2027 is available to view on gov.ie - River Basin Management Plan 2022 - 2027 (www.gov.ie)

13.4.1.2.4 Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced to give protection to migratory species across borders in Europe.

13.4.1.2.5 Ramsar Convention

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994 Ha.

13.4.1.3 Relevant Plans and Policies

13.4.1.3.1 Cork County Development Plan (2022-2028)

While the County Development Plan in its entirety is relevant to this Development and can be referred to separately. Policies, principles and objectives of the Cork County Development Plan (CCDP) 2022 – 2028 that are of particular relevance to this chapter are outlined in this section.

Volume 1 of the CCDP (2022-2028) comprises the main policy material for the CDP, with the following chapters being of particular relevance to this chapter:

- Chapter 14 – Green Infrastructure and Recreation
- Chapter 15 – Biodiversity and the Environment
- Chapter 16 – Built and Cultural Heritage

Chapter 14 lists a number of objectives concerning green (and blue) infrastructure and recreation, which can be referred to. However, the countywide objectives for green and blue infrastructure, which underpin these objectives, include (GI-14-1):

- Create an integrated and coherent green infrastructure for the County by encouraging the retention and strengthening of substantial networks of green space in urban, urban fringe and the wider countryside to serve the needs of communities now and in the future and as a key contributor to climate mitigation and climate adaptation.
- Develop the green infrastructure network (including green corridors) to ensure the conservation and enhancement of biodiversity, including the protection of Natura 2000 European Sites, the provision of accessible parks, open spaces and recreational facilities (particularly within settlements), the sustainable management of water, the maintenance of landscape character and the protection and enhancement of architectural and archaeological heritage.
- Capitalise on and highlight the multifunctional benefits/opportunities (ecosystem services) that green and blue infrastructure can present. Seek to advance the use of nature based solutions as an alternative to traditional infrastructure. Seek to advance an ecosystem services approach and ecosystem services valuation as a decision-making tool in plans and projects.
- Recognise rivers and streams (and their wider riparian corridors) as one of the natural foundations for multi-functional green and blue infrastructure corridors. Seek to strengthen ecological linkages which watercourses have with other water dependent habitats as well as with hedges/treelines, woodland and scrub in the wider landscape.

- Ensure that all settlements have an adequate level of quality green and recreational infrastructure (active and passive) taking into account existing deficits, planned population growth as well as the need to serve their surrounding hinterlands.
- Achieve a net gain in green infrastructure through the protection and enhancement of existing assets and through the provision of new green infrastructure as an integral part of the planning process. Encourage the provision of different green infrastructure elements, such as trees in urban areas and green roofs in town centres, so that a net gain in green infrastructure is achieved over the lifetime of this Development Plan.
- Seek to increase investment in green infrastructure provision and maintenance by accessing relevant EU funding mechanisms and national funding opportunities including tourism related funding.
- Integrate the provision of green infrastructure with infrastructure provision and replacement, including walking and cycling routes, as appropriate, while protecting biodiversity and other landscape resources.
- Support initiatives and programmes which seek to strengthen the green and blue infrastructure and work with communities and other stakeholders in furthering the green and blue infrastructure concept.

The following objectives are outlined in Chapter 15 in relation to protecting biodiversity and the environment:

- BE-15-1: To support and comply with national and biodiversity protection policies.
- BE-15-2: To protect sites, habitats, and species.
- BE-15-3: Local Authority Plan making;
    - Ensure that biodiversity issues are considered at the earliest possible stages of plan making;
    - Ensure that plans and strategies comply with nature conservation legislation and policy as required, and;
    - Carry out ecological impact assessment of plans and strategies as appropriate.
- BE-15-4: Local authority development and projects;
    - Ensure that biodiversity protection is considered at design stage for works and development planned and progress in Cork County Council and that all such projects comply with nature conservation legislation and policy as required;
    - Fulfil appropriate assessment and environmental impact assessment requirements and carry out ecological impact assessments in relation to local authority plans and projects as appropriate.
- BE-15-5: Biodiversity on council owned land and managed land and property
- BE-15-6: Biodiversity and new development.
- BE-15-7: Control of invasive alien species.
- BE-15-8: Trees and Woodlands.
- BE-15-12: Air Quality.
- BE-15-13: Noise and light emissions.
- BE-15-17: Waste prevention and management.

The following objectives are outlined in Chapter 16 in relation to protecting built and cultural heritage:

- HE-16-1: County Heritage Plan;

    - To continue to implement the county heritage plan (2005) in partnership with relevant stakeholders and any successor of this document.
- HE-16-9: Archaeology and infrastructure schemes.
- HE-16-10: Management of monuments within development sites.
- HE-16-16: Protection of non-structural elements of built heritage;
    - Protect non-structural elements of built heritage. These can include designed garden/garden features, masonry walls, railings, follies, gates, bridges, shopfront and street furniture.
- HE-16-18: Architecture and conservation areas; Conserve and enhance the special character of the Architectural Conservation Areas included in this Plan. The special character of an area includes its traditional building stock, material finishes, spaces, streetscape, shopfronts, landscape and setting. This will be achieved by;
    - Protecting all buildings, structures, groups of structures, sites, landscapes and all other features considered to be intrinsic elements to the special character of the ACA from demolition and non-sympathetic alterations.
    - Promoting appropriate and sensitive reuse and rehabilitation of buildings and sites within the ACA and securing appropriate infill development.
    - Ensure new development within or adjacent to an ACA respects the established character of the area and contributes positively in terms of design, scale, setting and material finishes to the ACA.
    - Protect structures from demolition and non-sympathetic alterations.
    - Promoting high quality architectural design within ACAs.
    - Seek the repair and re-use of traditional shopfronts and where appropriate, encourage new shopfronts of a high quality architectural design.
    - Ensure all new signage, lighting advertising and utilities to buildings within ACAs are designed, constructed and located in such a manner they do not detract from the character of the ACA.
    - Protect and enhance the character and quality of the public realm within ACAs. All projects which involve works within the public realm of an ACA shall undertake a character assessment of the said area which will inform a sensitive and appropriate approach to any proposed project in terms of design and material specifications. All projects shall provide for the use of suitably qualified conservation architects/designers.
    - Protect and enhance the character of the ACA and the open spaces contained therein. This shall be achieved through the careful and considered strategic management of all signage, lighting, utilities, art works/pieces/paintings, facilities etc to protect the integrity and quality of the structures and spaces within each ACA.
    - Ensure the protection and reuse of historic street finishes, furniture and features which contribute to the character of the ACA.

In addition to the above, policies and objectives of the Cork County Development Plan 2022 – 2028 (Volume three – North Cork) (CCDP) that are of relevance to this NIS Report are outlined in Section 2.4, those of particular note are listed below:

- Sustainable population growth and supporting development in Mallow, while securing the objectives of the relevant River Basin Management Plan, and the River Blackwater Special Area of Conservation (MW-GO-02).
- New development should be sensitively planned and designed to protect the green infrastructure, biodiversity, and landscape assets of Mallow town (MW-GO-03).
- All new development will need to make provision for Sustainable Urban Drainage Systems (SuDS) and provide adequate storm water infrastructure. Surface water Management and Disposal should be planned in an integrated way in consideration with land use, water quality, amenity and habitat enhancements as appropriate (MW-GO-04).
- Protect and enhance the habitat, landscape, visual and amenity qualities of the River Blackwater and its flood plain so that they can contribute to the environmental diversity of the area for future generations and be used for recreation and other compatible uses during the lifetime of the Plan (MG-GO-13).
- All proposals for development within the areas identified as being at risk of flooding will need to comply with Objectives in this Plan. In planning development located upstream of/adjacent to the defended area in Mallow, due regard must also be had to the potential flood impacts of development, and its potential impact on the defended area in particular (MW-GO-14).

13.4.1.3.2 The Cork County Biodiversity Action Plan (2014-2019)

The Cork County Biodiversity Action Plan (2014-2019) is set out to protect and improve biodiversity through the following aims, objectives and action plans:

- Objective 1 – To review biodiversity information for County Cork and to prioritise habitats and species for conservation action.
- Objective 2 – To collect data and use it to inform conservation action and decision making.
- Objective 3 – To incorporate positive action for biodiversity into local authority actions and policy.
- Objective 4 – To promote best practice in biodiversity management and protection.
- Objective 5 – To facilitate the dissemination of biodiversity information.
- Objective 6 – To raise awareness of County Cork's biodiversity and encourage people to become involved in its conservation.

Note that this Action Plan has not been updated since its term, however the Planning Authority intends to commence the process of reviewing the County Biodiversity Action Plan within 12 months of the adoption of the County Development Plan.

13.4.1.4 Relevant Guidance

The guidance documents that have been taken into account in conducting this assessment include the following:

- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management' (OPR, 2021a)
- OPR Practice Note PN02 Environmental Impact Assessment Screening (OPR, 2021b).
- Guidelines for planning authorities and An Bórd Pleanála on carrying out an environmental impact assessment (DHPLG, 2018).

- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, (CIEEM, 2018).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports Environmental Protection Agency (EPA, 2022).
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009a).
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008b).
- Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council. (Smith et al., 2011).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition) (Collins, 2016).
    - Note that updated guidance was released in late 2023 (Collins, 2023) and has been applied to this chapter where applicable. Further details in section 13.4.2.3.4.
- Bat Mitigation Guidelines for Ireland (Kelleher and Marnell, 2022).
- Guidance Note 08/18. Bats and Artificial Lighting in the UK - Bats and the Built Environment series (ILP, 2018).
- Guidelines on The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (Now Transport Infrastructure Ireland - TII) (NRA, 2010)
- The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020).

13.4.2 Site Surveys/Investigation

13.4.2.1 Assessment Methodology

This section details the steps and methodology employed to undertake an Ecological Impact Assessment of the Proposed Development.

13.4.2.1.1 Scope of The Assessment

The aims of the Biodiversity Chapter are to:

- To establish baseline ecological conditions and determine the ecological value of ecological features identified;
- To identify potentially important ecological features within the zone of influence of the project;
- To assess the significance of potential impacts, direct or indirect, on ecological features owing to the project;
- To identify avoidance, mitigation, or compensatory measures;
- To identify residual impacts, if any, after implementation of avoidance measures, and the significance of their effects; and
- Where possible, to identify opportunities for ecological enhancement and achieve an overall biodiversity net gain at the Site.

13.4.2.1.1.1 Zone of Influence (ZOI)

The ‘zone of influence’ (ZOI) for a project is the area over which ecological features may be affected by changes as a result of the Proposed Development and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the

site boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change. Given the nature and surrounding landscape of the Proposed Development, the ZOI is regarded to be relatively limited and within the redline boundary for most ecological receptors (with the exception of designated sites, e.g., European sites, Ramsar sites, Natural Heritage Areas and proposed Natural Heritage Areas – see below).

To determine the ZOI of the Proposed Development for designated sites, reference was made to the OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021), a practice note produced by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for appropriate assessment (AA) during the planning process, and although it focuses on the approach a planning authority should take in screening for AA, the methodology is also readily applied in the preparation of Biodiversity Chapters such as this to identify relevant designated sites potentially linked to the proposed development.

In addition, the guidance document published by the Department of Housing, Planning and Local Government (then DEHLG) 'Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities' (2009) was considered, which recommends an arbitrary distance of 15km as the precautionary ZOI for a plan or project being assessed for likely significant effects on European Sites, stating however that this should be evaluated on a case-by-case basis.

As such, due to the relatively large scale of the Proposed Development, the 15km ZOI is used in this report as an initial starting point for collating designated sites for this Biodiversity Chapter.

The methodology used to identify relevant designated sites comprised the following:

Use of up-to-date GIS spatial datasets for designated sites and water catchments – downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) to identify designated sites which could potentially be affected by the Proposed Development;

- The catchment data were used to establish or discount potential hydrological connectivity between the project boundary and any designated sites.
- All designated sites within the preliminary ZOI (within 15km of the Proposed Development Site) were identified and are shown in Figure 13-8.
- The potential for connectivity with designated sites at distances greater than 15km from the Proposed Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Proposed Development Site and designated sites located at a distance greater than 15km based on the Source-Pathway-Receptor model.
- Table 13-8 provides details of all relevant designated sites as identified in the preceding steps. The potential for pathways between designated sites and the Proposed Development Site was assessed on a case-by-case basis using the Source-Pathway-Receptor framework as per the OPR Practice Note PN01 (March 2021). Pathways considered included:
    - Direct pathways (e.g., proximity (i.e., location within the designated site), water bodies, air (for both air emissions and noise impacts).
    - Indirect pathways (e.g., disruption to migratory paths, 'Sightlines' where noisy or intrusive activities may result in disturbance to shy species.

13.4.2.2 Desktop Study

A desktop study was carried out and finalised in October 2024 to collate and review available information, datasets and documentation sources pertaining to the Site's natural environment. The desktop study relied on the following sources:

- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at www.maps.biodiversityireland.ie ;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.gis.epa.ie ;
- Information on bedrock, groundwater, aquifers, and their statuses, obtained from Geological Survey Ireland (GSI) at www.gsi.ie ;
- Information on the network of designated conservation sites, boundaries, qualifying interests, and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie ;
- Information on the extent, nature, and location of the proposed development, provided by the applicant and/or their design team;
- The current conservation status of birds in Ireland taken from Gilbert et al. (2021).
- Information on planning applications within the vicinity of the proposed development Site available from the Dublin City Council and the National Planning Application Database.
- Information on the network of European sites, relevant boundaries, QIs and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie and the European Environment Agency (EEA) at https://natura2000.eea.europa.eu/ ;
- Information on the status of EU protected habitats and species in Ireland, obtained from the NPWS Article 17 reports;
- Text summaries of the relevant European sites taken from the respective Site Synopses for each site, available at www.npws.ie ;
- Information on underlying soils, obtained from Teagasc or EPAs National Soils Map at https://www.teagasc.ie/ and https://gis.epa.ie/EPAMaps/ ;
- Water quality. Guidance standard on monitoring freshwater pearl mussel (*Margaritifera margaritifera*) populations and their environment (I.S. EN 16859:2017).
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland; and
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and their design team, including information garnered from any site investigations (SI) (for example; any specific hydrological, hydrogeological, flood risk, or Arboricultural assessments) where they were undertaken.

The above list is not exhaustive, and as such, a comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 15, References & Sources.

13.4.2.3 Field Studies

A range of field surveys have been carried out at the Site of the Proposed Development to inform this Biodiversity Chapter. The following sections provide details of the field surveys carried out and a summary of ecological surveys is provided in Table 13-1:.

Table 13-1: Summary of Ecological Field Surveys Carried out at the Site.

Survey	Surveyor(s)	Survey Date
Preliminary Habitat and Invasive Flora Survey	Enviroguide Consulting (CBH, GK)	07th February 2023
Mammal Survey	Enviroguide Consulting (CBH, GK)	07th February 2023
Bird Scoping Survey	Enviroguide Consulting (CBH, GK)	07th February 2023
Preliminary Bat Roost Assessment Survey	Enviroguide Consulting (CBH, GK)	07th February 2023
Bat Roost Emergence Survey (Building C)	Enviroguide Consulting (CBH, GK)	11th May 2023
Bat Roost Emergence Survey (Building A)	Enviroguide Consulting (CBH, GK, EJD)	15th May 2023
Breeding Bird Survey	Enviroguide Consulting (CBH, GK)	15th May 2023
Mammal Survey	Enviroguide Consulting (CBH, GK)	15th May 2023
Habitat and Invasive Flora Survey	Enviroguide Consulting (CBH, GK)	29th May 2023
Bat Roost Emergence Survey (Building A)	Enviroguide Consulting (CBH, GK)	29th May 2023
Site walkover to establish site conditions and to inform surface water mitigation strategy	Enviroguide Consulting (TR)	15th July 2024

While all surveys have been undertaken having regard to best practice guidelines and guidance documentation published by relevant bodies including Transport Infrastructure Ireland (TII), the following sections detail the methodology employed by Enviroguide Consulting during the most recent suite of surveys carried out between February 2023 – May 2023, and an updated walkover survey in July 2024.

13.4.2.3.1 Habitat and Flora Surveys

Ecological walkovers of the Site were conducted on the 07th of February 2023 and the 29th of May 2023 by Enviroguide Consulting. Where possible species compositions and abundance are described using the DAFOR (Dominant, Abundant, Frequent, Occasional or Rare) scale, a simple method of assigning abundance categories to species.

Habitats were categorised to level 3, according to the Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011) published by the Heritage Council, and the National Roads Association (now known as Transport Infrastructure Ireland (TII)) guidance on 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes' (TII, 2009). Habitats within the surrounding area of the proposed development were classified based on views from the Site and satellite imagery where necessary (Google Earth, Digital Globe and OSI). The habitat and flora surveys cover the period considered suitable for such surveys as per the abovementioned guidance (April-October). The surveys also included a search for any rare of protected plant species which may be present at the Site.

13.4.2.3.1.1 Update walkover July 2024

The walkover survey on the 15th of July 2024 examined the existing Site with a view to identifying surface water sensitivities. On-Site conditions were assessed in their current state including topography, vegetation, presence or absence of drainage channels and possible surface water links to the nearby River Blackwater SAC (002170).

In addition, any changes to the previously recorded habitats, flora and fauna were recorded if applicable.

13.4.2.3.2 Invasive Alien Species (IAS) Surveys

Invasive species surveys were incorporated into the ecological walkovers carried out at the Site. During the ecological walkovers conducted in February and May 2023, the location of invasive species, where they were encountered, was documented on the field map or through the use of GPS in the field, along with the extent of the area they cover. The invasive plant species survey primarily focused on plant species that are listed on Schedule III of the European Communities (Birds and Habitats) Regulations and considered to be 'High impact' invasive species e.g., Japanese Knotweed (*Fallopia japonica*). Incidental observations of other terrestrial plant species known to be potentially invasive, such as Buddleia (*Buddleja davidii*), were also recorded.

13.4.2.3.3 Non-volant Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with the habitat and bird surveys. The Site was searched for tracks and signs of non-volant mammals (i.e., mammals which are incapable of flight). Bat surveys were carried out separately and are described below. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. During this survey, the Site was searched for tracks and signs of mammals as per Bang and Dahlstrom (2001).

13.4.2.3.4 Bat Surveys

Note that updated guidance for bat surveys was published at the end of 2023, after the surveys described in this section were carried out (Collins, 2023). To avoid confusion, the methods and results are both aligned with the previous guidance throughout this report, except in cases where the application of the new guidance would significantly alter the interpretation of the results or subsequent impact assessments. In these instances, this will be clearly stated.

13.4.2.3.4.1 Preliminary Bat Roost Assessment

A preliminary bat roost assessment of Potential Roost Features (PRFs) within trees and/or buildings was completed in February 2023, in adherence to best practice guidelines (Collins, 2016 and Marnell et al., 2022).

This was undertaken to determine the suitability of the Site for roosting bats and the potential requirement for further surveys to be undertaken. PRFs can be defined in four broad terms of suitability as detailed below:

- Negligible – No suitable features observed;
- Low – A structure with one or more roost features as used by individual bats or a tree of sufficient size to contain roost features but none observed from the ground;
- Moderate – A structure or tree with one or more roost features and able to support one or more bats but unlikely to support a roost of high conservation status.

- High - A structure or tree with one or more roost features that are obviously suitable for use by a larger number of bats on a regular basis, and potentially for longer periods.

During the inspection, the buildings on Site were inspected internally. Any signs of bat activity were documented including the presence of bats, droppings, feeding remains, or other indicative evidence, were they shown to occur.

13.4.2.3.4.2 Preliminary Habitat Suitability Assessment

The Site was also assessed in relation to potential bat foraging habitat and potential bat commuting routes. Aerial images were assessed so that bat habitats and commuting routes identified were identified and considered in relation to the wider landscape to determine landscape connectivity for local bat populations through examination of aerial photographs. Suitability was assigned as per Table 4.1 in the Bat Conservations Trust's Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016). According to Table 4.1 trees and buildings can present the following suitability ratings:

- Negligible suitability – where there is negligible presence of suitable commuting and foraging features.
- Low suitability – where there are some suitable but isolated commuting and foraging features.
- Medium suitability – where there is continuous habitat connected to the wider landscape that could be used by bats for foraging and commuting.
- High suitability – where there is the presence of continuous high-quality habitat connecting the Site to the wider landscape or other known roosts.

13.4.2.3.4.3 Dusk Bat Activity Emergence Surveys

Survey methodologies followed those of the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).

As per the best practice guidelines (Collins, 2016), activity surveys should be undertaken in the period from May to September. Weather conditions (Collins, 2016) and the time of year (Marnell et al., 2022) must be suitable for bat surveys. Surveys in March, April or October, may be possible if weather conditions allow.

As such, dusk activity surveys were carried out in May 2023, under suitable weather conditions. Further details on the survey timing and weather conditions are available in Appendix I, Survey Details. To comply with best practice guidelines, dusk surveys began 15 minutes before sunset and were sustained for a minimum of 2 hours (Collins, 2016). During the emergence survey bat echolocation calls were recorded using an Elekon Batlogger. The recordings were subsequently analysed to species level, where possible, using BatExplorer analytical software.

Transect activity surveys were not carried out as the habitats were assessed as having negligible commuting and foraging suitability.

13.4.2.3.4.4 Data Analysis

Species were identified from recordings using Elekon's BatExplorer software (Version 2.1.10.1). Bat data was analysed and species assigned to each record with reference to species identification guides such as Russ (2012).

Each record i.e., a sequence of bat calls/pulses, is noted as a bat pass; to indicate the level of bat activity for each species recorded. Each bat pass does not correlate to an individual bat but is

representative of bat activity levels. Some bats such as *Pipistrelle* species may continuously fly around a habitat or feature, therefore, it is possible that a series of bat passes within a similar time frame is representative of an individual bat. On the other hand, Leisler's bats (*Nyctalus leisleri*) tend to travel through an area quickly, and as such, an individual sequence or bat pass is more likely to be indicative of individual bats.

13.4.2.3.5 Breeding Bird Survey

A general (scoping) bird survey of the Site was carried out during the initial walkover in February 2023, with a precautionary approach taken when assessing the likelihood of species recorded at the Site and likelihood to breed therein. The Site was walked with details of all bird species encountered recorded to assess their behaviour and numbers.

A subsequent breeding bird survey was completed at the Site in May 2023. The aim of these surveys was to:

- To assess the potential usage of the Site by breeding birds during the summer months, and;
- To identify any key breeding habitats on Site that may be in use by breeding bird species

The survey methodology has been adapted from the breeding bird survey guidance published by the Bird Survey & Assessment Steering Group (2022) 'Bird Survey Guidelines for assessing ecological impacts. The survey consisted of a combination of walked transects of the Site (being walked at a slow, ambling pace, stopping to scan priority habitat/features where appropriate) and vantage point observation from fixed points, as required.

Generally, surveys of the breeding bird community should start between half an hour before sunrise and half an hour after sunrise. Surveys should typically be concluded by around mid-morning (10–11 am, with some regional variation) as activity levels (and hence detectability) of many species will have tailed off.

13.4.2.3.6 General Fauna Surveys

The Site was assessed for the presence of fauna other than mammals and birds in conjunction with the habitat surveys undertaken at the Site. The Site was searched for signs of aquatic fauna (incl. amphibians, fish and invertebrates), reptiles and rare/endangered invertebrates, and habitats were assessed for their potential suitability for same.

13.4.2.4 Assessment

The value of the ecological resources – the habitats and species present or potentially present was determined using the ecological evaluation guidance provided in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009). This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal (Table 13-2). The NRA (2009) defines key ecological receptors as those ecological features which are evaluated as Locally Important (higher value) or higher, that are likely to be impacted significantly by the Proposed Development. Internationally important receptors would include Special Areas of Conservation (SAC) or Special Protected Areas (SPA) while those of national importance would include Natural Heritage Areas (NHA).

This evaluation scheme has been adapted here to assess the value of habitats and fauna within the Site of the Proposed Development. The value of habitats is assessed based on the condition, size, rarity, conservation, and legal status. The value of fauna is assessed on its biodiversity value, legal status, and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends.

Using the evaluation criteria as described above, the habitats and species identified as being present or potentially present were assessed. As per the NRA guidelines, impact assessment is only undertaken of Key Ecological Receptors (KERs).

Table 13-2: Description of Values for Ecological Resources based on Geographic Hierarchy of Importance (NRA, 2009).

Importance	Criteria
International Importance	- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. - Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). - Features essential to maintaining the coherence of the Natura 2000 Network - Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive - Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). - World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). - Biosphere Reserve (UNESCO Man & The Biosphere Programme) - Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). - Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). - Biogenetic Reserve under the Council of Europe.

	- European Diploma Site under the Council of Europe. - Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	- Site designated or proposed as a Natural Heritage Area (NHA). - Statutory Nature Reserve. - Refuge for Fauna and Flora protected under the Wildlife Acts. - National Park. - Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. - Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive
County Importance	- Area of Special Amenity. - Area subject to a Tree Preservation Order. - Area of High Amenity, or equivalent, designated under the County Development Plan. - Resident or regularly occurring populations (assessed to be important at the County level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. - Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. - County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.

Local Importance (Higher Value)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. - Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; - Sites or features containing non-native species that is of some importance in maintaining habitat links.

13.4.2.4.1 Impact Assessment Criteria

Once the value of the identified Key Ecological Receptors (KERs) was determined, the next step was to assess the potential effect of the Proposed Development on these KERs. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009b; CIEEM, 2018) that set down a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts. Once impacts are defined, their significance was categorised using EPA Guidelines (EPA, 2022a).

Identification of a risk does not constitute a prediction that it will occur, or that it will create or cause significant impact. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk and the characteristics of the ecological receptor.

13.4.2.4.2 Criteria used to define the quality, significance, and duration of effects

In line with the EPA Guidelines (EPA, 2022a), the following terms are defined when quantifying the quality of effects. See Table 13-3.

Table 13-3: Definition of Quality of Effects.

Quality	Definition

Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative/adverse Effects	An effect which causes noticeable changes in the character of the environment but without significant consequences. (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

In line with the EPA Guidelines (EPA, 2022a), the following terms are defined when quantifying the significance of effects. See Table 13-4.

Table 13-4: Definition of Significance of Effects.

Significance of Effects	Definition
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 Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	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 Effects	An effect which obliterates sensitive characteristics

In line with the EPA Guidelines (EPA, 2022a), the following terms are defined when quantifying duration and frequency of effects. See Table 13-5.

Table 13-5: Definition of Duration of Effects.

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

13.4.3 Consultation

As part of the consultation process for this EIAR, letters were sent out via email and post in October 2023 to the following statutory bodies:

- Department of Housing, Local Government, and Heritage (DHLGH)
- Department of Tourism, Culture, Arts, Gaeltacht, Sport & Media
- Department of Education
- Geological Survey Ireland (Department of the Environment, Climate and Communications)
- The Heritage Council
- Office of Public Works (OPW)
- Transport Infrastructure Ireland (TII)
- The National Transport Authority (NTA)
- The Health and Safety Authority (HSA)
- The Health Service Executive (HSE)
- Inland Fisheries Ireland
- Bat Conservation Ireland
- Uisce Éireann
- An Taisce
- Bord Gais
- ESB
- Environmental Protection Agency
- Fáilte Ireland

The DHLGH response included the following notes relevant to this Biodiversity Chapter:

- Appropriate licences and derogations must be applied for where required for the protection of protected species and their habitats. This should be done after appropriate surveys have been carried out.
- Disturbance of the southern woodland habitat must be minimised and mitigated against.
- Carry out Appropriate Assessment Screening and subsequent Natura Impact Statement.
- Mitigation applied is appropriate to the ecological receptors identified.

This response has been taken into account when preparing this Biodiversity Chapter. No other responses that are of relevance to this Chapter were received.

13.5 Difficulties Encountered

There were no difficulties encountered in compiling the information for Chapter 13 - Biodiversity.

13.6 Baseline Environment (The Existing and Receiving Environment)

The following sections detail the baseline conditions at the Site of the Proposed Development that relate to ecology. A detailed description of the Proposed Development is provided in Chapter 2 – Site Location and Project Description.

13.6.1 Hydrology

The Site of the Proposed Development is located within the Blackwater (Munster) river catchment and the Blackwater [Munster]_SC_090 sub catchment. The Site lies within the Blackwater (MUNSTER)_140 sub basin (EPA, 2024). The Site's existing topography is relatively flat in areas but falls to a steep slope towards the southern portion of the site as it connects to the existing public park. The Site, which slopes naturally to the south, drains freely towards the Blackwater River, with ground elevations ranging from 87.5 meters above Ordnance Datum (mOD) in the north of the Site to 43mOD to the south of the Site (Figure 13-7). As such, is an important site in the context of supporting the hydrological regime of the Blackwater River. There are no drainage ditches, sewers/drains or waterbodies present at the Site.

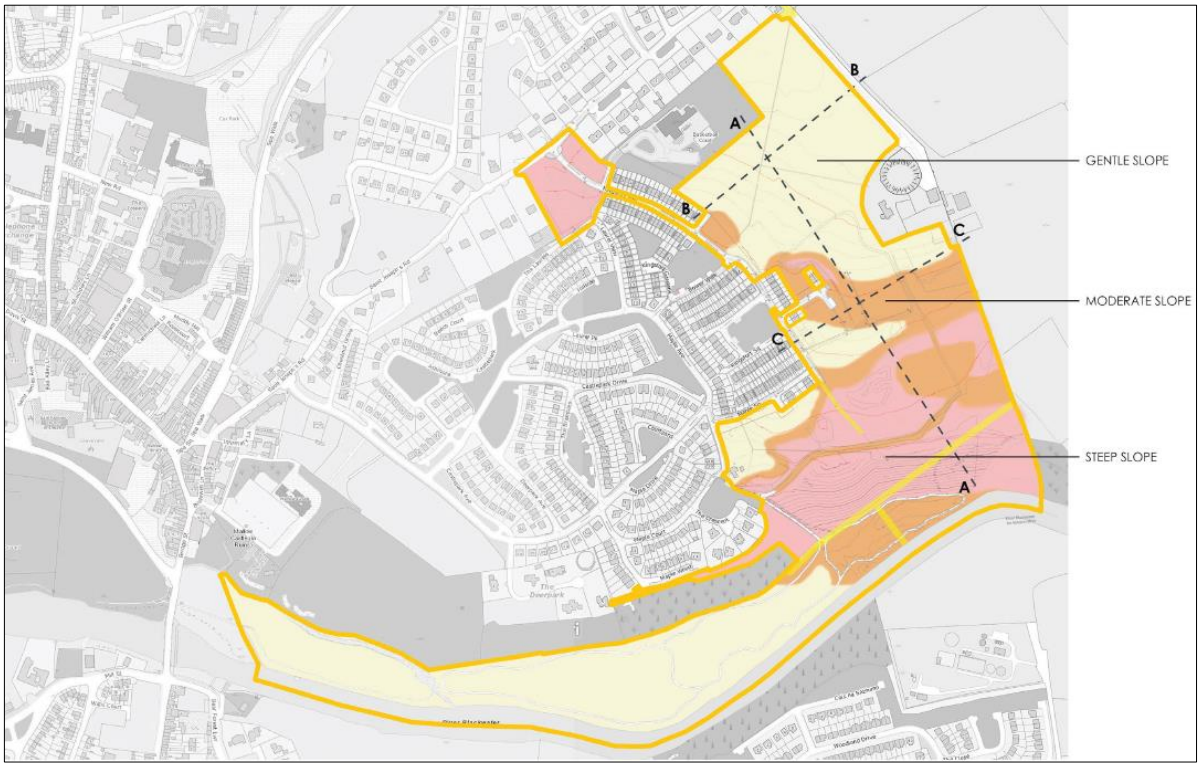

Figure 13-7: Showing the topography of the Site of the Proposed Development and the clients landholding.

The closest mapped (EPA, 2024) surface waterbody to the Site is the Blackwater River (IE_SW_18B021800) which is located 80m directly South of the Site, adjacent to the existing parklands located to the south (the parklands lie within the client's overall landholding but outside of the Site boundary for this Development). This river is a 5th order river which flows west to east, before converging with the Upper Blackwater M Estuary transitional waterbody (EU Code: IE_SW_020_0500) approximately 57.76km downstream of the Site. Upper Blackwater M Estuary transitional waterbody flows initially east before turning south and converging with the Lower Blackwater M Estuary/Youghal Harbour transitional waterbody (EU Code: IE_SW_020_0100) a further 18.15km downstream. The Lower Blackwater M Estuary/Youghal Harbour transitional waterbody flows, in a southerly direction, a further 13.60km downstream before discharging to the Youghal Bay coastal waterbody (EU Code: IE_SW_020_0000).

The WFD status (2016-2021) for the Blackwater River is *Good*, while the river waterbody risk is currently *Not at Risk* (EPA, 2024). The Blackwater River forms part of the Blackwater River (Cork/Waterford) SAC (002170).

There are two EPA monitoring points at the Mallow Viaduct (Station ID: RS18B021510 and RS18B021500) which are located ca. 2km to west of the Site and upstream of where the East Baltydaniel watercourse joins the Blackwater River. These stations recorded a Q-value of 3-4, *Moderate* in 2021.

The EPA water quality monitoring data for the stations on the Blackwater River located closest to the Site is summarised in Table 13-6. The latest reported Q-value results indicate that water quality in the Blackwater River in the vicinity of the Site is good.

Table 13-6: EPA Monitoring Stations and Assigned Q-Values.

EPA Monitoring Station name	Station Code	Location from Site	Distance from Site	Assigned Q value
Rly Br, Mallow (LHS)	RS18B021500	West	1.2km	4 "Good"
Rly Br, Mallow (RHS)	RS18B021510	West	1.2km	3-4 "Moderate"
Northeast of Ballymagooly	RS18B021800	Southeast	2.3km	4 "Good"

13.6.2 Geology and Hydrogeology

The Site of the Proposed Development is situated on the Mitchelstown groundwater body (IE_SW_G_082), which is classified as having "Good" status (WFD Status 2016-2021). The aquifer type in the area is Regionally Important Aquifer-Karstified (Diffuse) (Rkd). The underlying bedrock is mapped by GSI and is classified as 'Pale-grey massive mud-grade limestone' to the north and 'Massive unbedded lime-mudstone' to the south (New Codes: CDHAZE/CDWAUL) (GSI, 2024).

The subsoil beneath the Site is Shale and Sandstone Till (Namurian) with Bedrock at or Close to the Surface to the east (EPA, 2024). The SIS National Soils data classifies the Site as Urban (GSI, 2023). According to the Teagasc soil maps the soils beneath the Proposed Development Site consist of Deep well drained mineral soils (GSI, 2024). Corine (2018) land cover at the Site comprises 'Agricultural Areas' with 'Urban Areas' extending west from the Site, and 'Agricultural Areas' extending east from the Site.

The Proposed Development is located on a regionally important gravel aquifer – Karstified diffuse (EPA, 2024). The groundwater vulnerability across the Site is mapped as having 'Extreme' vulnerability to contamination from human activity, with 'High' vulnerability to the west at the existing Castlelands estate, and 'Rock at or near Surface or Karst' in the east and south of the Site (GSI, 2024).

The quaternary sediments beneath the majority of the Site are mapped as Till derived from Namurian sandstones and shales, while the subsoil beneath the eastern boundary of the Site is mapped as Bedrock outcrop or subcrop (Rck) (GSI, 2024).

The Waterbody Status for river, groundwater, transitional and coastal water bodies relevant to the Site as recorded by the EPA (2024) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003), Part IV of the European Communities Environmental Objectives

(Surface Waters) Regulations 2009 and Part IV of the European Communities Environmental Objectives (Groundwater) Regulations 2010, are provided in Table 13-7.

Table 13-7: WFD Risk and Water Body Status (EPA, 2016-2021).

Waterbody Name	Water body; EU code	Location from Site	Distance from Site (km)	WFD water body status (2013-2018)	WFD 3rd cycle Risk Status	Hydraulic Connection to the Site
Surface Water Bodies						
Blackwater River [Munster]	IE_SW_18B021720	south	80m	Good	Not At risk	Via overland surface water run-off
Transitional Water Bodies						
Upper Blackwater M Estuary	IE_SW_020_0500	East	57.76km	Moderate	At Risk	Downstream of the Blackwater River
Lower Blackwater M Estuary / Youghal Harbour	IE_SW_020_0100	East	>70km	Moderate	At Risk	Downstream of the Blackwater River
Coastal Water Bodies						
Youghal Bay	IE_SW_020_0000	Southeast	>70km	Moderate	At Risk	Downstream of the Blackwater River
Western Celtic Sea	IE_SW_010_0000	Southeast	>70km	High	Not at risk	Downstream of the Blackwater River
Groundwater Bodies						
Mitchelstown Groundwater Body	IE_SW_G_082	N/A	N/A	Poor	At Risk	Underlying groundwater-body

13.6.3 Designated Sites

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (79/409/EEC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other

regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

National Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with SAC and/or SPA sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

Table 13-8 presents details of the key ecological features of the designated sites within a 15km radius of the Proposed Development. The result of this preliminary screening concluded that there is a total of one SAC, one SPA, no NHAs and 12 pNHAs located within the ZOI of the Proposed Development Site Figure 13-8. The distances to each site listed are taken from the nearest possible point of the Proposed Development Site boundary to nearest possible point of each Natura 2000 site or pNHA.

Table 13-8: Designated Sites within the Precautionary Zone of Influence (ZOI) of the Proposed Development (15km) (Rows shaded in grey are indicative of sites where a potential pathway has been identified).

Site Name & Site Code	Qualifying Interests (*= priority habitats)	Potential Pathways
Special Areas of Conservation (SAC)		
Blackwater River (Cork/Waterford) SAC (002170) **https://www.npws.ie/protected-sites/sac/002170**	**Conservation Objectives Version 1.0 (NPWS, 2012)** **Habitats** - 1130 Estuaries - 1140 Mudflats and sandflats not covered by seawater at low tide - 1220 Perennial vegetation of stony banks - 1310 Salicornia and other annuals colonising mud and sand - 1330 Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* - 1410 Mediterranean salt meadows *(Juncetalia maritimi)* - *3260* Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation - 91A0 Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles - 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* **Species** - 1029 Freshwater Pearl Mussel (*Margaritifera margaritifera*) - 1092 White-clawed Crayfish (*Austropotamobius pallipes*) - 1095 Sea Lamprey (*Petromyzon marinus*) - 1096 Brook Lamprey (*Lampetra planeri*) - 1099 River Lamprey (*Lampetra fluviatilis*) - 1103 Twaite Shad (*Alosa fallax fallax*) - 1106 Salmon (*Salmo salar*) - 1355 Otter (*Lutra lutra*) - 1421 Killarney Fern (*Trichomanes speciosum*)	Direct hydrological, hydrogeological, and land/air Connection to the Site owing to the proximity of the Site to this SAC and the underlying geography and topography of the Site.
Special Protection Areas (SPAs)		

Kilcolman Bog SPA (004095) **https://www.npws.ie/protected-sites/spa/004095**	**Conservation Objectives Version 9.0 (NPWS, 2022)** **Birds** - A038 Whooper Swan (*Cygnus cygnus*) - A052 Teal (*Anas crecca*) - A056 Shoveler (*Anas clypeata)* A999 Wetland and Waterbirds	11.5km north of the Proposed Development Site – no potential pathways identified.
Natural Heritage Areas (NHAs)		
There are no Natural Heritage Areas within the zone of influence of the Proposed Development or with a potential pathway to the Proposed Development.		
Proposed Natural Heritage Areas (pNHAs)		
Ballinvonear Pond pNHA (000012)	There are no formal qualifying interests listed for proposed Natural Heritage Areas. A general site synopsis is available for most sites on the NPWS website: **https://www.npws.ie/sites/default/files/general/pNHA_Site_Synopsis_Portfolio.pdf** The only pNHA sites with a potential pathway to the Proposed Development are those which occur downstream of the Proposed Development Site, along the Blackwater River (highlighted in grey), owing to a direct/indirect hydrological pathway between same.	13.95km north
Awbeg Valley (Below Doneraile) pNHA (000074)		12.17km northeast
Awbeg Valley (Above Doneraile) pNHA (000075)		9.26km northeast
Bride/Bunaglanna Valley pNHA (000079)		14.17km southeast
Kilcolman Bog pNHA (000092)		11.33km north/northeast
Eagle Lough pNHA (001049)		10.77km north/northwest
Blackwater Valley (Killavullen) pNHA (001080)		7.89km east
Awbeg Valley (Castletownroche) pNHA (001561)		11.43km northeast
Blackwater Valley (Ballincurrig Wood) pNHA (001793)		9.78km east
Blackwater Valley (Kilcummer) pNHA (001794)		11.63km east
Ballyhoura Mountains pNHA (002036)		13.44km north
Convamore, Ballyhooly (Near Fermoy) pNHA (002097)		13.88km east

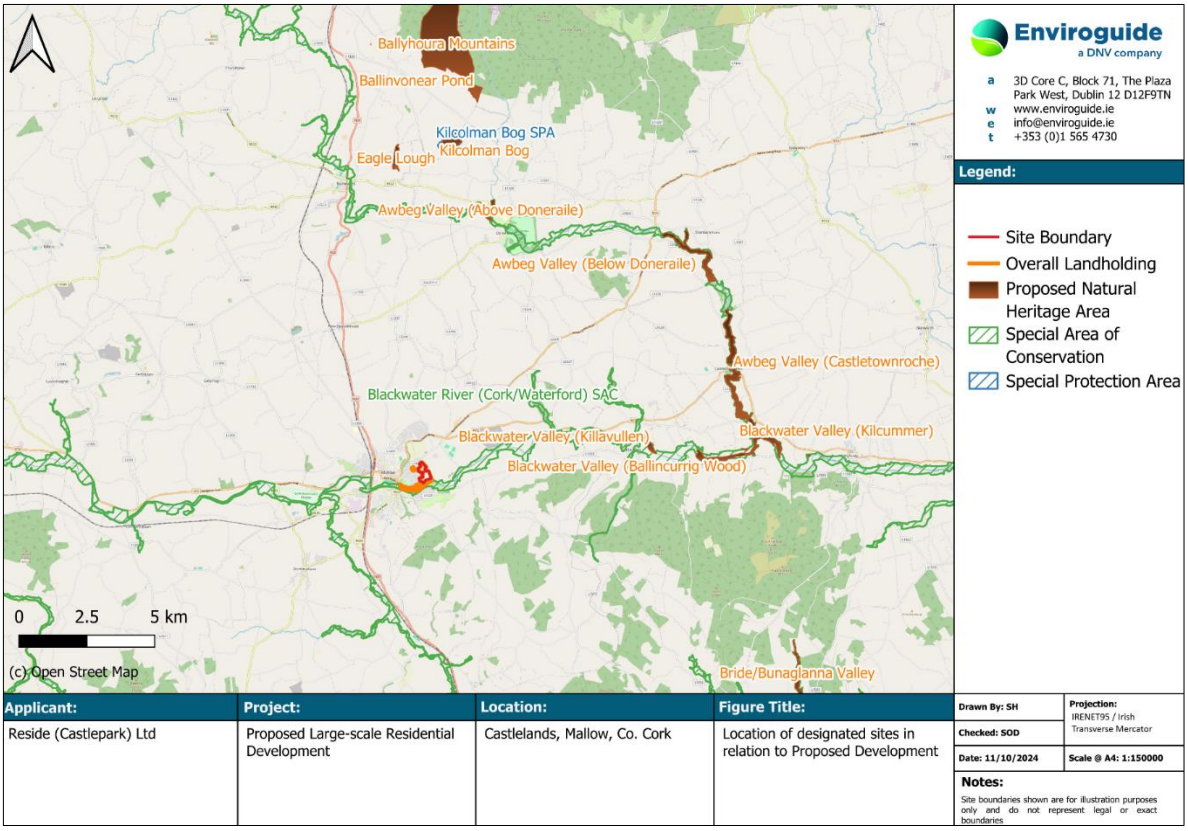

Figure 13-8: Designated Sites in Relation to the Proposed Development.

13.6.4 Desk Study Results

13.6.4.1 Flora

The Site of the Proposed Development is located within the Ordnance Survey Ireland National tetrad W59, however due to its location in the northeast of the grid square, the 2km grid square W59U to the north, and W59T to the south was also considered. Species records from the National Biodiversity Data Centre (NBDC) online database for this grid square was studied for the presence of rare or protected flora and fauna. The following records were excluded:

- Records greater than 20 years old;
- Species records with no designation or conservation status (excluding mammals and birds).
- Records of species placed on the Waiting List or identified as Least Concern, Data Deficient, Near Threatened or Not Evaluated in national red lists (Lockhart et al., 2012; Wyse Jackson et al., 2016), unless they are listed on the Flora Protection Order .

In addition, data from various sources (e.g., Flora Protection Order Map Viewer) were used to determine the presence of rare or protected species in the vicinity of the Proposed Development.

13.6.4.2 Rare and Protected Flora

The Site of the Proposed Development is located within the Ordnance Survey 10km Grid Square (W59), 2km Grid Square (W59U) to the north and 2km Grid Square (W59T) to the south. Species records from

the NBDC online database show these grid squares were studied for the presence of rare and/or protected species within the last 20 years.

This database contained no records of protected flora within the last 20 years. Similarly, no rare or protected floral species were recorded during the Site visits.

13.6.4.3 Invasive Alien Plant Species

In total, 5 no. invasive plant species have been historically recorded within the relevant tetrads (Table 13-9). Of these, two are listed in Schedule III of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011). The nearest recorded instance of Japanese Knotweed (*Fallopia japonica)* is ca. 247m west of the Site, near the boat slipway onto the Blackwater River, at back of the search and rescue building. The nearest recorded instance of Indian Balsam (*Impatiens glandulifera*) is located along the Blackwater River bank, south of the Proposed Development.

Table 13-9: Invasive Flora Records within W59 10km Grid Square Hectad (Data from NBDC).

Common name	Scientific name	Date of Last Record	Title of Dataset	Designation
Cherry Laurel	*Prunus laurocerasus*	07/05/2017	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	High Impact Invasive Species
Indian Balsam	*Impatiens glandulifera*	22/05/2017	National Invasive Species Database	High Impact Invasive Species, Regulation S.I. 477
Japanese Knotweed	*Reynoutria japonica*	06/04/2021	National Invasive Species Database	High Impact Invasive Species, Regulation S.I. 477
Sycamore	*Acer pseudoplatanus*	04/06/2018	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Traveller's Joy	*Clematis vitalba*	17/01/2012	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species

13.6.4.4 Mammals

Records for terrestrial mammals were retrieved from the NBDC online database. Nine native terrestrial mammals were recorded within the 10km grid square associated with the Site. Of these, Otter (*Lutra lutra*) and Pine Marten (*Martes martes*) is afforded legal protection in Europe (EU Habitats Directive), while the remaining native species are afforded legal protection in Ireland under the Wildlife Acts 1976, as amended, with the exception of Red Fox (*Vulpes vulpes*) which is not afforded any legal protection in Ireland (Table 13-10).

Seven non-native terrestrial mammals were recorded within the 10km grid square, and of these, four are considered 'High Impact' invasive species (Table 13-10).

Table 13-10: Recorded Mammal Species within the grid squares that encompass the Proposed Development Site.

Name	Date of Last Record	Database	Legal Status/Designation
Native Species			
Eurasian Badger (*Meles meles*)	14/03/2017	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts 1976, as amended.

Eurasian Pygmy Shrew (*Sorex minutus*)	01/07/2018	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts 1976, as amended.
Eurasian Red Squirrel (*Sciurus vulgaris*)	16/04/2018	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts 1976, as amended.
European Otter (*Lutra lutra*)	06/09/2015	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts 1976, as amended. EU Habitats Directive – Annex II species.
Pine Marten (*Martes martes*)	19/08/2013	Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts 1976, as amended. EU Habitats Directive – Annex V species.
West European Hedgehog (*Erinaceus europaeus*)	21/05/2022	Hedgehogs of Ireland	Protected Species: Wildlife Acts 1976, as amended.
Irish Hare (*Lepus timidus subsp. hibernicus*)	21/09/2017	Mammals of Ireland 2016-2025	Protected Species: Wildlife Acts 1976, as amended.
Irish Stoat (*Mustela erminea subsp. hibernica*)	18/08/2012	Atlas of Mammals in Ireland 2010-2015	Protected Species: Wildlife Acts 1976, as amended.
Red Fox (*Vulpes vulpes*)	04/07/2018	Mammals of Ireland 2016-2025	Not Legally Protected in Ireland.
Non-native Species			
American Mink (*Mustela vison*)	30/09/2013	Mammals of Ireland 2016-2025	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Bank Vole (*Myodes glareolus*)	05/09/2015	Atlas of Mammals in Ireland 2010-2015	Medium Impact Invasive Species
Brown Rat (*Rattus norvegicus*)	02/10/2015	Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
European Rabbit (*Oryctolagus cuniculus*)	03/04/2015	Atlas of Mammals in Ireland 2010-2015	Medium Impact Invasive Species
Fallow Deer (*Dama dama*)	31/12/2008	Deer of Ireland Database	High Impact Invasive Species Regulation S.I. 477 (Ireland Protected Species: Wildlife Acts
Greater White-toothed Shrew (*Crocidura russula*)	05/09/2015	Atlas of Mammals in Ireland 2010-2015	Medium Impact Invasive Species
Sika Deer (*Cervus nippon*)	31/12/2008	Deer of Ireland Database	High Impact Invasive Species Regulation S.I. 477 (Ireland) Protected Species: Wildlife Acts

13.6.4.5 Bats

The NBDC map viewer contains a field layer entitled 'Bat Landscapes' which is based on the results of research by Lundy et al. (2011) that assessed the relative importance of landscape/habitat features present across the Irish landscape for bats. Based on this assessment, the Bat Habitat Suitability Index was established (BHSI). The index ranges from 0 to 100, with 0 being the least favourable and 100 being the most favourable for bats. The index is available for all species combined in addition to

individual species indices. A review of this layer determined the BHSI ratings for all bat species at the Site, which are shown in the below table (Table 13-11) along with the main roost types associated with each bat species (Teagasc, 2023).

Table 13-11: BHSI Ratings for bat species within the vicinity of the Site as well as their main roost types.

Bat Species	Index Rating (to the west of the Site)	Index Rating (to the East and majority of the Site)	Main Roost types
Soprano Pipistrelle *(Pipistrellus pygmaeus)*	49	39	Buildings and trees
Brown Long-eared Bat *(Plecotus auritus)*	51	40	Buildings and trees
Common Pipistrelle *(Pipistrellus pipistrellus)*	50	41	Buildings and trees
Lesser Horseshoe Bat *(Rhinolophus hipposideros)*	0	0	Buildings, caves, and tunnels
Leisler's Bat *(Nyctalus leisleri)*	48	35	Tree holes and buildings
Whiskered Bat *(Myotis mystacinus)*	39	41	Buildings and underground places
Daubenton's Bat *(Myotis daubentonii)*	35	24	Bridges, trees, buildings, and underground
Nathusius's Pipistrelle *(Pipistrellus nathusii)*	4	0	Tree holes and crevices
Natterer's Bat *(Myotis nattereri)*	38	33	Buildings, trees, and underground places
All Bats	34.89	28.11	

The majority of the Site falls within an area of overall 28.11 BHSI (medium rating, 1km grid square W5798), while the north-western (1km grid square W5698) and south-western extent (1km grid square W5697) falls within an area of overall 34.89 BHSI (high rating), as shown in Figure 13-9 below.

Figure 13-9: Showing the BHSI Rating for the Area that encompasses the Proposed Development Site.

Within both BHSI ratings, the Lesser Horseshoe bat (*Rhinolophus hipposideros*) had the lowest rating of zero. The Article 17 reports on the status of species protected in Ireland under the Habitats Directive describes the range of this protected species. Lesser Horseshoe bats are currently confined to the west of the country; mainly counties Mayo, Galway, Clare, Limerick, Kerry, and Cork (NPWS, 2019).

The relevant NBDC grid squares were also checked for records of bat species. The search showed that records of Common pipistrelle (*Pipistrellus pipistrellus*), Daubenton's (*Myotis daubentonii*), and Soprano pipistrelle (*Pipistrellus pygmaeus)* exist within the 2km (W59U) grid square that encompasses the majority of the Site, with no bat species recorded within the 2km (W59T) that encompasses the southwestern section of the Site, along the greenzone (NBDC, 2023).

13.6.4.6 Birds

There are records for 103 bird species within the 10km (W59) grid square associated with the Site. Of these, 62 No. are Green-listed, 26 No. are Amber-listed and 12 No. are Red-listed according to Birds of Conservation Concern in Ireland 2020-2026 (Gilbert et al., 2021) (Table 13-12). Two Green-listed species were also noted as being listed under Annex I of the EU Birds Directive, namely; Little Egret (*Egretta garzetta*) and Peregrine Falcon (*Falco peregrinus*).

Table 13-12: List of all species recorded in the 10km (W59) grid square (NBDC, 2023).

Species Name	Date of Last Record	Title of Dataset	BoCCI
Barn Owl (*Tyto alba*)	30/09/2020	Birds of Ireland	Red
Barn Swallow (*Hirundo rustica*)	22/05/2016	Birds of Ireland	Amber
Black-headed Gull	31/12/2011	Bird Atlas 2007 - 2011	Amber

(*Larus ridibundus*)			
Black-tailed Godwit (*Limosa limosa*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Common Coot (*Fulica atra*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Common Kestrel (*Falco tinnunculus*)	28/11/2014	Birds of Ireland	Red
Common Kingfisher (*Alcedo atthis*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Common Linnet (*Carduelis cannabina*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Common Pochard (*Aythya ferina*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Common Shelduck (*Tadorna tadorna*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Common Snipe (*Gallinago gallinago*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Common Starling (*Sturnus vulgaris*)	22/05/2016	Birds of Ireland	Amber
Common Swift (*Apus apus*)	14/07/2021	Swifts of Ireland	Red
Eurasian Curlew (*Numenius arquata*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Eurasian Teal (*Anas crecca*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Eurasian Tree Sparrow (*Passer montanus*)	22/05/2016	Birds of Ireland	Amber
Eurasian Wigeon (*Anas penelope*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Eurasian Woodcock (*Scolopax rusticola*)	31/12/2011	Bird Atlas 2007 - 2011	Red
European Golden Plover (*Pluvialis apricaria*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Gadwall (*Anas strepera*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Great Cormorant (*Phalacrocorax carbo*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Hen Harrier (*Circus cyaneus*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Herring Gull (*Larus argentatus*)	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Amber
House Martin (*Delichon urbicum*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
House Sparrow (*Passer domesticus*)	22/05/2016	Birds of Ireland	Amber

Lesser Black-backed Gull (*Larus fuscus*)	29/02/1984	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.	Amber
Little Egret (*Egretta garzetta*)	31/12/2011	Bird Atlas 2007 - 2011	Green Annex I of the EU Birds Directive
Mallard (*Anas platyrhynchos*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Merlin (*Falco columbarius*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Mute Swan (*Cygnus olor*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Northern Goshawk (*Accipiter gentilis*)	25/05/1991	Rare birds of Ireland	Amber
Northern Lapwing (*Vanellus vanellus*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Northern Shoveler (*Anas clypeata*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Peregrine Falcon (*Falco peregrinus*)	31/12/2011	Bird Atlas 2007 - 2011	Green Annex I of the EU Birds Directive
Sand Martin (*Riparia riparia*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Sky Lark (*Alauda arvensis*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Spotted Flycatcher (*Muscicapa striata*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Stock Pigeon (*Columba oenas*)	31/12/2011	Bird Atlas 2007 - 2011	Red
Tufted Duck (*Aythya fuligula*)	31/12/2011	Bird Atlas 2007 - 2011	Amber
Yellowhammer (*Emberiza citrinella*)	31/12/2011	Bird Atlas 2007 - 2011	Red

13.6.4.7 Other Fauna

Information on fish, amphibians, reptiles, and invertebrates is included below.

13.6.4.7.1 Fish (and other aquatic species)

There are records for two fish (bony fish) species within the W59 10km hectad (NBDC, 2023). These are shown in the below table (Table 13-13).

Table 13-13: Records of Fish species within the W59 10km hectad that encompasses the Proposed Development.

Species Name	Date of Last Record	Title of Dataset	Designation
Dace (*Leuciscus leuciscus*)	31/12/1889	National Invasive Species Database	Medium Impact Invasive Species

			Regulation S.I. 477 (Ireland)
Stone Loach (*Barbatula barbatula*)	16/09/2009	River Biologists' Database (EPA)	

There are no waterbodies within the Site of the Proposed Development that could support protected fish species such as salmonids or lampreys. It is noted that Dace (*Leuciscus leuciscus*) is a non-native invasive species, however, the last known record for this species within this 10km hectad was over 20 years ago.

While there are no records present for other fish species within this hectad, the Blackwater River is both a designated Special Area of Conservation (SAC) and a designated Salmonid River. Further details on both designations are provided below.

13.6.4.7.1.1 Salmonid River – Blackwater River

The main channel of the Blackwater River is designated as a salmonid river in accordance with EU Directive 78/659 (S.I. No. 293 of 1988) and as such receives protection under S.I. No. 293/1988: European Communities (Quality of Salmonid Waters) Regulations, 1988.

The River Blackwater supports resident Brown Trout (*Salmo trutta*) and a population of Sea Trout (*Salmo trutta trutta*) in addition to a significant and biologically valuable population of Atlantic salmon (*Salmo salar*). Atlantic Salmon is listed under Annex II and V of the EU Habitats Directive.

In addition to this designation, the Blackwater River eventually discharges into the Blackwater Estuary for which records of additional fish species exist. A fish stock survey of this estuary was carried out as part of the programme of monitoring for the Water Framework Directive (WFD) in 2008 by staff from the Central Fisheries Board (CFB) and the Southern Regional Fisheries Board (SRFB). A list of species recorded during this fish stock survey is included below (Figure 13-10), having been extracted from this report (CFRB, 2008).

Scientific name	Common Name	Lower Blackwater		Upper Blackwater	
		Beach seine (12)	Fyke net (8)	Beach seine (4)	Fyke net (3)
Chelon labrosus	Thick Lipped Grey Mullet	32	5	-	-
Platichthys flesus	Flounder	115	304	11	28
Dicentrarchus labrax	Sea Bass	5	-	-	-
Sprattus sprattus	Sprat	748	-	-	-
Pomatoschistus microps	Common Goby	1,096	1	2	-
Pleuronectes platessa	Plaice	7	-	-	-
Ammodytes tobianus	Lesser Sandeel	2	-	-	-
Anguilla anguilla	Eel	-	39	1	28
Ciliata mustela	5-Bearded Rockling	-	35	-	-
Limanda limanda	Dab	1	-	-	-
Salmo trutta	Brown Trout	1	6	-	1
Salmo trutta	Sea Trout*	-	4	-	2
Salmo salar	Salmon	1	-	1	-
Gasterosteus aculeatus	3-Spined Stickleback	4	-	16	-
Merlangus merlangus	Whiting	-	5	-	-
Rutilus rutilus	Roach	-	2	-	-
Gadus morhua	Cod	-	1	-	-
Pollachius pollachius	Pollock	-	7	-	-
Phoxinus phoxinus	Minnow	-	-	1	-
Gobiusculus flavescens	2-Spotted Goby	7	-	-	-
Syngnathus acus	Greater Pipefish	1	-	-	-
Osmerus eperlanus	Smelt	43	-	-	-
Leuciscus leuciscus	Dace	9	39	1	1
Liza aurata	Golden-Grey Mullet	1	-	-	-
Pollachius virens	Saithe (Coalfish)	-	1	-	-
Gobio gobio	Gudgeon	-	-	1	-

*sea trout are included as a separate "variety" of trout

Figure 13-10: List of fish species and abundances of each species by net type in the Upper and Lower Blackwater Estuary, October 2008 (Extracted Table)(CFRB, 2008).

13.6.4.7.2 Molluscs

A single record exists for mollusc species within the W59 10km hectad (NBDC, 2023) in the last 20 years. These are shown in the below table:

Table 13-14: Records of threatened molluscs within the 10km (W59) grid square that encompasses the Proposed Development.

Species Name	Date of Last Record	Title of Dataset	Designation
Freshwater Pearl Mussel (*Margaritifera (margaritifera*)	26/07/2006	River Biologists' Database (EPA)	EU Habitats Directive, Annex II

Freshwater Pearl Mussel (*Margaritifera margaritifera*) (FPM) are a Qualifying Interest (QI) species of the Blackwater River SAC. While no waterbodies occur within the Proposed Development, the Site occurs just 80m north of the Blackwater River and so is subject to surface/ground water runoff from the Site.

No dedicated surveys for Freshwater Pearl Mussel were conducted, however, given the importance of the Blackwater River for this Annex II species, and historical records for same (NPWS and NBDC) along the main Blackwater River Channel, it can be assumed that FPM are present in the Blackwater River channel located 80m south of the Proposed Development Site. FPM are listed under Annex II of the EU Habitats Directive. FPM are listed under Annex II of the EU Habitats Directive. As such, the FPM assemblage of the Blackwater River will be considered as part of this Biodiversity Chapter under the entity of 'Fauna of the Blackwater River'.

13.6.4.7.3 Amphibians

While Common Frog (*Rana temporaria*) was recorded in the 10km (W59) grid square for the Site, it is noted that neither Common Frog nor Smooth Newt (*Lissotriton vulgaris*) were recorded within the 2km (W59T and W59U) grid squares that encompass the Site (NBDC: Amphibians and reptiles of Ireland).

13.6.4.7.4 Invertebrates

There is a single NBDC record for a threatened invertebrate within the 2km (W59U) grid square, and none in the 2km (W59T) grid square, as listed below (Table 13-15).

Table 13-15: Records of threatened invertebrates within the 2km (W59U) grid square that encompasses the Proposed Development.

Species Name	Date of Last Record	Title of Dataset	Designation
Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius)*	17/05/2020 (W59U grid square)	Bees of Ireland	Threatened Species: Near threatened

13.6.4.7.5 Otter

There is a single record for Otter (Lutra lutra) within the W59 10km hectad (NBDC, 2023). This is shown in the below table:

Table 13-16: Records of Otter within the 10km (W59) grid square that encompasses the Proposed Development.

Species Name	Date of Last Record	Title of Dataset	Designation
European Otter (*Lutra lutra*)	06/09/2015	Mammals of Ireland 2016-2025	EU Habitats Directive Annex II

There are no watercourses present within the Site boundary suitable of supporting Otter. However, it should be noted that the Blackwater River (main channel) is located 80m south of the Site and does contain suitable habitat for this species. As such, Otter of the Blackwater River will be considered as part of this Biodiversity Chapter under the entity of 'Fauna of the Blackwater River'.

13.6.4.7.6 Fauna of the Blackwater River

Listed below are the aquatic qualifying interest (QI) species for the Blackwater River (Cork/Waterford) SAC:

- Fresh Water Pearl Mussel (*Margaritifera margaritifera*) [1029]
- White-clawed Crayfish (*Austropotamobius pallipes*) [1092]
- Sea Lamprey (*Petromyzon marinus*) [1095]
- Brook Lamprey (*Lampetra planeri*) [1096]
- River Lamprey (*Lampetra fluviatilis*) [1099]
- Twaite Shad (*Alosa fallax fallax*) [1103]
- Salmon (*Salmo salar*) [1106]
- Otter (*Lutra lutra*) [1355]

13.6.4.8 Protected and/or Notable Species Unlikely to Occur at the Site.

Other notable and/or rare species and species listed on Annex IV of the Habitats Directive that were considered but that are unlikely to occur at the Site include:

- Flora
    - Marsh Saxifrage (*Saxifraga hirculus*) – Known populations only in Co. Mayo.
    - Killarney Fern (*Vandenboschia speciosa*) – Nearest known populations in Co. Kerry, not recorded at the Site, no suitably sheltered and moist habitats available.
    - Slender Naiad (*Najas flexilis*) – A clear water, lowland lake species. No suitable habitat available at the Site.
- Fauna
    - White-clawed Crayfish (*Austropotamobius pallipes*) – no waterbodies within the Site, and, while the Blackwater River is designated for this species, the known distribution for this species occurs upstream of Section of the Blackwater River that occurs south of this Site, along a tributary of the Blackwater; the Awbeg, which joins the Blackwater River to the east (downstream) of the Site of the Proposed Development. Therefore, it is considered unlikely that this species will be impacted by the Proposed Development. Note that potential impacts have been fully considered as part of the NIS accompanying this submission under separate cover.
    - Natterjack Toad (*Epidalea calamita*) – Distribution restricted to few coastal sites.
    - Kerry Slug (*Geomalacus maculosus*) – Distribution restricted to south and west of Ireland, however, no records for this species exist within the 10km grid square or the grid squares surrounding the Site. The nearest record for this species occurs at grid square W304801 located between Millstreet and Macroom >30km away.

13.6.5 Field Study Results

13.6.5.1 Habitats & Flora

The habitats within the Site of the Proposed Development were coded and categorised to level 3 according to Fossitt (2000). The following distinct habitat types were identified:

- BL1 – Old stone wall
- BL3 – Buildings and artificial surfaces
- ED2 - Spoil and bare ground
- ED3 - Recolonising bare ground
- ED5 – Refuse and other waste
- GS2 – Dry meadows and grassy verges
- WD5 – Scattered trees and parkland
- WL2 – Treelines

Similarly, adjacent and linked habitats were identified/classified as above and are listed below:

- BC1 Arable Crops
- FW2 – Depositing/lowland river
- GA2 – Improved amenity grassland
- WL2 – Treelines

- WS2 – Immature woodland

The habitats present within the Site, as recorded in the survey area during the field surveys, are described in this section and summarised below.

While the ground was relatively bare (ED2 spoil and bare ground) during the initial Site visit in February 2023 due to previous clearance works taking place, the assessment was backed up by a follow up habitat and flora survey within the optimal botanical period in May 2023, as well as a desktop study of historical satellite imagery of the Proposed Development Site (Google Earth, 2023). The results showed that the dominant habitat type within the Site is dry meadows and grassy verges (GS2), with areas of scrub (WS1) and scattered trees and parkland (WD5) revegetating in parts.

Ground species present in the GS2 habitat include Dock (*Rumex obtusifolius*), Creeping Buttercup (*Ranunculus repens*), Lesser Trefoil (*Trifolium dubium*), Bird's Foot Trefoil (*Lotus corniculatus*), Clover (*Trifolium repens*), Daisy (*Bellis perennis*), Common Valerian (*Valeriana officinalis*), Vetch (*Vicia sativa*), Bramble (*Rubus fructicosus*), Silverweed (*Potentilla anserina*), Willowherb (*Chamaenerion angustifolium),* Ground Ivy (*Glechoma hederacea*), and various grass species, but predominantly Perennial Ryegrass (*Lolium perenne*).

A small treeline (WL2) and buildings and artificial surfaces (BL3) were located to the west, while there was some refuse/waste (ED5) to the east and a stone wall (BL1) habitat was observed along the eastern/southeastern boundary.

Immature Grey Willow (*Salix cinerea*) trees were scattered predominantly to the west, which borders the rear gardens of the existing residential estate, although they were also found sparsely interspersed throughout the Site, particularly to the southwest.

The treeline habitat to the west, adjacent to the existing local road in Kingscourt Avenue, comprised a variety of semi-mature/mature tree species such as Sycamore (*Acer pseudoplatanus*), Willow, Beech (*Fagus sylvatica*), and Cherry Plum (*Prunus cerasifera*). It is noted that this habitat is being retained.

Two invasive plant species were recorded on Site, namely Butterfly Bush, and New Zealand Flax (*Phormium tenax*). Butterfly Bush was observed growing on areas of hardstanding/artificial surfaces to the west of the Site, while New Zealand Flax was observed growing behind a rear garden, to the west of the Site, just behind a dense willow tree canopy.

No rare or protected plant species were observed during the ecological walkovers. Adjacent and linked habitats are discussed in Section 13.6.5.1.9 below.

A map of the habitats and ecological constraints at the Site is provided in Figure 13-11, while a map of invasive plant species is shown in Figure 13-12. The following paragraphs describe the habitats within the Proposed Development Site boundary and are accompanied by Site photographs.

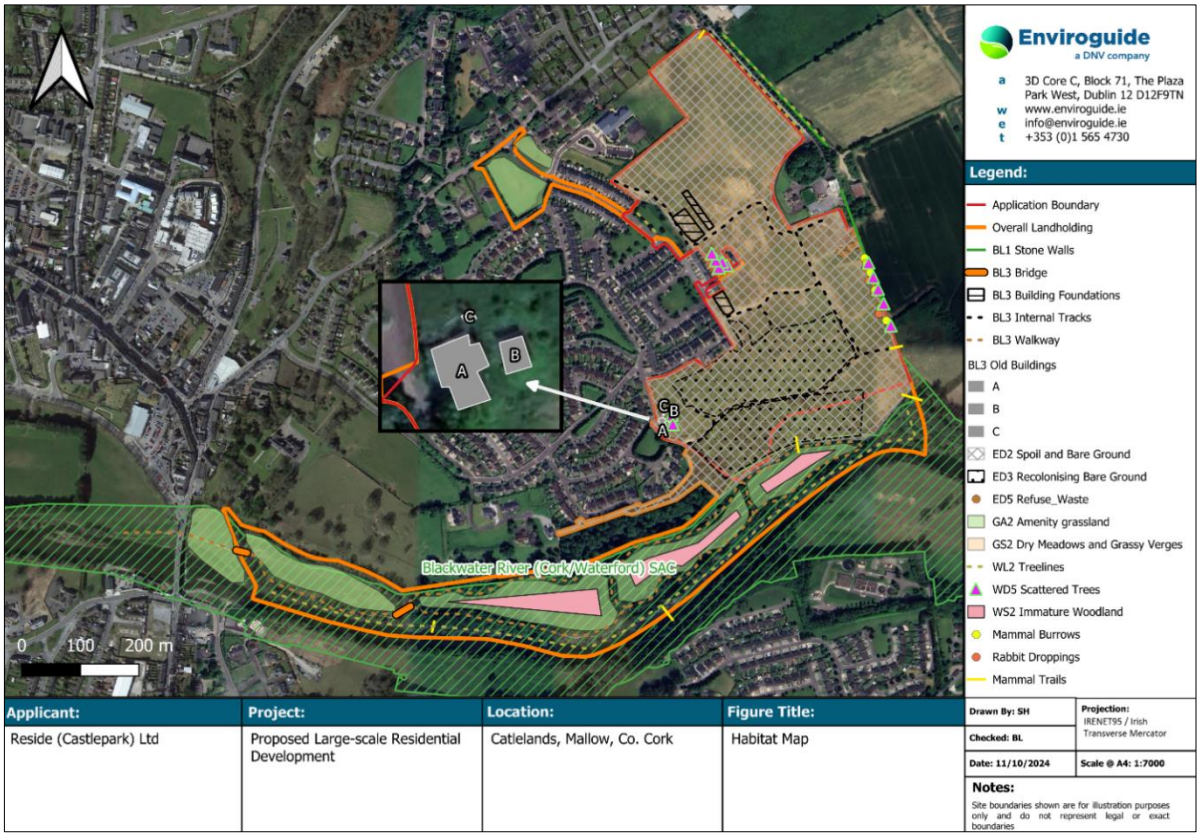

Figure 13-11: Habitats at the Site of the Proposed Development.

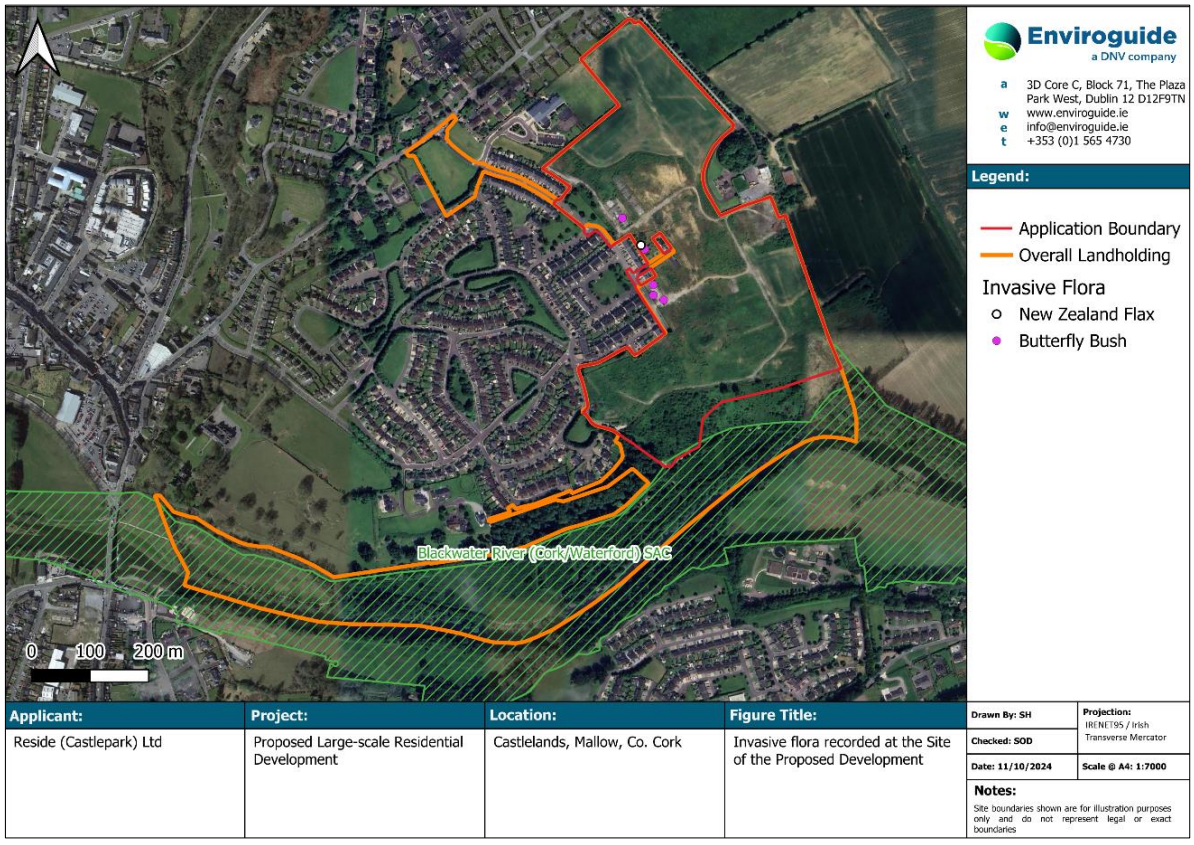

Figure 13-12: Invasive plant species recorded at the Site of the Proposed Development.

13.6.5.1.1 BL1 - Old Stone Wall

Old stone wall habitat is found along the eastern/southeastern extent of the Site (Figure 13-13).

This habitat occurs in mosaic with scattered trees and parkland (WD5) as scattered trees were observed growing on and adjacent to this habitat. Tree species observed along the stone wall habitat include Silver Birch (*Betula pendula*).

Figure 13-13: Example of Old Stone Wall Habitat at the Site (BL1).

A significant amount of Ivy (*Hedera hibernica*) growth was present along much of the stone wall habitat, with multiple Rabbit (*Oryctolagus cuniculus*) burrows and fresh digging observed along its base. Old Stone walls can exhibit cracks/fissures which can be important ecologically for species such as bats and common lizard which can roost/shelter in them. While the ivy cover limited visibility, several cracks and fissures were observed in this old stone wall. Old stone walls, such as this can also provide an important linear feature in the landscape which can form an ecological corridor for commuting/foraging species such as bats, although this old stone wall does not continue down the length of the eastern boundary providing continuous linear habitat. This habitat is being retained as part of the Proposed Development.

13.6.5.1.2 BL3 - Buildings and Artificial Surfaces

Buildings and artificial surfaces were present in various forms throughout the Site (Figure 13-14). A total of three buildings were observed to the southwest section of the Site, comprising a main building, pump house and storage shed. Other built surfaces included foundations constructed under a previously granted application which was abandoned, and associated access tracks.

Figure 13-14: Example of Buildings and Artificial Surfaces on Site (BL3).

Both the main house (building A, a former lodge) and the pump house (building B) have been deemed to have the potential to host roosting bats given the existing potential access points to the roof space of the buildings. The shed/outhouse (building C) provided no bat roost potential given its high level of exposure to the elements. It is noted that these buildings are not being retained.

These buildings can also provide potential roosting/nesting habitat for small birds, although access is limited.

13.6.5.1.3 ED2 - Spoil and Bare Ground

Spoil and bare ground was observed throughout the Site (Figure 13-15), with the exception of the existing walkway/greenzone to the south. This was the dominant habitat type present during the preliminary ecological surveys that were carried out on Site in February 2023, however, by the time of the return visits in May 2023, almost all of this habitat had revegetated to comprise dry meadows and grassy verges and other habitat types. This is a highly disturbed habitat with low biodiversity value.

Figure 13-15: Example of Spoil and Bare Ground on Site (ED2).

13.6.5.1.4 ED3 – Recolonising Bare Ground

Recolonisng bare ground was present within the Site during all site visits. This habitat occurred in mosaic with the bare ground habitat observed in February 2023. Plant species found within this transitional habitat predominantly included grass species (Figure 13-16), however other species such as Willow saplings (*Salix sp.)*, Ragwort (*Senecio jacobaea)*, Ribwort Plantain (*Plantago lanceolata*), Buttercup (*Ranunculus sp*.), and Willowherb (*Epilobium sp.*,) were observed growing around the Site also. This is a highly disturbed, transitional habitat, with low biodiversity value.

Figure 13-16: Example of Recolonising Bare Ground on Site (ED3).

13.6.5.1.5 ED5 – Refuse and Other Waste

The Site contained refuse and other waste associated with construction waste, which was located along the eastern extent of the Site, just north of the old stone wall habitat (Figure 13-17). This constitutes a highly modified, unnatural habitat, and provides no ecological value.

Figure 13-17: Example of Refuse and Other Waste on Site (ED5).

13.6.5.1.6 GS2 – Dry Meadows and Grassy Verges

During the May visits, this was the dominant habitat type recorded on Site (Figure 13-18) with dry meadows covering the majority of the site and grassy verges occurring along some field margins and along the margins of the existing footpaths along the southern walkway (within the greenzone). This habitat exhibits signs of an infrequent mowing regime and a lack of active management.

Species present within this habitat type include Dandelion (*Taraxacum vulgaria),* Ribwort Plantain (*Plantago lanceolata)*, Thistle (*Circium sp.)*, Willowherb (*Epilobium sp.)*, Speedwell (*Veronica sp.)*, Bramble (*Rubus fructicosus),* Gorse (*Ulex europaeus).* Nettle (*Urtica dioica)*, Creeping Buttercup (*Ranunculus repens)*, Meadow Buttercup (*Ranunculus acris)*, Dock (*Rumex sp.)*, Sedges (*Carex sp.*), Thistle (*Circium sp.)*, and Cow Parsley (*Anthriscus sylvestris)*.

Figure 13-18: Example of Dry Meadows and Grassy Verges on Site (GS2).

13.6.5.1.7 WD5 – Scattered Trees and Parkland

Scattered trees and parkland occur in various locations across the Site in the form of young Willow (*Salix sp.*) saplings. While a few were scattered throughout the Site, there was a small cluster of Willow saplings to the rear of the existing adjoining residential estate as shown below (Figure 13-19). In addition, scattered Silver Birch (*Betula pendula*) trees were also present along the old stone wall habitat to the east. The understorey is comprised of generic GS2 Dry meadows species as described previously in this report.

Figure 13-19: Example of Scattered Trees and Parkland at the Site (WD5).

13.6.5.1.8 WL2 – Treelines

A small Treeline habitat occurs along the western extent of the Site. Tree species present include Sycamore (*Acer pseudoplatanus*), Willow, Beech (*Fagus sylvatica*), and Cherry Plum (*Prunus cerasifera*). An example of the treeline present within the Site is shown below (Figure 13-20). The Cork County Biodiversity Action Plan (2009-2014) highlights the importance of woodlands, trees and hedges as wildlife corridors. It is noted that this habitat is being retained.

It is also noted that Sycamore is traditionally considered to be an invasive species due to its ability to outcompete native tree species and its supposedly low contribution to local biodiversity by supporting fewer insect species than native tree species (Leslie, 2005). However, sycamore's invasiveness is considered to be more of an issue in some sensitive native woodland settings and not in urban, anthropogenic environments such as the Site in question. Sycamore has also been found to support relatively high numbers of lichen species, including rarer species, when compared to native tree species (Leslie, 2005). Sycamore is therefore not considered to be a negative presence at the Site and in fact provides suitable nesting and foraging habitat for local birds and invertebrate species, and thus can be viewed as being positive for biodiversity in the context of the urban location of the Site.

Figure 13-20: Example of Treelines on Site (WL2).

13.6.5.1.9 Adjacent and Linked Habitats

A Cherry Laurel (*Prunus laurocerasus*) hedgerow lies outside the Site boundary to the north, within the existing school lands. This hedgerow occurs in tandem with a small brick wall (not old stone wall habitat) that is c.1m in height. Extending east away from the Site lies agricultural lands, including land used for crops. The Site is bound to the west by the existing estate, while the Site slopes southwards towards the Blackwater River which bounds the southern section of the Site.

A Cherry Laurel hedgerow also exists around the existing dwelling to the east of the Site. Further east are agricultural grasslands primarily consisting of Arable Crops (BC1), to the west and north lies Buildings and Artificial Surfaces (BL3) associated with the urban fabric of the surrounding residential/urban areas of Mallow.

To the south lies the Blackwater River main channel, a Depositing/Lowland River (FW2) which runs in a west to east direction with a public park, following the northern bank west to Mallow town. Within this park there lies Amenity Grassland (GA2) and Immature Woodland (WS2), which is separated by the existing footpath network. Some scattered trees and scrub were also noted growing in parts to the north and along the river bank itself.

The below sections provide further detail on the adjacent/linked habitats mentioned above.

13.6.5.1.9.1 BC1 – Arable Crops

Fields of arable crops are located directly east of the Proposed Development, adjacent to the eastern boundary and the old stone wall habitat. Further east lies a myriad of agricultural fields and associated

field boundaries, often marked by treeline and hedgerow habitat. This is a manmade habitat of low ecological value located east of the Site. It is noted that crops/farming management practices can provide a foraging source for some bird species. This habitat will not be impacted by the Proposed Development.

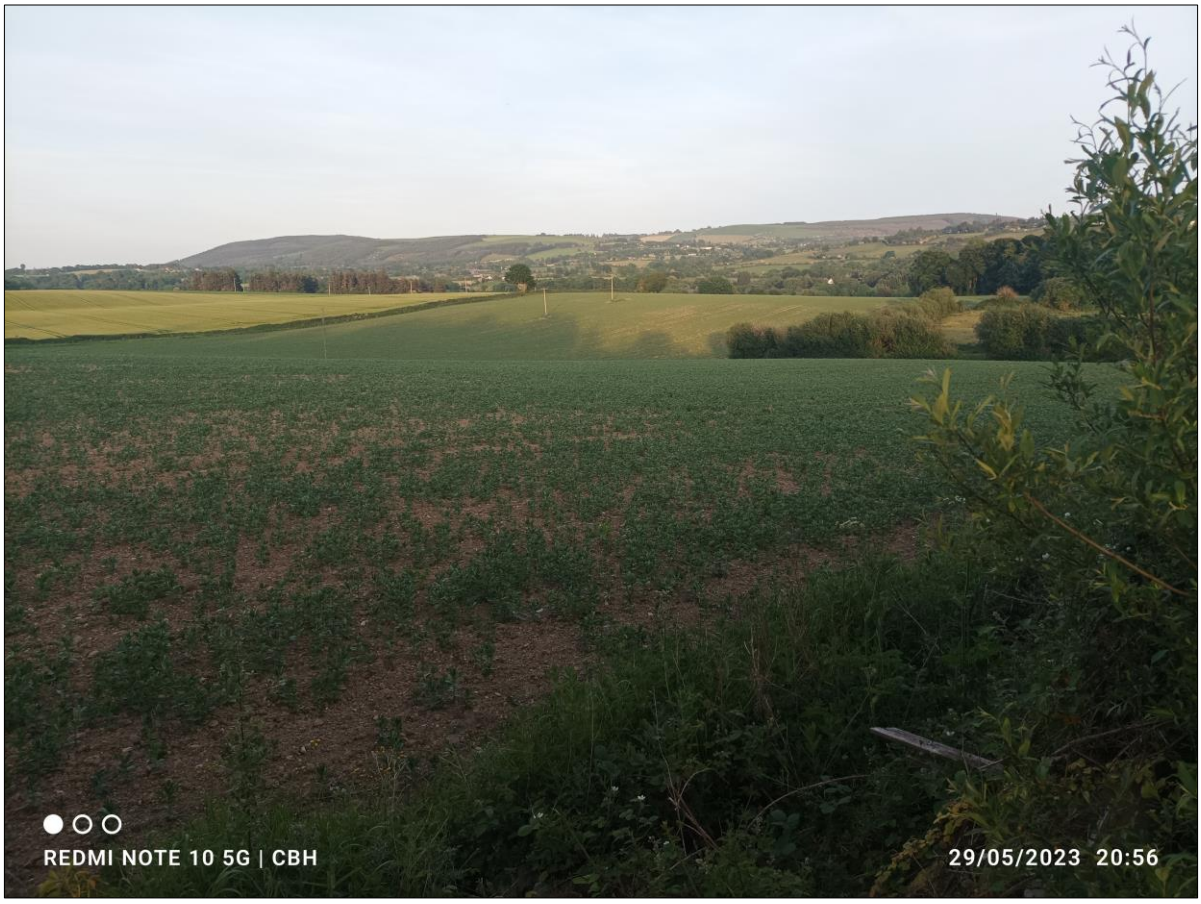

Figure 13-21: Example of Arable Crops (BC1).

13.6.5.1.9.2 BL3 – Buildings and Artificial Surfaces

This habitat type is present in the adjacent landscape in the form of buildings and artificial surfaces associated with the existing public road and path network and the adjacent residential estate and public school.

South of the Proposed Development along the green zone/public park are footpaths and footbridges associated with the existing 'Mallow Castlepark' walkway along the Blackwater River (Figure 13-22).

Figure 13-22: Example of Buildings and Artificial Surfaces (BL3).

13.6.5.1.9.3 FW2 – Depositing/Lowland River

The Blackwater River is located along the southern extent of the applicant's landholding, approx. 80m south of the Proposed Development's southern Site boundary. This river is a 5th order river which flows west to east, eventually flowing into the southern Irish Sea at Youghal ca.55km south-east, as the crow flies, from the Site of the Proposed Development. This river also forms part of the Blackwater River (Cork/Waterford) SAC (002170). Although outside of the Site Boundary, there is the potential for surface/foul water arising from the Proposed Development to impact on this habitat.

Figure 13-23: Example of Depositing/Lowland River (FW2).

13.6.5.1.9.4 GA2 – Amenity Grassland

Amenity grassland habitat occurs within the greenzone to the south of the Site (Figure 13-24) and occurs in mosaic with other habitat types present within this section, predominantly on either side of the existing footpaths and footbridges associated with this local amenity. Relatively low ecological value in the local/Site context, low diversity of flora, and is a highly managed habitat. Some value as commuting/foraging habitat for mammals.

Figure 13-24: Example of Amenity Grassland on Site (GA2).

13.6.5.1.9.5 WL2 – Treelines

Treeline habitat occurs along the margins of the Site, specifically along the eastern extent. To the northeast, an immature treeline of oak (*Quercus sp.*) species is located just outside the existing fence boundary for the Site. Tree species within this treeline include Oak and Birch. An example of a treeline present within the Site is shown below (Figure 13-25). The Cork County Biodiversity Action Plan (2009-2014) highlights the importance of woodlands, trees and hedges as wildlife corridors.

Figure 13-25: Example of Treelines on Site (WL2).

13.6.5.1.9.6 WS2 – Immature Woodland

Immature woodland is located to the south of the Site boundary, within the greenzone amenity area (Figure 13-26). Here small sections of trees have been planted within the amenity grassland habitat at various intervals. Tree species planted were Birch (*Betula sp.)* trees. The Cork County Biodiversity Action Plan (2009-2014) highlights the importance of woodlands, trees and hedges as wildlife corridors.

Figure 13-26: Example of Immature Woodland on Site (WS2).

13.6.5.2 Fauna

13.6.5.2.1 Bats

13.6.5.2.1.1 Preliminary Bat Roost Assessment Results

During the Site visit in February 2023, a preliminary bat roost assessment was conducted on all trees and buildings within the Site. No evidence of bats was detected on Site and the trees present were assessed as having *negligible* value for roosting bats (Collins, 2016). No evidence of roosting bats was present, nor were any significant gaps or cracks evident on the trees capable of supporting roosting bats.

The three buildings (A, B, C) present to the southwest of the Site were also assessed for their potential to provide suitable roosting habitat for bats. It is noted that all three buildings, which were clustered together in the southwest section of the Site, were also located close to the Site boundary (marked by iron fencing) which separates the Site from the existing residential estate. Owing to the proximity of these buildings to the road and residential dwellings, significant light spill was observed on the buildings under assessment. Other than the fencing noted above, the habitats surrounding the buildings were open, primarily meadow/rank grassland and revegetating bare soil, with no linear features (other than the fencing) present such as hedgerow or treelines.

As part of the assessment, each building was inspected externally and internally in order to assess their individual suitability. The results of which are included in the below table (Table 13-17).

Table 13-17: Bat roost suitability assessment results for the three buildings on Site.

Building Ref.	Building Description	Potential Roost Features	Assessment Rating	Further Survey Required
A	Main House (Former Lodge)	Several emergence/re-entry points, roof space present, although internal inspection showed reduced access to this space than originally thought. Windows and doors were largely well sealed with wooden boards.	Moderate	Yes
B	Pump House	Two emergence/re-entry points noted near door frame and to rear of the building (although low to ground), otherwise a very well-sealed building. The window was largely well-sealed with wooden boards.	Low	Yes
C	Shed	Brick wall frame, no doors/windows, small, no loft space, corrugated roof, very exposed to the elements.	Negligible	No

13.6.5.2.1.2 Preliminary Habitat Suitability Assessment Results

The habitats present on Site were also assessed for their potential to provide suitable features which could be used by commuting and foraging bat species which may be present in the area. The dominant habitat types on Site were dry meadows and grassy verges, with areas of recolonising bare ground. The treeline to the west and northeast could provide some habitat suitability for bats to commute and forage along, although it is noted that these weren't well connected to the wider landscape. Within the greenzone to the south, however, the treelines, river, and immature woodland provide suitable habitat for bat species. This habitat within the greenzone, which is outside of the Proposed Development area and therefore is not being developed, has been assessed as having High suitability for commuting and foraging bats. All habitats within the boundary of the Proposed Development were assessed as having negligible commuting and foraging suitability.

13.6.5.2.1.3 Dusk Bat Activity Emergence Results

The three buildings (A,B,C) located on the southwest section of the Site were surveyed for their potential to provide suitable roosting habitat for bats. Table 13-17 above shows the roost suitability rating each building was assessed as having during the preliminary bat roost assessment survey. As building C (the shed) was assessed as having negligible roosting potential, no further surveys on this building were required. Building A was assessed as having moderate roosting potential, while building B was assessed as having low roosting potential.

As per BCT Guidelines (Collins, 2016) buildings assessed as having moderate roosting potential require two emergence surveys to be conducted between the months of May and September, with at least one of those surveys occurring between April and August.

Similarly, as per BCT Guidelines buildings assessed as having low roosting potential require a single emergence survey to be conducted between the months of May and August.

As such, two separate emergence surveys were carried out on building A, and one emergence survey was carried out on building B during the month of May 2023, as shown:

Table 13-18: Bat emergence survey dates on the buildings within the Site.

Building Ref.	Building Description	Assessment Rating	Date of Survey
B	Pump House	Low	11/05/2023
A	Main House (Former Lodge)	Moderate	15/05/2023
A	Main House (Former Lodge)	Moderate	29/05/2023

Complete survey information, including date, time and weather conditions are included in Appendix I. The results of these emergence surveys are shown in the below table:

Table 13-19: Results of the bat emergence surveys carried out on the buildings within the Site.

Building Ref.	Building Description	Date of Survey	Results
B	Pump House	11/05/2023	No bat passes, emergence or re-entrance activity were observed or recorded during emergence survey of building B
A	Main House (Former Lodge)	15/05/2023	No bat passes, emergence or re-entrance activity were recorded during emergence survey of building A. A single bat pass was observed high over the building at 22:00 moving north to south.
A	Main House (Former Lodge)	29/05/2023	No bat passes, emergence or re-entrance activity were recorded during emergence survey of building A. A single bat pass was observed high over the building at 22:01 moving north to south initially but circled back several times feeding over the area.

No bats were seen to emerge or re-enter any of the buildings on Site during said surveys. On the 15th of May 2023, a single bat pass was observed high over the main house building at 22:00 whereby the lone bat (most likely Leisler's (*Nyctalus leisleri*) bat) was observed moving rapidly in a north to south direction. This bat was considered to be commuting and was not seen to return.

On the 29th of May 2023, a single bat pass was again observed high over the main house building at 22:01. In this instance the bat was observed moving north to south initially, however, it circled over the area between the main house and the pump house several times, feeding over the area.

No other bats were seen or recorded during the emergence surveys.

Due to a lack of suitable habitats and roosting features at the Site, as well as lack of activity recorded during the dusk emergence surveys, the bat population within the Site is considered to be very limited. However, due to potential indirect effects on the 'High' suitability habitats outside of the southern boundary, and historical records within the vicinity of the Site for several species, a precautionary approach is applied. As such it is considered likely that the Site and the habitats outside the southern boundary may support regularly occurring local populations of the more common Irish bat species.

Emergence surveys showed no roosting activity, but bats are likely to commute/forage from this adjacent habitat through the Site. A lack of transect survey effort has been accounted for by considering bats as a higher value receptor. The works are set back from the Blackwater River and its floodplain, with the existing public park occurring intermediately.

Adopting a precautionary approach, it is considered that the Site has the capacity to support regularly occurring populations of foraging and /or commuting bats.

13.6.5.2.2 Birds

During the bird scoping and breeding bird surveys conducted in 2023, a total of 17 species of birds were recorded (Table 13-20). Of these, only the Meadow Pipit (*Anthus pratensis*) is Red-listed, with five species being Amber-listed, and the remaining eleven species being Green-listed (Gilbert et al. 2021).

Table 13-20: Bird species recorded during the walkover surveys of 2023 (X indicates presence).

Species	BoCCI Status	07/02/2023	15/05/2023	29/05/2023	15/07/2024	Notes
Meadow Pipit (*Anthus pratensis*)	Red	X				Flying over the Site
Yellowhammer (*Emberiza citronella***)**	Red				X	Probable Breeding **Off Site**. In Song at arable fields, c.100m northeast of Site boundary. On-Site habitat unsuitable for breeding.
Swift *(Apus apus)*	Red				X	Circling and calling over the Site including foraging and soaring. (6 birds). No suitable breeding habitat on-Site.
Goldcrest (*Regulus regulus*)	Amber	X				Flying across the Site
House Sparrow (*Passer domesticus*)	Amber		X			Perched on cable line northwest of the Site
Mallard (*Anas platyrhynchos*)	Amber	X				Mallard pair loafing on the Blackwater River, south of the Site
Starling (*Sturnus vulgaris*)	Amber	X	X		X	Flying over the Site, landing in fields and moving between the Site and surrounding habitats
Linnet (*Linaria cannabina*)	Amber				X	Mixed with Goldfinch flock on Site. Foraging only.
Swallow (*Hirundo rustica*)	Amber		X	X		Multiple Swallows observed feeding in fields within and east of the Site

Blackbird (*Turdus merula*)	Green	X	X	X		Male and female, throughout site on the ground feeding and in suitable breeding habitat
Blue Tit (*Cyanistes caeruleus*)	Green			X		One male observed calling on tree above stone wall along the eastern boundary
Coal Tit (*Periparus ater*)	Green		X			Perched in treeline along western boundary
Great tit (*Parus major*)	Green	X				-
Hooded Crow (*Corvus cornix*)	Green	X	X			Flying over the Site and occasionally landing to feed
Magpie (*Pica pica*)	Green	X				Flying over the Site
Pheasant (*Phasianus colchicus*)	Green			X		Heard calling only
Robin (*Erithacus rubecula*)	Green	X				-
Rook (*Corvus frugilegus*)	Green	X	X			Flying over the Site and occasionally landing to feed
Stonechat (*Saxicola torquata*)	Green	X	X		X	Male and female calling near area of hard-standing (BL3 habitat)
Woodpigeon (*Columba palumbus*)	Green	X	X	X		Flying over the Site
Goldfinch (*Carduelis carduelis*)	Green				X	Mixed with Linnet flock on Site. Foraging only.
Reed Bunting (*Emberiza schoeniclus*)	Green				X	Present
Raven (*Corvus corax*)	Green				X	Present off Site over mature woodland/ parks.

While no nests were observed and there are very little hedgerow and treeline habitats present on Site to support nesting birds, most species observed during the May surveys could be considered breeding within the Site or surrounding area which would provide more suitable breeding habitat. It is noted that the field directly east of the Site contained crop which would provide a potential food source for and attract a variety of bird species. Considering the variety of bird species recorded both in the historical records and during the various field surveys, it is considered that the Site contains resident and regularly occurring, locally important populations of bird species protected under the Wildlife Act.

13.6.5.2.3 Non-volant Mammals

During the ecological walkovers the Site was checked for any evidence of fauna presence/activity on Site. No evidence of badger (*Meles meles*) activity was observed.

While there was very limited suitable habitat at the Site for Badger and they are considered unlikely to be regularly present, they could potentially commute/forage from the surrounding area, and they also have the potential to move into the Site pre-construction.

There were some mammal trails traversing the Site which could be used by Fox (*Vulpes vulpes*). Although a local domestic cat was observed using the Site to hunt on several occasions. Fox was heard and observed on the 11th of May 2023 prior to the commencement of a bat emergence survey within the southwestern corner of the Site boundary.

Droppings of European Rabbit (Oryctolagus cuniculus) were observed in February 2023, while visual observations for this species was made in May 2023. They were largely concentrated along the eastern extent, near the stone wall habitat, which borders improved agricultural grassland habitat, and burrows were observed at the base of this habitat, belonging to this species.

Other, smaller mammals such as Hedgehog (*Erinaceous europaeus*) and Pygmy Shrew (*Sorex minutus*) were not observed, although it is considered that the treeline habitat along the Site margins could provide potentially suitable shelter/commuting habitat for these species.

13.6.5.2.4 Other Fauna

13.6.5.2.4.1 Amphibians

There were no bodies of standing water present which could provide suitable breeding habitat for Common Frog. While no amphibians or suitable habitat for same were observed during the site walkovers, with the exception of the dry meadow and grassy verge habitat which could potentially provide suitable sheltering habitat for Common Frog. Therefore, the Site is considered to have the capacity to support regularly occurring populations of Common Frog.

13.6.5.2.4.2 Reptiles

While no observations of Common Lizard (*Zootoca vivipara*) were observed, there is some suitable habitat for this species within the Site of the Proposed Development, particularly within the eastern boundary stone wall which provides suitable sheltering habitat, particularly due to the presence of various cracks and crevices within the wall.

In addition, the dry meadow and grassy verges could provide suitable sheltering/foraging habitat for this species. As no targeted surveys for Common Lizard were carried out, it is assumed under the precautionary principle that a locally important population of this species may be present at the Site.

Therefore, the Site is considered to have the capacity to support regularly occurring populations of Common Lizard.

13.6.5.2.4.3 Fish (and other aquatic species)

There are no waterbodies within the Site of the Proposed Development that could support notable fish species such as salmonids or lampreys. However, the Site occurs just north of the Blackwater River which is known as a salmonid river and supports a Brown Trout (*Salmo trutta*) population as well as Sea Trout in addition to a significant and biologically valuable population of Atlantic salmon. Atlantic Salmon is listed under Annex II and V of the EU Habitats Directive. As such, the fish assemblage of the Blackwater River will be considered as part of this Chapter under the entity of 'Fauna of the Blackwater River'.

While there is no suitable habitat present within the Site, fish species can be considered present in the Blackwater River south of the Site, which is hydrologically linked to the Site via surface and ground water run-off.

13.6.5.2.4.4 Molluscs

Freshwater Pearl Mussel (*Margaritifera margaritifera*) (FPM) are a Qualifying Interest (QI) species of the Blackwater River SAC. While no waterbodies occur within the Proposed Development, the Site occurs just north (28m) of the Blackwater River and so is subject to surface/ground water runoff from the Site. FPM are listed under Annex II of the EU Habitats Directive.

No dedicated surveys for FPM were conducted, however, given the importance of the Blackwater River for this Annex II species, and historical records for same (NPWS and NBDC) along the main Blackwater River Channel, it can be assumed that FPM are present in the Blackwater River, south of the Proposed Development.

While there is no suitable habitat present within the Site, this species can be considered present in the Blackwater River south of the Site, which is hydrologically linked to the Site via surface and ground water run-off. FPM will be considered as part of this Chapter under the entity of 'Fauna of the Blackwater River'.

13.6.5.2.4.5 Otter

There are no watercourses present within the Site boundary suitable of supporting Otter. However, it should be noted that the Blackwater River (main channel) is located directly south of the Site and does contain suitable habitat for this species.

While there is no suitable habitat present within the Site, this species can be considered present in the Blackwater River south of the Site, which is hydrologically linked to the Site via surface and ground water run-off.

13.6.5.2.4.6 Terrestrial Invertebrates

No rare or protected species of invertebrates were recorded during the Site walkovers. However, several Holly Blue (*Celastrina argiolus*) butterflies were observed and once instance of Cinnabar Moth (*Tyria jacobaeae*). The Site exhibited very little floral diversity overall for invertebrate species, however, the small stands of Butterfly Bush recorded on Site could attract pollinators and other invertebrates to the Site.

13.7 Evaluation of Ecological Features.

Habitats have been evaluated for their conservation importance, based on the NRA evaluation scheme (NRA, 2009b). Those selected as KERs are those which are evaluated to be of at least local importance (higher value).

Fauna that has the potential to utilise the Site and immediate area of the Proposed Development, or for which records exist in the wider area, have been evaluated for their conservation importance. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b).

The results of this evaluation for each ecological feature occurring at the Site are given in Table 13-21 below.

Table 13-21: Evaluation of Habitats within the Proposed Development Site (Grey shading is indicative of habitats that have been selected as a KER for this Development).

Species/Species Group	Evaluation	Rationale	Key Ecological Receptor (KER)
DESIGNATED SITES			
Blackwater River (Cork/Waterford) SAC (002170)	International Importance	Occurs south of the Proposed Development and is hydrologically linked via surface run-off and ground water. High Value, internationally important habitat.	Yes
Kilcolman Bog SPA (004095)	International Importance	Located 11.5km north of the Proposed Development Site with no potential pathways identified between same.	No
Ballinvonear Pond pNHA (000012)	National Importance	Located 13.95km north of the Proposed Development Site with no potential pathways identified between same.	No
Awbeg Valley (Below Doneraile) pNHA (000074)	National Importance	Located 12.17km northeast of the Proposed Development Site with no potential pathways identified between same.	No
Awbeg Valley (Above Doneraile) pNHA (000075)	National Importance	Located 9.26km northeast of the Proposed Development Site with no potential pathways identified between same.	No
Bride/Bunaglanna Valley pNHA (000079)	National Importance	Located 14.17km southeast of the Proposed Development Site with no potential pathways identified between same.	No
Kilcolman Bog pNHA (000092)	National Importance	Located 11.33km north/northeast of the Proposed Development Site with no potential pathways identified between same.	No
Eagle Lough pNHA (001049)	National Importance	Located 10.77km north/northwest of the Proposed Development Site with no potential pathways identified between same.	No
Blackwater Valley (Killavullen) pNHA (001080)	National Importance	Located 7.89km east and downstream of the Proposed Development Site with a hydrological pathway between same.	Yes
Awbeg Valley (Castletownroche) pNHA (001561)	National Importance	Located 11.43km northeast of the Proposed Development Site with no potential pathways identified between same.	No
Blackwater Valley (Ballincurrig Wood) pNHA (001793)	National Importance	Located 9.78km east and downstream of the Proposed Development Site with a hydrological pathway between same.	Yes
Blackwater Valley (Kilcummer) pNHA (001794)	National Importance	Located 11.63km east and downstream of the Proposed Development Site with a hydrological pathway between same.	Yes
Ballyhoura Mountains pNHA (002036)	National Importance	Located 13.44km north of the Proposed Development Site with no potential pathways identified between same.	No

Blackwater Valley I-WeBS Site (0M404)	International Importance	Located downstream of the Proposed Development Site with a hydrological pathway between same.	Yes
HABITATS			
BL1 – Old Stone Wall	Local Importance (Lower Value)	Small habitat extent that is isolated from other shelter habitats, some albeit limited biodiversity and ecological value for small mammals. However, it is noted that this habitat is being retained so impacts on same from Phase 1 of the Proposed Development are not foreseen.	No
BL3 – Buildings and Artificial Surfaces	Buildings - Local Importance (Higher Value) Artificial Surfaces (Negligible)	The three buildings on Site do provide some suitability for nesting/roosting birds and have the potential to support roosting bats in the future although no evidence of the same have been identified. Precautionary approach is taken by assigning this habitat a higher ecological value. The remaining artificial surfaces which comprise existing hard-standing areas within the Site provide low ecological value. The entirety of these hard-standing areas will be removed to facilitate the Proposed Development.	Yes
ED2 – Spoil and Bare Ground	Local Importance (Lower Value)	This is a highly disturbed and often transient habitat with low biodiversity value. The entirety of this habitat will be lost to facilitate the Proposed Development.	No
ED3 – Recolonising Bare Ground	Local Importance (Lower Value)	Highly disturbed and unnatural habitat which provides low ecological value. However, some ground flora species were observed. Transitional habitat. The entirety of this habitat will be lost to facilitate the Proposed Development.	No
ED5 – Refuse and Other Waste	Negligible	Highly disturbed and unnatural habitat which provides low ecological value.	No
GS2 – Dry Meadows and Grassy Verges	Local Importance (Higher Value)	Habitat covers majority of Site (dominant habitat type), semi-natural habitat with some importance to local wildlife. Entirety will be lost to facilitate Proposed Development.	Yes
WD5 – Scattered Trees and Parkland	Local Importance (Higher Value)	Small extent of scattered trees isolated from other shelter habitats, largely comprising very immature trees/saplings which provide limited biodiversity and ecological value.	Yes
WL2 – Treeline (Western boundary)	Regional/County Importance	The Cork County Biodiversity Action Plan (2009-2014) highlights the importance of woodlands, trees, and hedges as wildlife	Yes

		corridors. Mature (albeit short) treeline which provides habitat for wildlife and forms an ecological corridor. This habitat will be retained in its entirety, however, works in proximity to this habitat, during the Construction Phase, could potentially cause damage on the roots of the trees or trees themselves.	
ADJACENT AND LINKED HABITATS			
BC1 – Arable Crops	Less than Local Importance	Manmade habitat of low ecological value located east of the Site. Although it is noted that crops/farming management practices can provide a foraging source for some bird species. Not impacted by the Proposed Development.	No
BL3 – Buildings and Artificial Surfaces	Negligible	Artificial habitat associated with the adjacent (to the west) residential estate, southern public park, and urban fabric. Provides low ecological value.	No
FW2 – Depositing/Lowland River (The Blackwater River)	International Importance	The Blackwater River (Munster) is both designated as an SAC and is an important salmonid river system and ecological corridor as recognized in the CDP and under SI 293 of 1988, as such all associated habitats (watercourses, riparian habitats etc.) and species are protected under several policies and objectives. Hydrologically connected to the Site via surface/ground water run-off to the South (80m).	Yes
GA2 – Amenity Grassland	Local Importance (Lower Value)	Relatively low floral diversity and limited evidence of fauna use across this habitat. Also, evidently under frequent maintenance which likely limits ecological value further. Located south of the Site, north of the Blackwater River.	No
(WL2) – Treeline (Eastern boundary)	Regional/County Importance	The Cork County Biodiversity Action Plan (2009-2014) highlights the importance of woodlands, trees, and hedges as wildlife corridors. Mature (albeit short) treeline which provides habitat for wildlife and forms an ecological corridor. This habitat is located entirely outside the Site boundary and will not be impacted by the Proposed Development.	No
WS2 – Immature Woodland	Regional/County Importance	The Cork County Biodiversity Action Plan (2009-2014) highlights the importance of woodlands, trees, and hedges as wildlife corridors. This is a manmade habitat with very immature trees located along the existing park to the south of the Site, along	No

		the Blackwater River. This habitat will not be impacted by the Proposed Development.	
FLORA			
Rare & Protected Flora	Local Importance (Lower Value)	No rare or protected flora were recorded during the field surveys. Unlikely to be present in notable numbers/densities.	No
Invasive Species	Negligible value	Limited stands of Butterfly Bush and a single stand of New Zealand Flax that provide little ecological value. However, there is a risk of introduction of invasive plant species to the Site during the Construction Phase.	No
NATIVE FAUNA			
Bat Assemblage	Local Importance (Higher Value)	Site habitats assessed as negligible suitability, however, high suitability habitat located outside and adjacent to Site of the Proposed Development along its southern boundary. A lack of transect survey effort has been accounted for by considering bats as a higher value receptor. Emergence surveys showed no roosting activity but bats likely to commute/forage from this adjacent habitat through the Site. The works are set back from the Blackwater River and its floodplain, with the existing public park occurring intermediately.	Yes
Bird Assemblage	Local Importance (Higher Value)	Variety of red, amber and green listed species recorded at the Site during scoping and breeding surveys, with suitable breeding habitat for a few notable species (e.g., Meadow Pipit and Yellowhammer).	Yes
Badger	Local Importance (Higher Value)	Very limited suitable habitat at the Site for these mammals. Unlikely to be regularly present, however, they could potentially commute/forage from the surrounding area, and they also have the potential to move into the Site pre-construction.	Yes
Pine Marten	Local Importance (Lower Value)	Very limited suitable habitat at the Site for these mammals. Unlikely to be regularly present.	No
Fox	Local Importance (Lower Value)	Not legally protected in Ireland. No evidence of Fox at the Site.	No
Hedgehog Pygmy Shrew	Local Importance (Higher Value)	Some commuting and foraging habitat suitability is present for these small native mammals at the Site, and European Rabbit has been observed on several occasions within the Proposed Development Site.	Yes

Common Frog	Local Importance (Higher Value)	Suitable habitats in areas dry meadows and grassy verges that could support regularly occurring populations of Common Frog.	Yes
Common Lizard	Local Importance (Higher Value)	Suitable habitats present particularly within old stone wall habitat. Considered likely to occur regularly at the Site.	Yes
Fauna of the Blackwater River: • Otter • Fish assemblage • Fresh Water Pearl Mussel	International Importance And County Importance	No suitable habitat present within the Site, however all listed species are considered present in the Blackwater River south of the Site, which is hydrologically linked to the Site via surface and ground water run-off.	Yes
Terrestrial Invertebrates	Less than Local Importance	Very little floral diversity on Site, unlikely to contain regular populations of any protected or threatened terrestrial invertebrate species.	No

13.8 The 'Do nothing' Scenario

If the Proposed Development was not to go ahead, habitats at the Site of the Proposed Development would continue to evolve, particularly if the lack of management currently exhibited on Site is maintained. Eventually, the recolonising bare ground habitat and dry meadows and grassy verges habitats would likely transition to scrub. The Site would likely continue to be used by various local fauna such as bats, birds, fox, and hedgehog.

13.9 Potential Significant Effects

13.9.1 Construction Phase

13.9.1.1 Impacts on Designated Sites

13.9.1.1.1 European sites

The closest European sites to the Site of the proposed development ais the Blackwater River (Cork/Waterford) SAC (002170) which is located adjacent to the southern Site boundary. The AA Screening Report concluded that a degree of uncertainty exists in whether the Proposed Development could give rise to potentially significant effects on a nearby European site, namely on the Blackwater River (Cork/Waterford) SAC (002170).

Therefore, a Natura Impact Statement (NIS) has been prepared for the Proposed Development. The purpose of the NIS report is to provide information for the relevant competent authority to carry out a Stage 2 Appropriate Assessment in respect of the Proposed Development. The NIS report is presented in a separate document with this application, the conclusions of which are presented below:

"This NIS details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect impacts of the Mixed-used Residential Development, located at Castlelands, Mallow, Co. Cork, on the following European Sites:

- *Blackwater River (Cork/Waterford) SAC (002170).*

The above site was identified by a screening exercise that assessed likely significant effects of a range of impacts that have the potential to arise from the Proposed Development. The AA investigated the potential direct and indirect effects of the proposed works, both during construction and operation, on the integrity and qualifying interests of the above European Site, alone and in combination with other plans and projects, taking into account the site's structure, function and conservation objectives.

Where potentially significant effects were identified, a range of mitigation and avoidance measures have been recommended to avoid them. This NIS has concluded that, once the avoidance and mitigation measures are implemented as proposed, the Proposed Development will not have an adverse effect on the integrity of the above European site, individually or in combination with other plans and projects. Where applicable, a suite of monitoring surveys have been proposed to confirm the efficacy of said measures in relation to ensuring no adverse impacts on the QI habitats and species of the relevant European sites have occurred.

As a result of the complete, precise and definitive findings in of this NIS, it has been concluded, beyond reasonable scientific doubt, that the Proposed Development will have no significant adverse effects on the QIs of, and the integrity and extent of, the Blackwater River (Cork/Waterford) SAC (002170).

Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European site."

13.9.1.1.2 Proposed Natural Heritage Areas (pNHAs) and Natural Heritage Areas (NHAs)

There no NHAs located within the zone of influence of the Proposed Development with an S-P-R pathway. The closest pNHA is the Blackwater Valley (Killavullen) pNHA (001080) which is located 7.89km southeast and downstream of the Proposed Development Site. There are two more pNHAs: Blackwater Valley (Ballincurrig Wood) pNHA (001793) and Blackwater Valley (Kilcummer) pNHA (001794) which are located 9.78km and 11.63km located further downstream of the Proposed Development Site. Therefore, all three pNHAs identified have the same hydrological pathway from the Site.

In terms of potential impacts, the AA screening (Enviroguide, 2023) has identified the presence of a surface water pathway during construction and operation where surface water will be discharged to the surface water network and foul water will be treated at Mallow WWTP. The surface water network discharges to the Blackwater River which flows to the aforementioned pNHAs further downstream. There is also the potential for land (surface water) and air pathways to occur, owing to the Proposed Development, which is assessed below.

With regards to the Blackwater River, the Natura Impact Statement (NIS) Report concludes that the Proposed Development will not impact on the European sites within Blackwater River, including via surface water pathway, once all mitigation measures outlined in the NIS are implemented accordingly. As the pNHAs located within the Blackwater River have the same receptors, these are covered by the assessment in the NIS report and are therefore not considered further in this Chapter.

In addition, any pNHAs that occur upstream of the above-mentioned sites, with no other pathway to the Proposed Development (land, air or groundwater) can also be ruled out for further assessment in this report, e.g., Kilcolman Bog pNHA (000092).

The following pNHA sites occur directly upstream from the Blackwater River segment into which the Proposed Development is likely to drain: Eagle Lough pNHA (001049) and Awbeg Valley (Castletownroche) pNHA (001561). As such, these sites are not considered to be within the ZOI and are therefore not considered further in this Chapter.

And finally, the Ballyhoura Mountains pNHA (002036) is designated for terrestrial habitats, meaning the only potential connection to the site would be via air pathways. However, accounting for the type of habitats present, the prevailing winds, the distance between these sites and the Proposed Development, these sites are not considered to be within the ZOI and are therefore not considered further in this Report.

There are no remaining pNHA sites with a potential impact pathway connecting to the Proposed Development and as such, the only sites with a potential connection were those listed above, which have been ruled out, therefore is no need for further assessment of NHA/pNHAs in this Report.

13.9.1.1.3 Other Designated Sites

The Blackwater river is a designated Salmonid river under S.I. 293: European Communities (Quality of Salmonid Waters) Regulations, 1988. In addition, the Blackwater Valley is a designated I-WeBS Site located c.7km downstream of the Proposed Development Site with a hydrological pathway between same via the Blackwater River: Blackwater Valley I-WeBS Site (0M404). As such, this I-WeBS Site has the same hydrological pathway from the Site (Figure 13-27).

As with the pNHAs above, with regards to the Blackwater River, the Natura Impact Statement (NIS) Report concludes that the Proposed Development will not impact on the European sites within Blackwater River, including via surface water pathway. As the designated Salmonid and I-WeBS Site are both located within the Blackwater River, they have the same receptors and these are covered by the assessment in the NIS report and is therefore not considered to be impacted once all mitigation outlined in the NIS is implemented accordingly. Accounting for this, and, given the intervening distance between the I-WeBs site (and sub-sites contained therein) and the Proposed Development (>7km), the potential for impact on the above owing to the project is unlikely to occur.

Figure 13-27: Location of the Blackwater Valley I-WeBS Site (and sub-sites) (blue shading) in relation to the Proposed Development (blue box).

It should be noted that some of the Blackwater Valley I-WeBS subsites occur upstream of the Proposed Development, and so impacts from surface water run-off from the Site upon same are not foreseen. Operational Phase foul waters will be directed to Mallow WWTP upstream of these Sites for treatment and subsequent discharge. The Mallow WWTP has undergone recent upgrade works increasing the capacity of the plant to 22,000 PE initially, with an ability of future expansion to 24,595 PE. As part of the upgrade, a new Mallow Bridge Wastewater Pumping Station, storm tank, and rising main meant excess stormwater would no longer overflow into the Blackwater River and instead would flow to the newly constructed Storm Tank with a capacity of 2,400 m3. The following is noted on Irish Waters website (Irishwater.ie) with regard to said improvement works:

"Uisce Éireann first began work on the original WWTP, which was outdated and overloaded, with Glan Agua back in early 2021. The project also involved the construction of a new pumping station and stormwater holding tank at Mallow Bridge. A separate contract to upgrade the wastewater network was signed with Ward & Burke Construction Ltd in early 2021. Work commenced in April 2021 and was completed in January 2023. The overall investment of €34m in these two projects will provide the additional capacity in the wastewater network and at the wastewater treatment plant to cater for current and future development and housing in the Mallow area and will also improve water quality in the River Blackwater through the provision of an enhanced wastewater treatment plant and the removal of eight combined storm overflows".

Accounting for all of the above, potential impacts from foul waters arising from the Operational Phase of the Proposed Development on the Blackwater Valley I-WeBS Site (and sub-sites) are not foreseen.

13.9.1.2 Impacts on Habitats and Flora

13.9.1.2.1 Habitats on Site

The existing buildings on Site will be demolished to facilitate the Proposed Development. As the field surveys concluded that these structures provided limited value to local wildlife (based on bat and bird surveys), the loss of habitat is considered to have only an **imperceptible** impact at a local scale.

The majority of the Site is comprised of dry meadows and grassy verges habitat (GS2) that has recolonised from bare ground habitat (ED3) which will be removed to facilitate the Proposed Development. This is considered to have a **negative, short-term, slight** impact on a local scale.

Some sections of scattered trees and parkland will be lost due to the Development. However, it is noted that the scattered trees (WD5) observed on Site were sparse and very immature Willow sapling trees that were revegetating. This habitat occurs in mosaic with small sections of scrub (WS1) to the west (next to the rear gardens of existing residential dwellings in the estate to the west). Both habitats will be lost entirely to facilitate the Proposed Development. The scrub habitat is Bramble dominant. Overall, the loss of habitat and risk of damage to roots or overground growth is considered to have a **negative, short-term, slight** impact on a local scale.

As per the landscape proposal prepared by Simon Ronan Landscape Architects (SRLA, 2023) and as detailed in their Landscape Design Statement, it is proposed to retain the treeline habitat (WL2) to the west and the old stone wall that runs along the eastern section of the Site (Figure 13-4). Other than these linear features, which are rather small and isolated, there are no habitats of significant ecological value present at this Site. Which was previously disturbed due to clearance works to facilitate a previous planning development several years ago, which was subsequently abandoned. In the absence

of precaution, works near the retained treelines or scattered trees could cause damage to the underground root systems or overground growth of the trees. This constitutes a potential **negative, long-term, moderate** impact at a local scale.

Overall, the habitats present on Site comprise provide relatively low ecological value. Habitats lost e.g., grassland, scrub and scattered trees) to facilitate the Development are to be reinstated (per SRLA landscape plan) with further planting (to include a variety of meadow grassland, scrub, trees, hedgerow, and ground floor/perennial species) proposed to connect habitat features on Site, not just throughout the Development but also to the southern section of the Site, which lies at a remove of 80m from the Blackwater River, existing public park that intervenes, and higher value habitats associated with the Blackwater River, providing ecological corridors/connectivity for wildlife, and providing an overall **positive** effect on a local scale.

13.9.1.2.2 Adjacent and Linked Habitats

Surface water discharges associated with the Construction Phase of the Proposed Development may have the potential to cause deterioration of water quality within the Blackwater River in the absence of suitable mitigation, owing to the topography of the site, which is separated from the Blackwater River by 80m which includes the existing public park which provides an intermediate buffer between the Proposed Development and the Blackwater River.

In the absence of mitigation, pollutants may travel downstream along the River, and therefore this risk constitutes a potential **negative, short-term, significant** impact at the county scale.

13.9.1.2.3 Invasive Alien Plant Species

Two notable IAPSs were recorded on Site during the Site walkovers in 2023, namely: Butterfly Bush and New Zealand Flax. Butterfly Bush is a medium impact invasive species, while New Zealand Flax is a low impact invasive species. Figure 13-28 below shows the location of these invasive species recorded on Site.

In general, Butterfly Bush was found in small stands that were heavily associated with the built/disturbed ground habitat, while New Zealand Flax was found as a single stand to the rear of a nearby residential garden, most likely a garden escape.

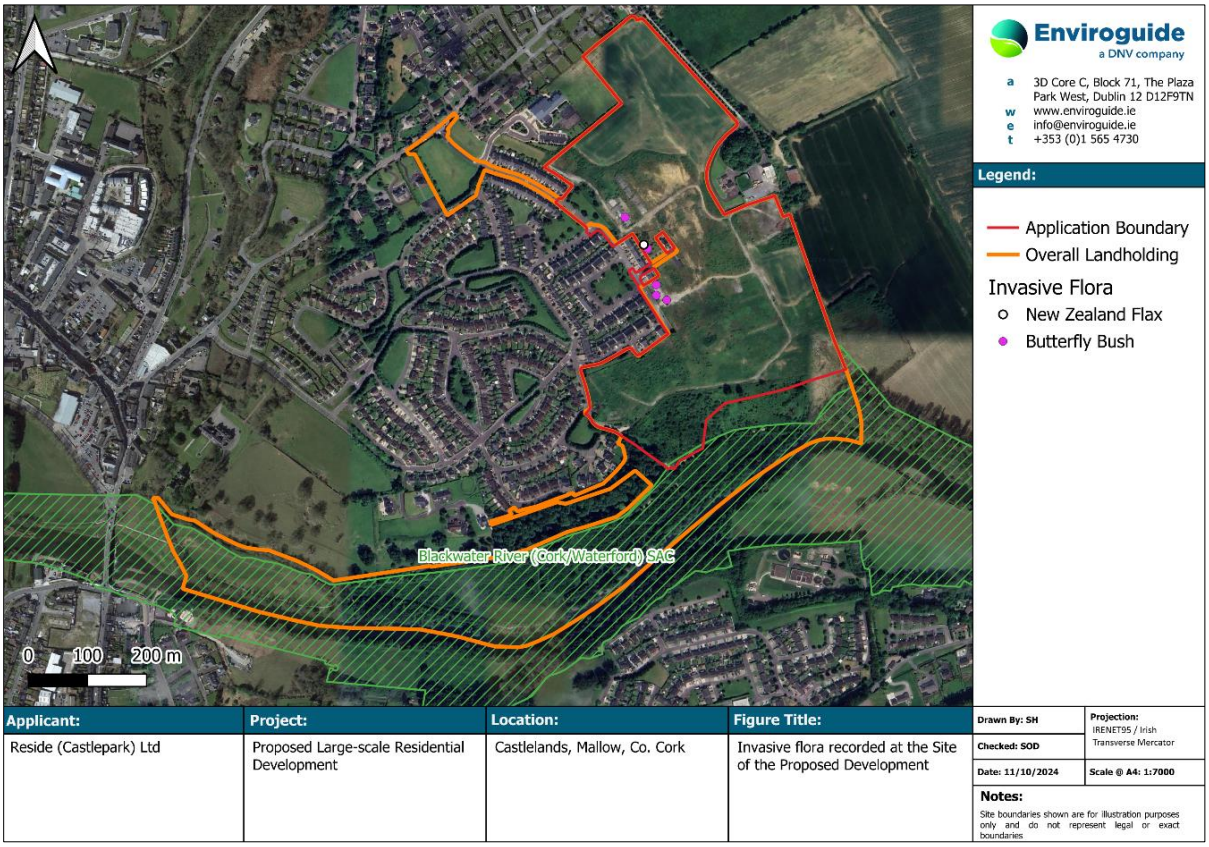

Figure 13-28: Location of Invasive Plant Species on Site.

It is noted that neither of these two species are high-impact species listed on the Third Schedule of European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011).

High-impact Cherry Laurel was also recorded as bushes in adjacent habitats to the north and east, however this species is not listed on the Third Schedule of S.I. 477 of 2011 and is located outside the Site boundary.

Should any of these invasive alien plant species be spread (either on or off-site) during the proposed works (e.g., vegetation clearance) they may cause nuisances at other locations. This is considered to have a potential **negative, long-term, moderate** impact at a site scale, while the impact is considered to be potentially **negative, long-term, significant** on adjacent habitats owing to their ecological importance.

Regarding the medium and lower-impact species; as these are not considered to be high-risk flora species, potential impacts of their spread can be addressed by good site biosecurity hygiene and best practice removal methods. Good biosecurity hygiene on Site can also prevent the introduction and spread of new species to the Site. TII (2020) guidance 'The Management of Invasive Alien Plant Species on National Roads – Technical Guidance' will be consulted with regard to the treatment, removal and disposal of invasive flora at the Site. Although not all KERs are deemed at risk of impacts associated with these invasive species, best practice mitigation and biosecurity measures are recommended in Section 13.10.3.1.2 below.

13.9.1.3 Impacts on Fauna

13.9.1.3.1 Bats

There was very limited suitable habitat for bat species present on Site. The only linear features present on Site were those in the form of a small treeline to the west and an old stone wall habitat to the east. Both provided some suitable habitat for bats, although it should be noted they were generally small isolated pockets of this habitat type that weren't well connected to the wider landscape. The grassland and scrub habitat (present to the west) also provide potentially suitable foraging/commuting habitat for bat species.

Bats are considered most likely to be using the high value habitat (and High bat suitability habitat) south of the Proposed Development, associated with the existing public park and Blackwater River, as the habitats contained therein provide much more suitable habitat for bat species. As the habitats located within the Proposed Development Site were assessed as being of low potential for bat species, transect activity surveys were not required. However, accounting for the proximity of this habitat to the Site, and the potential for bats to commute/forage from same into the Site, the habitats present on Site were considered local importance – higher value, as previously stated.

Dusk emergence surveys were carried out on the 3 no. vacant buildings present on Site, located towards the southwest boundary of the Site. The results of which determined that there were no bats using either of these buildings as a potential bat roost, as no bats were seen to emerge/re-enter any of these buildings during said emergence surveys. One two instances however, a single bat was observed flying high above building A (former lodge) the main and largest of the three buildings, moving in a south to north direction as it flew. While this species was not identified at the time using the handheld bat detectors, due to the height it was travelling at, it was considered likely to be a Leisler's bat owing to the flight height, emergence time and the habitats present at the Site. This bat (or bats, should it be a different bat that was observed each time) was considered to be commuting and foraging through the Site from the high value habitat located south of the Site.

These buildings are to be demolishes as part of the Proposed Development. However, accounting for the above, no roosting or potential roosting habitat will be demolished to facilitate the Proposed Development. The demolition of these buildings therefore represents an overall **neutral** impact on bats which may be using the Site. Especially when considering the demolition works, which could provide potential noise disturbance, will not take place outside of normal working (daylight) hours.

Additionally, the removal of suitable commuting and foraging habitat, i.e., grassland and scrub habitat and potential disruption to foraging and commuting bats due to Construction Phase lighting, is considered to constitute a potential **negative, permanent, slight** impact at a local level on bat species which may be utilising the Site, in the absence of mitigation measures.

The proposed landscape plan includes the planting of grassland glades and native understorey planting within the Site, in addition to extensive tree and hedgerow planting, thus providing favourable commuting/foraging habitats for bats during the Operational Phase of the Proposed Development.

13.9.1.3.2 Birds

The Proposed Development could have a potential **negative, permanent, moderate** impact at a local level on bird species utilising the Site such as Meadow Pipit and Yellowhammer, where present, in the

absence of mitigation measures, through injury or death during the removal of the grassland, scattered trees, and scrub habitat, as well as direct habitat loss.

In addition, the increased noise and dust levels associated with the Construction Phase of the Proposed Development, along with the loss of some nesting habitat (including the demolition of the existing vacant buildings on Site) has the potential to cause **negative, short-term, moderate** impacts on local bird populations in the absence of mitigation.

13.9.1.3.3 Non-volant Mammals

13.9.1.3.3.1 Potential Impacts on Badger (if present)

There was a distinct lack of evidence of Badger activity/Badger setts recorded during field surveys at the Site, however the Site does provide suitable habitat for commuting/foraging Badger, and, potentially for Badgers to move into the Site (pre-construction). The Proposed Development Site is located adjacent to an urban environment, on the suburb of Mallow Town, north of the Blackwater River, and west of existing agricultural lands. The grassland habitat to the south, adjacent to the Blackwater River is being retained. As such, it is considered that the removal of any suitable Badger habitat could result in a reduction in connectivity for this species. Accounting for the above, any habitat loss associated with Proposed Development will have an **imperceptible** and **neutral** impact on badger in the absence of mitigation.

There is the risk if Badger do frequent the Site, of construction related injuries or entrapment. This would represent a **negative, short-term, moderate** impact to Badgers at the local scale.

13.9.1.3.3.2 Potential Impacts on Small Mammals

The Proposed Development could have a potential impact at a local level on small mammals utilising the Site. During the Construction Phase, small mammal species, such as Hedgehogs and Pygmy Shrew, which may be present at the Site, have the potential to become trapped in trenches and entangled in construction materials such as netting and plastic sheeting, as well as other waste materials, causing entrapment and injury or death. Additionally, vegetation clearance could place small mammals at risk of death or injury. In the absence of mitigation measures and precaution, these risks constitute a **negative, short-term, significant** impact at a local level.

While evidence of Red Fox was observed during the field visits, and the removal of the GS2 grassland habitat could lead to a potential negative impact, Red Fox is not afforded any specific conservation in Ireland, other than that of the Wildlife Act 1976, as amended, and are considered a widespread and abundant species.

Disturbance of small mammal species due to lighting (particularly nocturnal species), noise and dust generated during the Construction Phase, although unlikely, is possible and, as such, a precautionary approach is adopted with these disturbances representing potential **negative, short-term, slight** impacts at a local scale in the absence of mitigation.

13.9.1.3.4 Other Fauna

13.9.1.3.4.1 Amphibians

While no amphibians were observed during any of the Site walkovers, the grassland habitat on Site does contain potentially suitable shelter habitat for amphibians such as Common Frog. As such, the removal of same to facilitate the Proposed Development could place any potentially present frogs at

risk of injury or death, with constitutes a potential **negative, permanent, moderate** impact on the local amphibian population in the absence of mitigation.

13.9.1.3.4.2 Reptiles

While no evidence of Common Lizard was observed during field surveys, there is some suitable habitat present on Site for this species in the form of dry meadows and grassy verges which provides suitable shelter/foraging habitat, and the old stone wall to the east which also provides suitable shelter habitat for this species.

As such, there may be some loss of foraging habitat to Common Lizard associated with the Proposed Development should this species be present on-site. This is offset somewhat by the landscape plan which includes the retention of the stone wall in its entirety that runs along the eastern extent of the Site boundary, and the hedgerow and grassland planting per the landscape plan.

Overall, the risk of injury and/or death from vegetation clearance, entrapment in construction related wastes, and the loss of suitable habitats at the Site constitute a potential **negative, short-term, slight** impact on locally occurring common lizard populations.

13.9.1.3.4.3 Fauna of the Blackwater River

There are no watercourses within the Proposed Development Site. However, the nearest watercourse is the Blackwater River which is located 80m south of the Proposed Development at its closest point. As such, there exists the potential for significant effects on fish, molluscs, Otter and other species of this freshwater habitat during the construction phase, in the absence of mitigation, via surface water run-off and potential pollution events from machinery.

13.9.2 Operational Phase

13.9.2.1 Impacts on Designated Sites

Also considered in this Biodiversity Chapter is the impact of the Proposed Landscape plan, particularly the proposal to plant native trees throughout the Site. This will not pose a negative impact to the species of the Blackwater River (including FPM) due to the underlying soil types and freely draining nature of the Site.

In terms of potential hydrological connections to downstream designated sites, Operational Phase impacts of the Proposed Development are deemed to be **neutral** due to the SuDs measures embedded in the project design which includes features such as soft landscaping, tree pits, swales, green roofs on apartment blocks, permeable paving, petrol interceptors, an attenuation pond, and a management train, which mitigate for any potential impacts of surface water-runoff from the Site. In addition, all foul water arising from the Proposed Development will be treated by an on-Site WWTP prior to treatment at Mallow WWTP and subsequent discharge into the Blackwater River.

As per the licencing application for Mallow WWTP, an NIS was produced which considered the conservation objectives of the QI/SCI species and habitats for which the Blackwater River SAS is designated. It is noted that it is not expected that foul waters generated by the Proposed Development will present any source of significant impacts to the Blackwater River SAC post treatment and discharge from the on-site WWTP and subsequently, Mallow WWTP, as the Proposed Development will not prevent the Mallow WWTP from achieving compliance with its ELVs.

It is also noted that the Mallow WWTP upgrade works are complete and have capacity for the Proposed Development connection to the existing network. As such, water quality impacts from same are not anticipated.

13.9.2.2 Impacts on Fauna

13.9.2.2.1 Bats

It is noted that the building heights do not pose a collision risk for bats. Irish bat species navigate largely by echolocation, and fixed structures, such as those proposed as part of the Proposed Development, present a negligible risk in terms of collision. Light spill from outdoor lighting and the proposed structures themselves, is the more likely source of obstruction to commuting bats.

Operational Phase public lighting could reduce areas of foraging and commuting habitat for local bats. This represents a **negative, permanent, significant** impact at the Development Site (at site scale) in the absence of any mitigation measures. The southern boundary of the Site will see the addition of an accessible footpath to connect to the existing footpaths within the parkland. This path will include low level lighting, however as the lux levels will be low and near the ground (using bollard mounted lights) this is not considered likely to have a notable impact any bats commuting or foraging along the Blackwater River or its adjacent habitats.

13.9.2.2.2 Birds

Noise and human activity disturbance impacts to breeding birds as a result of the Operation Phase of the Proposed Development would represent a **neutral, permanent, imperceptible** impact, considering the quality of habitats on Site, the existing urban environment to the west and north representative of Mallow Town (with similar levels of noise/human activity expected to arise from this proposal), and the habitats present to the east and south of the Proposed Development that are considered to provide higher value habitat for bird species in the area.

In addition, tall structures such as electrical pylons, wind farms and tall buildings can lead to fatal collisions with commuting bird species. This is particularly true for those species considered to be "poor" fliers, with relatively low manoeuvrability compared to other more agile bird species (see Eirgrid, 2012). While the Blackwater River is not a designated SPA, numerous bird species, in particular waterbirds are known to utilise this habitat.

Some of the most at-risk groups (classified as 'medium' and 'high' collision risk species) include wader species; waterfowl such as geese, swan and duck species; and some raptor species. Gulls such as Black-headed Gull (Larus ridibundus), Herring Gull (Larus argentatus), and Lesser Black-backed Gull (Larus fuscus) are classed as 'low' collision risk species due to their superior manoeuvrability when flying (Eirgrid, 2012).

Likelihood of Collision Impacts

The physical location of buildings and structures can influence the likelihood of bird collisions, with structures placed on or near areas regularly used by large numbers of feeding, breeding, or roosting birds, or on local flight path; such as those located between important foraging and roosting areas, can present a higher risk of collision.

The Site itself is located within agricultural lands and is not deemed to be located in a sensitive area in terms of bird flight paths i.e., it is not located along the coast, or adjacent to any SPAs designated

for wetland bird populations. The Site in itself is not deemed to represent suitable ex-situ feeding/roosting habitat for any such species (Habitats present largely comprise of recolonising rank grassland and treeline/scrub). See accompanying AA Screening Report for further detail.

Building Height

The Proposed Development entails the construction of low level residential buildings ranging in height from 2 - 3 storeys and as such, the risk of migrating birds colliding with the structure due to its height is deemed to be negligible (Migrating species tend to commute far above this with Swans and Geese flying up to 2500ft (ca.750m) during migration along Irish Coasts (Irish Aviation Authority, 2020). Birds that fly over the Site to commute between feeding grounds at various locations would fly lower than this, however, once the proposed structures are made of visible materials i.e., not entirely comprised of reflective materials such as glass, the birds would simply fly around or over them.

Building Appearance

The overall façades of the proposed buildings are well broken up, with a varied material composition interspersing any reflective areas. These architectural design features provide important visible cues as to the presence and extent of the proposed structures to any commuting/foraging bird species should they be in the vicinity of the Site. This overall visual heterogeneity of the building façades will be sufficient to further ensure that the risk of bird collisions as a result of the Proposed Development is negligible. These architectural design features are part of the overall design of the Proposed Development and are not considered to represent specific mitigation measures to prevent collisions, however, they will contribute to the overall effect in this regard. It is noted that birds are not deemed to be at any particular risk of collisions with the proposed buildings at the Site.

As such, based on the heights of the proposed structures, their physical appearance and the nature of their location, it is deemed that birds including any 'at-risk' species, do not have the potential to be impacted by the Proposed Development in terms of collisions and the risk is therefore deemed to be **imperceptible** in the absence of any mitigation.

13.9.2.2.3 Non-volant Mammals

The Proposed Development has the potential to impact small mammals via the fragmentation of commuting and foraging habitat. This is largely attributed to the design nature of residential developments which comprise units, particularly garden spaces, which occur in distinct separate areas, that are not generally connected to each other. As such, in the absence of suitable mitigation measures, this risk represents a **negative, permanent, moderate** impact on small mammals at a local scale.

No potential impacts on Badger as a result of the Operation of the Proposed Development are foreseen.

13.9.2.2.4 Other Fauna

13.9.2.2.4.1 Amphibians

SuDS measures including permeable paving, petrol interceptors, and attenuation ponds have been incorporated into the design to treat and minimise surface water runoff from the Site. The landscape plan also includes the reinstatement of grassland habitat (lawn and wildflower meadows) across the Site, with the retention of much of the grassland habitat along the southern margins of the Site.

Accounting for this, the potential impact to amphibians on Site or within connected watercourses during the Operational Phase of the Development is considered to be **positive, long-term, slight.**

13.9.2.2.4.2 Reptiles

No potential impacts on the Common Lizard are foreseen as a result of the Operational Phase of the Proposed Development.

13.9.2.2.4.3 Fauna of the Blackwater River

SuDS measures including permeable paving, petrol interceptors, and attenuation storage have been incorporated into the design to treat and minimise surface water runoff from the Site during its Operational Phase. Therefore, the potential impact to fish species within the Blackwater River during the Operational Phase of the Proposed Development is considered to be **neutral.**

The Operational Phase of the Proposed Development will see an increase in noise and human activity to the existing public park that runs contiguous to the northern bank of the Blackwater River, running east to west towards Mallow Town. A popular amenity at present amongst locals, including local dog owners/dog walkers. This increase in human activity is also likely to bring with it an increased number of dogs visiting the parks. Dog foul and flea and tick treatments used on pet dogs could potentially be introduced to the Blackwater River during the Operational Phase of the Proposed Development, as it is noted that access can easily be gained to the river by pets from within this park. Studies in the UK have shown that these flea and tick treatments impact water quality negatively and can even harm aquatic life (Preston-Allen et al, 2023). Should dog foul not be appropriately removed by pet owners, this can also result in a negative impact by adding increased nutrients from same on the local flora of the park, which could potentially migrate southwards into the Blackwater River.

As such, impacts on the Blackwater River and adjacent habitat from an increase in pet dogs to the area, could results in an overall **negative, permanent, moderate** impact locally, in the absence of mitigation measures.

Meanwhile, increased human activity and noise disturbance could provide a **neutral, permanent, imperceptible** impact on local fauna which may be using the area (e.g., Otter).

13.10 Avoidance, Mitigation, Monitoring and Enhancement

The above sections outlined a range of potential impacts of the Proposed Development in the absence of mitigation measures. Potential impacts arising from both the Construction and Operational Phases include:

- Water quality impacts on designated sites arising from a potential pollution event, surface water run-off and potential groundwater flows containing silt, sediments, and other harmful pollutants, during the Construction Phase, which could impact on the hydrological regime of the Blackwater River and subsequently, on the conservation objectives of the Blackwater River SAC and the targets/attributes of the QI/SCI groups for which it is designated;
- Water quality impacts on the Blackwater River SAC owing to a potential pollution event/as a result of hydraulic or organic overloading of Mallow WWTP leading to the release of untreated sewage into the Blackwater River and the associated European sites (including downstream sites);
- Spread of invasive flora species during the Construction Phase, and;

- Back flows through surface water outfalls during extreme flood events, leading to a build-up of surface water run off on the Site.

In addition, various Ecological, Environmental and Engineering Reports have been prepared by DOSA Consulting Engineers in support of the application for this Proposed Large-scale Residential Development which provides further information on the management plans proposed during both the Construction and Operational Phases. Information provided by the client and obtained from these reports have been referenced throughout this document and include the following:

- Construction and Environmental Management Plan (CEMP) Report (Enviroguide, 2024a)
- Infrastructure Report (DOSA, 2024a)
- Surface Water Management Plan (DOSA, 2024c)

In addition to the below the mitigation measures outlined in this section, measures to ameliorate noise, dust, vibrations, and other environmental nuisances (e.g., disposal of wastes arising from the Development) associated with the Construction Phase have been provided in detail in the CEMP, provided under separate cover, which should be read in conjunction with this Report.

As the CEMP is a live document, the final Construction Stage CEMP will be prepared by the Contractor and submitted to Cork County Council for approval prior to any works commencing on Site. The Contractors CEMP will include all of the mitigation measures detailed in this NIS and the Biodiversity Chapter (of the EIAR) (Enviroguide, 2024c) to ensure that no significant impacts to downstream EU sites or ecological receptors occur.

13.10.1 Avoidance by Design

The Proposed Development includes several embedded design features that may act to avoid or mitigate negative impacts that would likely occur in the absence of these features. However, as opposed to typical mitigation measures, the implementation of these features is integral to the design and completion of the Proposed Development, and as such the impact assessments are performed with consideration of these features as integrated parts of the Proposed Development. All considered embedded design features that may act to mitigate negative impacts on local ecology and environment are listed in Table 13-22.

Table 13-22: Embedded Design Features and their potential to act to avoid or mitigate negative impacts on the local ecology and environment.

Embedded Design Feature	Avoidance / Mitigation Potential
SUDS: ▪ Permeable Pavements ▪ Greenroofs ▪ Rainwater Harvesting ▪ Tree Pits ▪ Attenuation Tanks ▪ Flow Control Device ▪ Petrol Interceptor ▪ Swales ▪ Management Train	The SUDS features included in the Project Design will ensure the surface water discharge from the Proposed Development is reduced to greenfield runoff rates. These features will be implemented as part of the surface water drainage design.
▪ Landscape Design: ▪ Urban Greenway	Accounting for the listed design features, the retention of the mature treeline on Site and the reinstatement of

▪ Full Site landscape connectivity ▪ Nature Park ▪ Wildflower Meadows ▪ Attenuation pond and associated wet meadow planting.	trees and grassland lost to facilitate the Development, the Proposed Landscape Plan is expected to have an overall positive impact on a local scale.

Included in this section are avoidance measures that are embedded into the project design which will further serve to protect water quality of the Blackwater River (and any downstream designated sites), ensuring no impacts to the hydrological regime of the Blackwater River occur.

Avoidance measures integrated into the project design includes the provision of an on-site waste-water treatment plant to be constructed as part of the Proposed Development and all SuDS measures that have been incorporated into the design of the Proposed Development.

Infrastructure Report

An Infrastructure Report (IR) has been prepared by DOSA Consulting Engineers (2024a) in relation to this Proposed Development. The relevant sections from the IR are reproduced above and below to provide comprehensive information for the evaluation of the potential impacts of the Proposed Development. This includes the above listed attenuation and Sustainable Drainage Systems (SuDS) measures.

These SuDS elements have the capacity to retain and filter pollutants and assist with suspended solids removal prior to discharge in addition to providing attenuation on the surface and within filter materials. Due to the Site layout and topography, not all paved areas could be directed to bioretention areas/swales, but they have been included wherever practicable adjacent to roads and hard-standing areas along the southern section of the Site, receiving water from the adjoining lands and footpaths. The swales will allow for an element of infiltration but ultimately will have a connection to the attenuation system.

It is proposed to provide a hydrobrake or similar approved, at the outfall of the surface water catchment to restrict the flow of water from the subject site, as well as providing a petrol interceptor upstream of the attenuation tanks to ensure that any remaining hydro-carbons or pollutants within the runoff from trafficked areas are treated prior to outfall at the existing watercourse. These devices will remove hydrocarbons and fine sediment particles from the site runoff and lower the risk of downstream contamination following an oil spillage on site.

These SuDs measures which are embedded in the design of this project, serve to ensure a precautionary approach to the project design, given the sensitivities of the nearby Blackwater River and associated QI habitats, species and downstream designated sites.

13.10.2 Pre-Construction Phase

The following applies to all stages of the Pre-Construction Phase for the Proposed Development unless specific measures have been identified. This section lists mitigation measures which must be applied in advance of the commencement of any Construction Phase works on Site. In most cases, the pre-commencement mitigation measures listed below are measures which set out to establish ongoing management at the Site for the duration of the pre-construction, construction, and post construction (monitoring) phases until all works are completed. Deemed necessary due to the KERs at the Site as

well as proximity of the Site to the Blackwater River SAC, the potential impact pathways to same, and accounting for the sensitive nature of the QI/SCI group for which this SAC is designated.

13.10.2.1 Mitigation 1: Ecological Clerk of Works (ECOW)

Prior to the commencement of the Construction Phase, the Site Ecologist will be on Site to ensure that the silt fences and bunding are correctly positioned in the correct locations and are effectively managed to ensure any run-off from these areas is intercepted.

In addition, the ECOW will prepare a Schedule of Work Operation Record (SOWOR) for the Development, in consultation with the Employers Representative and Contractor. All method statements prepared for the Construction Phase will be included and transferred into the SOWOR.

13.10.2.2 Mitigation 2: Preparation of a Water Management System

All water protection measures will be incorporated into a detailed Water Management System (WMS) which will be prepared by the contractor.

The WMS will be drawn up in consultation with the ECoW and Employers Representative and will take into account any changes in the physical conditions of the Site e.g. river flows or ground conditions, which may have occurred subsequent to the submission of the application.

13.10.2.3 Mitigation 3: Develop a Schedule of Works Operations Record (SOWOR)

The construction of the Development will be managed through the SOWOR system. The SOWOR for the Development will be run by the ECoW, who is, or will be, trained to implement the process.

The Construction Management Team with their Environmental Manager will provide the numbered Method Statements for the SOWOR.

Together with the ECoW, environmental triggers for safe undertaking of the high, intermediate and low risk activities associated with the construction of the Development will be agreed between the contractor, employer's representative along with any other experts or technical specialists needed for high risk aspects of the project. An experienced ECoW can assist with determining these values, but the responsibility rests with the developer / employer.

The SOWOR will specify commencement and abandonment triggers for the following parameters for key works activities (which will be monitored for the duration of the works):

- Rainfall levels;
- Water levels;
- Weather forecast;
- Weather conditions on the ground;
- Soil conditions on the ground (such as soil wetness, whereby a check that the soils in the works area are not so saturated that they could result in slippage, soil movement, or overland flow of contaminated water);
- Flow in the Blackwater River;
- Turbidity in the Blackwater River, upstream and downstream of the works area;
- Hydrocarbon sheen on the Blackwater River, upstream and downstream of the works area, and;
- Integrity of mitigation measures

The ECoW will have the power to stop any works where the SOWOR established a risk of failure to properly implement the planning conditions and mitigation measures included in the CEMP. Further information on the structure of the SOWOR system are provided in the CEMP that accompanies the application under separate cover.

13.10.2.4 Mitigation 4: Protection of Mammals

A combined survey for the presence of Badger and Otter is to be carried out pre-commencement/construction works, in order to rule out that either species have moved into the Site/nearby Blackwater River before any construction works take place.

This survey is to be completed by a qualified Ecologist during the optimal survey period (November – April) when vegetation has died back sufficiently to make the search to detect these species clearer, easier, and more precise.

Should either of these species be found to be present on Site. Works will not be allowed to commence, and NPWS will be consulted on how to proceed.

The following mitigation measures are recommended for otter in line with the following best practice guidance document 'Guidelines for Treatment of Otters Prior to the Construction of National Road Schemes' (TII, 2008):

- A pre-construction survey for otter should be carried out by a suitably qualified ecologist prior to the commencement of any works to search for signs of otter activity in the vicinity of the works, in particular any breeding and/or resting sites which may be pre-sent along the Blackwater River, to the south of the Proposed Development Site. Otter breeding may take place at any season of the year, so breeding activity at holts will need to be determined on a case by case basis.
- Where potential holts are identified, a period of monitoring over several days (e.g., five or more days of checking activity at the holt either with sticks or with sand pads to identify footprints) may be required to determine whether holts are active, inactive or disused. Otters do not tolerate disturbance at or near holts that are in active use.
- If a period of time has elapsed between the recommended pre-construction survey and commencement of the works (>10-12 months, TII 2008), a further inspection of the development area, immediately prior to the works, should be carried out to ensure that no new holts have been created in the intervening period and to check if any of the previously identified holts are in active use by breeding females or have otter cubs present.

13.10.3 Construction Phase Mitigation

Table 13-23 below gives a summary of the best practice development standards and mitigation measures to be implemented during the Construction Phase of the Proposed Development. The measures listed are outlined in more detail in the CEMP (Enviroguide Consulting, 2024c) accompanying this application under separate cover.

Table 13-23: Summary of best practice standards and mitigation outlined in the outline CEMP (Enviroguide, 2024c) where specific details relating to the protection of key ecological

receptors (KERs) is required under these measures, reference is made to the appropriate section in this report.

Theme	Best Practice Standards and Mitigation	Ecology Specific Mitigation
Soils and Geology	Appropriate measures to store and handle stripped topsoil and subsoil; consideration of weather conditions as per the SOWOR to minimise silt/sediment entering surface water network and dust control; and appropriate fill material import (Imported aggregates must be compatible with local stone and have an equivalent pH value when slurried with water. As with all Margaritifera construction, the importation of limestone aggregate is not acceptable), storage, and handling away from surface water features as outlined in the CEMP. Surface water discharge points for rain and groundwater pumped from excavations and directed to settlement ponds during Construction to be agreed with CCC prior to works and per the siting measures outlined in the CEMP. Appropriate storage of fuels, oils, and other chemicals, designated refuelling and maintenance area, and preparation of emergency response procedure as outlined in the CEMP. All plant will remain on site for the duration of this phase.	Please refer to the CEMP that accompanies this report for all ecology specific mitigation measures relating to soils and geology.
Management of Invasive Alien Species	An IAS Specialist will be contracted to treat and eradicate the Butterfly Bush and New Zealand Flax on Site, per TII Technical Guidance on ' Management of Invasive Plant Species on National Roads' published in December 2020. Other measures include restriction of vehicle movements, pressure-washing of all vehicles and vehicles carrying IAS off site, all materials imported to be certified as free from invasive materials.	**Yes, see mitigation 6.**
Measures for Protection of Birds	Any clearance of vegetation should ideally be carried out outside the main breeding season, i.e., 1st March to 31st August, in compliance with the Wildlife Act 2000. Where any removal of vegetation within this period is deemed unavoidable, a qualified Ecologist will be instructed to survey the vegetation prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged.	**Yes, See Mitigation 8 & 9.**
Measures for Protection of Bats	Where possible, Construction Phase lighting will be switched off during non-working hours. However, during use, directional lighting will be the lighting of choice as this will minimise light spill from the site, into any surrounding areas which may be in use by bats or other nocturnal animals that may be commuting/foraging in the area. It is recommended that LED luminaires possessing a warm white spectrum (2700k – 3000k) be used so as to reduce the blue light component. LED lights are also ideal due to their sharp cut-off, lower intensity, and dimming capabilities.	**Yes, See Mitigation 12 & 15.**

Water - Hydrogeology	Measures for erosion and sediment control (i.e., settlement ponds), prevention and control of accidental spills and leaks, concrete handling.	**Yes, See Mitigation 2.**
Water - Water Supply, Drainage & Utilities	Appropriate use of settlement ponds, foul water to be discharged via existing connections at the adjacent Castlelands estate, and all connections (wastewater, water supply, electrical, gas and telecommunications) to be made by authorized and qualified people.	**Yes, See Mitigation 1.**
Site Compound Facilities and Parking	Appropriate measures to handle foul water generated, protect potable water supply, health and safety, separate areas for (i) machinery and plant; (ii) concrete batching; and (iii) staff parking. The construction compound for the development will be located in the green area east of the development so that it will not need to be moved during each phase. Car parking will be located opposite the compound. Facilities include site office, welfare facilities, including temporary portaloos until a toilet block is established, with electricity and potable water supplied through existing connections.	Please refer to the CEMP that accompanies this report for all ecology specific mitigation measures relating to Site Compound Facilities and Parking.
Construction Waste Management	Managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication – 'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects'.	Please refer to the CEMP that accompanies this report for all ecology specific mitigation measures relating to Construction Waste Management.
Noise and Vibration	To comply with the requirements of BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 (Code of Practice for Noise and Vibration Control on Construction and Open Sites) as well as Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration.	**Yes, see mitigation 8.**
Air Quality	Dust Management Plan to include suppression via watering of areas identified as potential dust source; road sweeping to remove aggregate materials; appropriate cover of transported materials; wheel washing; cattle rumbles at the Site entrance/exit, maintenance of public roads in relation to dust; and appropriate monitoring.	Please refer to the CEMP that accompanies this report for all ecology specific mitigation measures relating to dust.

In addition, to ensure the CEMP remains 'fit for purpose' for the duration of the project it should be reviewed and updated by the Project Manager in consultation with the ECoW during the life of the project to ensure that it remains suitable to facilitate efficient and effective delivery of the project's environmental commitments. The Contractor shall also designate a Site Engineer/Manager/Assistant Manager as the Construction Waste Manager and who will have overall responsibility for the implementation of the Project Waste Management Plan (WMP). This Plan will be prepared upon appointment of the Main Contractor.

Additional mitigation measures required for sufficient protection of the KERs identified in this report, and/or details for the specific implementation of the mitigation measures as per the above table are given in the below sections.

13.10.3.1 Protection of Habitats

13.10.3.1.1 Mitigation 5: Tree Protection

Protective tree fencing in compliance with BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations' will be erected prior to any Construction works being undertaken to prevent damage to the canopy and root protection areas of existing trees at the Site. The fencing will be signed off by a qualified arborist prior to Construction to ensure it has been properly erected. No ground clearance, earthworks, stockpiling or machinery movement will be undertaken within these areas.

13.10.3.1.2 Mitigation 6: Invasive Species Management

No species of plant listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded at the Site of the Proposed Development during site surveys.

As such, no significant risk of impacts relating to the spread of invasive plant species exists at the Site. Nevertheless, efforts should be made to remove such plants and minimise any risk of spread offsite.

All of the medium impact invasives and their respective distributions at the Site are not significant and their removal will not be an issue.

Transport Infrastructure Ireland (2020) guidance 'The Management of Invasive Alien Plant Species on National Roads – Technical Guidance' will be consulted with regards the treatment, removal and disposal of invasive flora at the Site.

Biosecurity Measures

The following measures will be adhered to, to avoid the introduction or dissemination of invasive species to and from the Site of the Proposed Development site.

For the Construction Phase the contractor will prepare a project specific IAPS standard operating procedure document, in advance of work commencement. The document should be prepared by an IAPS specialist and should cover the bio-security measures to be taken, including the maintenance of records, to screen for the introduction of IAPS onsite, and to enable their tracing if such an introduction occurs; and to ensure no transmission of IAPS offsite. These measures to include:

- Validation that all machinery / vehicles are free of IAPS, prior to their first introduction to site.
- Certification from the suppliers that all imported soils and other fill/landscaping materials are free of IAPS
- A regular schedule of site inspections across the IAPS growing seasons, for the duration of the construction works programme.
- Validation that all machinery / vehicles are free of IAPS, prior to leaving the site.
- Appropriate and effective site biosecurity hygiene to ensure that no IAPS are transmitted off-site for the duration of the Proposed Works.

13.10.3.1.3 Mitigation 7: Aquatic and Surface Water Protection

To ensure that no contaminated waters containing silt, fuel, cementitious materials etc., have the potential to enter the receiving surface water network during the Construction Phase of the Proposed Development, a suite of mitigation measures will be put in place, all of which have been outlined in the CEMP which accompanies the application, along with all other relevant measures recommended to protect environmental sensitivities during the Proposed Works (including those listed in the NIS report).

13.10.3.1.4 Mitigation 8: Reduction of Noise Related Impacts

Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction/Infill Phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing.

To mitigate this disturbance, the following measures will be implemented:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by Site constraints.
- Avoidance of unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Proper balancing of plant items with rotating parts.
- Keep internal routes well-maintained and avoid steep gradients.
- Minimize drop heights for materials or ensure resilient material underlies.
- Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.
- Limiting the hours during which Site activities likely to create high levels of noise are permitted.
- Appointing a Site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to nesting birds or any other fauna species in the vicinity of the Site of the proposed development will be reduced to a minimum.

13.10.3.2 Protection of Fauna

13.10.3.2.1 Mitigation 9: Timing of Vegetation Clearance

To ensure compliance with the Wildlife Act 2000 as amended, the removal of areas of vegetation will not take place within the nesting bird season (March 1st to August 31st inclusive) to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. Where any removal of vegetation within this period is deemed unavoidable, a qualified Ecologist will be instructed to survey the vegetation prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged.

Table 13-24 provides guidance for when vegetation clearance is permissible. Information sources include The Herpetological Society of Ireland, the British Hedgehog Preservation Society's Hedgehogs and Development and The Wildlife (Amendment) Act, of 2000.

The preferred period for vegetation clearance is within the months of September and October. Vegetation will be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., Hedgehog). Where this seasonal restriction cannot be observed, a check for active roosts and nests, as well as signs of amphibians, will be carried out immediately prior to any Site clearance by an appropriately qualified ecologist and repeated as required to ensure compliance with legislative requirements.

Table 13-24: Seasonal restrictions on vegetation removal. The red boxes indicate periods when clearance/works are not permitted.

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
Amphibians	Vegetation /habitat clearance permissible		Amphibian breeding season **(Estimated)** No habitat destruction unless confirmed to be devoid of tadpoles and other signs of amphibians				Vegetation/habitat clearance is permissible if devoid of tadpoles and signs of amphibians.					
Breeding Birds	Vegetation clearance permissible		Nesting bird season No clearance of vegetation or works permitted unless confirmed to be devoid of nesting birds by an ecologist.						Vegetation clearance permissible.			
Hibernating mammals (namely Hedgehog, Pygmy Shrew)	Mammal hibernation season No clearance of vegetation is permitted unless confirmed to be devoid of hibernating mammals by an ecologist.			Vegetation clearance permissible.							Mammal hibernation season No clearance of vegetation or works to relevant structures is permitted unless confirmed to be devoid of hibernating mammals by an ecologist.	
Bats	Tree felling is to be avoided unless confirmed to be devoid of bats by an ecologist								Preferred period for tree-felling		Tree felling is to be avoided unless confirmed to be devoid of bats by an ecologist	
Common Lizard	Lizard Hibernation Season No habitat clearance permissible			Active period Habitat (Scrub, old stone walls) clearance permissible.							Lizard Hibernation Season No habitat clearance permissible	

13.10.3.2.2 Mitigation 10: Small Mammal and Fauna Protection

The following general avoidance measures will be incorporated to minimise impacts to mammals during the Construction Phase:

Hours of work

The hours of working will be limited to daylight hours where possible, so as to limit disturbance to nocturnal and crepuscular animals.

Waste management

As best practice, all construction-related rubbish on Site e.g., plastic sheeting, waste, wires, bags, netting in which animals can become entangled etc. will be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death.

Excavations & Pipes

Trenches/pits must be either covered when not in use/at the end of each working day with caps (especially at night) or include a means of escape for any animal falling in and getting stuck. If this is not possible, then a strategically placed plank or object should be placed in the corner of an excavation to enable animals to safely escape (Badgers will continue to use established paths across a Site even when construction work has started).

Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers from gaining access as may happen when contractors are off-site.

13.10.3.2.3 Mitigation 11: Otter Protection Measures

With regards to Site works in the vicinity of active otter holts, where they are identified during the pre-construction otter survey outlined in section 13.10.2.4 above, the following will be adhered to:

- No works should be undertaken within 150m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to such breeding holts may take place provided appropriate mitigation measures are in place, e.g., screening and/or restricted working hours on site.
- No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but nonbreeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence.
- The prohibited working area associated with otter holts should, where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Appropriate awareness of the purpose of the enclosure should be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on Site should be made fully aware of the procedures pertaining to each affected holts.
- Where holts are present in close proximity to invasive construction works but are determined not to require destruction, construction works may commence once recommended alternative mitigation measures to address otters have been complied with.

13.10.3.2.4 Mitigation 12: Construction Phase Lighting Regime

Where possible, Construction Phase lighting will be switched off during non-working hours. However, during use, directional lighting will be the lighting of choice as this will minimise light spill from the site, into any surrounding areas which may be in use by bats or other nocturnal animals that may be commuting/foraging in the area.

It is recommended that LED luminaires possessing a warm white spectrum (2700k – 3000k) be used so as to reduce the blue light component. LED lights are also ideal due to their sharp cut-off, lower intensity, and dimming capabilities.

13.10.3.2.5 Mitigation 13: Ecological Clerk of Works (ECoW)

A suitably qualified Ecological Clerk of Works (ECoW) will be present on-site for the duration of the works until monitoring for each construction element listed in the SOWOR is no longer required and has been signed off by the ECoW and the Employers Representative. The ECoW will ensure that all targeted ecological mitigation measures identified in this EcIA, the NIS and CEMP that accompany this report under separate cover are adhered to in full.

The ECoW will also ensure that the silt fences and bunding are correctly positioned in the correct locations as per the CEMP and are effectively managed to ensure any run-off from these areas is intercepted. Protecting both the Blackwater River SAC and it's QI features from adverse water quality impacts.

In addition, a qualified Ecologist will act as Clerk of Works (ECoW) during demolition of the existing buildings (Gate Lodge) whereby the buildings will be inspected for the presence of bats and breeding birds at least 24 hours prior to demolition works taking place. Should any evidence of bats or breeding birds be found. Then works will be halted until the breeding birds have fledged at the end of the season. While the presence of bats will result in the works being halted so that NPWS can be contacted for advice on how to proceed, under a derogation licence.

13.10.4 Operational Phase Mitigation

13.10.4.1 Protection of Habitats

13.10.4.1.1 Mitigation 14: Operational Phase Invasive Species Management

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Despite the measures identified in the CEMP for the importation of only clean materials, there is the potential for the inadvertent import of invasive species to the Site. If established, there is a risk of further spread both within and out of the Site.

As such, it is recommended that any newly landscaped areas, particularly where infill materials and soils have been imported for soft landscaping, are assessed during the Operational Phase within the next botanical season for the presence of any inadvertently introduced invasive species, with particular focus on those listed on Schedule III of SI 477 of 2011. If invasive species are detected, an

Invasive Species Management Plan will be prepared, agreed with the Local Authority and implemented at the earliest possibility to limit the potential for further spread by ongoing operations at the Proposed Mixed-use Development.

13.10.4.2 Protection of Fauna

13.10.4.2.1 Mitigation 15: Operational Phase Lighting

In order to minimise disturbance to bats utilising the site in general, the lighting and layout of the Proposed Development will be designed to minimise light-spill onto habitats used by the local bat population foraging or commuting. This can be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance' and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'. Therefore, where possible, the lighting scheme will include the following:

- Lighting will only be installed where necessary for public safety in known Bat Foraging and Roosting locations (Riparian corridor/pedestrian greenway). These lights have been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the pedestrian routes.
- Lighting along the riparian corridor and existing treelines, hedgerows and woodland margins (notably to the north) will be avoided where possible and bat friendly; using low level bollards, motion sensors where applicable once health and safety standards are met.
- Reflectance's – Downward lighting can be reflected from bright surfaces. To minimize bat disturbance, the design avoids the use of bright surfaces and incorporates darker colour lamp heads and poles to reduce reflectance. Only luminaires with an upward light ratio of 0% and with good optical control to be used.
- Lighting controls and dimming shall be utilised for post-curfew times.
- Shielding of Luminaires & Light - To minimize bat disturbance, the design avoids the use of upward lighting by shielding or by downward directional focus. i.e., no upward tilt.
- Type of Light – To minimize bat disturbance, the design avoids the use of strong UV lighting. The lighting design is based on the use of LED lighting which has minimal or no UV output of significance. Warmer 2700°K LED lighting will be utilized for amenity areas, as the warmer colour temperatures with peak wavelengths greater than 550nm (~3000°K) cause less impacts on bats.

13.10.4.2.2 Mitigation 16: Hedgehog Highways

By creating a number of separate private dwellings and gardens at a Site, the land becomes fragmented and largely inaccessible to species such as Hedgehog, which like to roam each night in search of food (garden pests e.g., slugs) (Figure 13-29). This can easily be fixed by ensuring that the boundaries and barriers within and surrounding the Site i.e., garden fencing, railings and gates, are permeable for Hedgehogs. This can be achieved by:

- The use of fence panels with 13 x 13 cm holes at ground level (Hedgehog holes);
- Leaving a sufficient gap beneath gates, and;
- Leaving brick spaces at the base of brick walls.

Figure 13-29: Examples of 'Hedgehog Highways that can maintain habitat connectivity for Hedgehogs in residential developments (Images: BHPS Guidance Document).

The inclusion of hedgehog highways will be considered as part of the landscape design of the Site, specifically the private garden boundary fencing. A variety of fence suppliers' stock specific hedgehog-friendly fencing options, which can be easily incorporated at little or no additional cost. These simple measures will provide habitat connectivity at the Site for Hedgehogs and reduce the impact of the land-use change on this species.

Including details of hedgehog-friendly features in the new home owner's welcome pack will raise awareness and prevent home owners from reversing these features, for instance blocking fence holes.

13.10.4.2.3 Mitigation 17: Public Signage

In order to mitigate against an increase in human traffic with pets (specifically pet dogs) to the Blackwater River, signage should be erected, upon exiting the Site that clearly states all pet owners should be kept on leads at all times and not allowed to enter the river as flea and tick treatments can pose a threat to aquatic life, and that all dog foul must be picked up per existing national legislation.

13.10.5 Biodiversity Enhancement Measures

13.10.5.1 Biodiversity Enhancement by Design

The landscape plan incorporates native planting throughout the green spaces of the Proposed Development. Additionally, the proposed attenuation pond will be planted with a native mix of wetland meadow species and a nature park is proposed to the south, with all key landscape features connected throughout the Site.

The planting of native shrubs in the ground layer will provide cover and nesting opportunities for birds and small mammals. While the mixed planting of wildflowers, hedgerow, scrub, fruit trees and wildflower meadow will attract insects which act as food sources for the above species groups and also as pollinators.

The above measures are considered good for promoting pollinators and are considered to provide an overall enhancement of the biodiversity at the Site from the baseline due to the low value and extent of habitats that are to be lost to facilitate the Proposed Development. As such, these measures are considered to have a potential **positive** impact at a local scale.

13.10.5.2 Enhancement 1:Ampbhibian and Reptile Hibernacula

It is recommended to enhance the proposed attenuation area for amphibian and reptile use by providing suitable refuge and hibernacula around it. It is recommended that 2-3 areas of hibernacula are provided at the southeastern boundary of the attenuation area, as this is furthest removed from traffic and likely human activity, and the location would provide a potential link to the adjoining scrub and trees to the south.

Hibernacula for amphibians and reptiles are relatively easy to create from rubble, wood and soil, all of which can likely be sourced from the Site during works. Rubble and wood in various sizes should be piled either in a shallow depression or on the slope of the attenuation pond in a disorganised way to create nooks and crevices. Larger tree trunks or rocks should be placed so that they will protrude through the final mound to provide open entrances to the mound. This pile should then be covered in soil to allow the inner crevices to maintain a stable temperature through the winter and allow for hibernation. The top can be planted with for example grass and native wildflowers. See the figure below for examples of hibernacula.

Figure 13-30: Examples of amphibian and reptile hibernacula and refugia.

13.10.5.3 Enhancement 2: Bird Box/Swift Brick Scheme

A bird box/Swift brick scheme is proposed to be installed at the Site of the Proposed Development and should be implemented with the landscape plan so as to enhance the potential bird nesting habitat in the area during its Operational Phase.

A total of 6 No. bird boxes are proposed to be installed on suitable trees around the Site, to provide nesting habitat for breeding birds that may be using the Site. The location of bird boxes will be advised by a suitably qualified ecologist.

In addition, and as part of this scheme, it is proposed to include 20 No. Swift bricks. These nest bricks will be installed at least 5 metres above the ground, in safe areas where they will not be disturbed. As the bricks tend not to overheat, they can be placed on any aspect, N, S, E, W. Care will be taken to ensure no obstacles or plate glass windows are located below the bricks.

The Swift bricks are installed side by side, in sets of 10 on each block, as Swifts are a social nesting species, on suitable buildings within the proposed development.

Guidelines for the bird box scheme should also follow guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitle "Saving Swifts" (2009/2010).

13.10.5.4 Enhancement 3: Bat Box Scheme

It is proposed to place a total of 4 No. bat boxes on suitable retained trees within the Site. These will provide an important roost habitat for bat species which may be using the Site. As such, a suitably qualified ecologist will be required to select and oversee the placement of these bat boxes in suitable locations, paying consideration factors such as aspect and height.

These bat boxes, will work in tandem with the following, to ensure that the Proposed Development will not result in a significant adverse impact on bat species:

- The reinstatement of grassland habitat and wildflower meadows along edge habitat (e.g., scrub and hedgerow edges);
- The planting of multiple tree species within the Site;
- The bat friendly lighting plan, and;
- The planting of hedgerows and trees to provide connectivity and additional foraging and commuting habitat throughout the Site.

13.10.5.5 Enhancement 4: Wildflower Meadows

The Landscape Plan includes the planting of wildflower meadows lost due to Construction works. It is recommended that wherever possible proposed wildflower areas are allowed to regenerate naturally by way of the existing seedbank within the soils present on Site. In addition, this can be supplemented by locally sourced wildflower seeds where necessary. At the very least, it is recommended that all wildflower seeds will be Irish Provenance Certified Seed, from a reputable source such as Design by Nature (Wildflowers.ie). To maximise the biodiversity value of the landscaping at the Site, consideration has been made to the All-Ireland Pollinator Plan planting code (NBDC, 2022).

13.10.5.6 Enhancement 5: Native Planting

The Landscape Plan also includes the planting of trees, scrub, and hedgerows. Whilst higher value trees will be retained, the majority of trees planted as part of the Proposed Development will be native species and will comprise a mix of species already present on Site.

The planting of native shrubs in the ground layer of the woodland habitat will provide cover and nesting opportunities for birds and small mammals. While the mixed planting of wildflowers, lawns, and hedgerows will attract insects which are a food resource for multiple species including birds, bats, and small mammals.

13.10.5.7 Enhancement 6: Insect Hotels

The landscape plan includes the insertion of 2 No. insect hotels in select areas around the Site, during its Operational Phase. Insect hotels will be located in areas that are destined to be undisturbed, such as the areas bounding the perimeter where dense scrub vegetation is proposed.

13.10.5.8 Enhancement 7: Log Piles for Invertebrates and Fauna

Piles of logs and other woody vegetation arising from the proposed tree felling will be left in suitable secluded margins of the Site where they will remain undisturbed. These will provide habitat for Common Frog and small mammals such as Hedgehog and Pygmy Shrew. These areas of woody debris will also benefit local invertebrate species through the provision of shelter and food sources (precise locations to be proposed by ECoW).

13.10.5.9 Enhancement 8: Low Intervention Hedgerow Management

The proposed hedgerows will be managed in a way that maximises the ecological value they provide at the Site, with habitat connectivity maintained along the margins of the Site; connecting it in with the wider field boundary network in the area.

This connectivity is vital for wildlife such as birds, bats, mammals and insect pollinators in a human landscape such as that which will be provided by the Proposed Development. Additionally, by managing hedgerows and treelines in a more natural way, they will provide more in terms of biodiversity; through increased plant diversity, increase provision of food resources and higher quality shelter to wildlife inhabiting and commuting through the area.

For the hedgerows running along the outer margins of the Site, the following management approach is proposed to maximise their biodiversity value and offset the loss of any sections of existing hedgerows at the Site. Should planning be granted, a Hedgerow Management Plan will be prepared by a suitably qualified ecologist; for the hedgerows at the Site. This management plan will include the following, with a focus on maintaining these hedges in as natural a state as possible to maximise their ecological value:

- The hedgerows located along the outer boundaries of the Site will, as much as is practicable, link up with each other. The provision of an almost continuous vegetative margin around the Site; through planted native hedgerows and trees, will maintain habitat connectivity with the surrounding environment.
- Hedgerows will be maintained with a natural meadow strip of 1-2m at their base wherever possible. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges.
- The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators. A two-cut management approach is ideal for suppressing coarse grasses and encouraging wild flowers. Cut the hedgerow basal strip once during February and March (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge once again during September and October (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed).
    - N.B. Raising the cutter bar on the back cut will lower the risk to amphibians, reptiles and small mammals.
- Hedgerows, where possible, will be allowed to reach at least 2.5m in height, and should be trimmed in an A-shape; maintaining a wider base to compliment the natural meadow strip at their base. Existing hedgerows being retained at the Site that are taller than 2.5m should be retained as is and pruned lightly as required.

- Where hedgerow trimming needs to occur delay trimming as late as possible – until January and February as the surviving berry crop will provide valuable food for wild-life. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow cutting will be done outside of the nesting season and due consideration of the Wildlife Act 1976 (as amended) needs to be taken.
- Where possible, cut these outer boundary hedgerows on a minimum 3-year cycle (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (Black-thorn in March, Hawthorn in May etc.).
- Where they occur naturally, Bramble and Ivy should be allowed grow in hedgerows, as they provide key nectar and pollen sources in summer and autumn.

Methods to Avoid

Hedgerows will not be over-managed. Tightly cut hedges mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites.

Hedgerows will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds. Red-listed bird species Yellowhammer (recorded on Site) in particular nest up until the end of August.

DO NOT use pesticide/ herbicide sprays or fertilisers near hedgerows as they can have an extremely negative effect on the variety of plants and animals they support.

13.10.6 Cumulative Impacts

Cumulative effects can result from individually insignificant but collectively significant impacts taking place over a period of time or concentrated to within a single location. Cumulative effects can occur where a Proposed Development results in individually insignificant impacts that, when considered in-combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

The effects of the proposed Development are considered likely to be confined to the immediate area of the Site and will be limited to habitat degradation of commonly occurring and widespread habitats as well as temporary disturbance and displacement of local fauna which may be present within the Site or within the immediate surroundings and which may utilise the Site. These effects are not considered to be significant. Therefore, it is considered that there is no pathway for other plans and projects to act in-combination and to give rise to cumulative effects.

In addition to assessing potential impacts on a local scale, the sections that follow assess the potential for in-combination effects to take place on a wider scale under several sub-headings.

13.10.6.1 Relevant Plans and Policies

The following policies and plans were reviewed and considered for possible in-combination effects with the Proposed Development.

- Cork County Development Plan (2022-2028).
- Cork County Biodiversity Action Plan (2014-2019).

- All Ireland Pollinator Plan (2021-2025).

Each of these plans has undergone AA, and where potential for likely significant effects has been identified (e.g., in the case of the Cork County Development Plan), an NIS has been prepared which identifies appropriate mitigation. As such, it is considered that the plans and policies listed will not result in in-combination effects with the Proposed Development.

The Cork County Development Plan 2022-2028 has directly addressed the protection of European sites through specific Objectives and policies (MW-GO-02, MW-GO-03, MW-GO-13). The Cork County Biodiversity Action (2014-2019) and the All-Ireland Pollinator plan are set out to protect and improve biodiversity and as such will not result in negative in-combination effects with the Proposed Development.

Lastly, the Mallow WWTP upgrade works which were completed in early 2023, long before this Proposed Development will be completed (in c.4 years), are considered to provide a positive impact on the treatment of foul waters received in the Mallow Town area. As per licencing application for this WWTP, an NIS was produced which considered the conservation objectives of the QI/SCI species and habitats for which the Blackwater River SAS is designated.

Therefore, on examination of the above it is considered that there are no means for the Proposed Development to act in-combination with any plans or projects that would cause any likely significant effects to nearby ecological sensitivities.

Existing Planning Permissions

As standard practice, a search of planning applications located within the town of Mallow of for which the Site of the Proposed Development is located was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie) and Cork County Council Planning Applications online map. Any planning applications listed as granted or decision pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on the relevant European sites. Long-term developments granted outside of this time period were also considered where applicable.

It is noted that the majority of the few developments within the vicinity of the Site of the Proposed Development are applications granted for small scale extensions and alterations to existing permitted developments. The larger developments in the vicinity of the Proposed Development are outlined in the below table:

Table 13-25: Granted and pending development applications within Mallow Town, where the Proposed Development is located. The location and distance given is relative to the Proposed Development.

Planning Reference	Planning Authority	Status	Location
226156	**Cork County Council**	**Application Finalised**	**Scoil Aonghusa CNS, Kingfort Avenue, Castlepark Village, Castlelands, Mallow, Co.Cork**
Development Description			

Permission for construction of a single storey extension to existing school (Scoil Aonghusa CNS) incorporating a special educational needs base and associated facilities, alterations to northeast and northwest elevations of existing school and all associated site works including the construction of a soft fall play area and retaining wall with fencing.

Potential for In-combination effects

The Proposal encompasses an attenuation tank which addressed concerns raised by Cork CoCo in an FI dated 17/11/2022 that the drainage from the proposal could impact on the Blackwater SAC. Once this FI was submitted, the development was granted, as impacts on the SAC, either alone or in-combination, were not envisaged. No other significant ecological impacts were identified as a result of this development, and as such no in-combination effects with the Proposed Development are foreseen.

224676	**Cork County Council**	**Pending appeal decision with ABP**	**Old Course, Spaglen, Mallow, Co.Cork**

Development Description

The construction of a residential development of 96 no. dwelling units and all associated site development works. The proposed development consists of the construction of 24 no. 4-bed semi-detached houses, 30 no. 3-bed semi-detached houses, 16 no. 3-bed townhouses, 14 no. 2-bedtownhouses and 6 no. 2-bed duplex units, 4 no. 2-bed apartment units and 2 no. 1-bed apartments units contained in 3 no. 3 storey apartment blocks. Vehicular access to the proposed development will be via the existing entrance from the L-1207. The proposed development also includes open space, landscaping, bicycle parking facilities, bin stores, public lighting, and all ancillary site development works. A Natura Impact Statement (NIS) has been prepared and will be submitted to the planning authority with the application. The NIS will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the offices of the planning authority.

Potential for In-combination effects

The NIS Report States: "with the implementation of the mitigation measures proposed, that the construction, operation and decommissioning of the proposed development will not adversely affect the integrity of any European Site" alone or in combination. In addition, A Letter from the Local Authority issued to ABP regarding the appeal on 13/01/2023 states: "The Planning Authority is of the opinion that all the relevant issues have been covered in the technical reports already forwarded to the Bord as part of the appeal documentation and has no further comment to make in this matter". The main potential for in-combination impacts on the Blackwater River SAC, however the NIS and CEMP for the Proposed Development at Castlelands, Mallow outline mitigation measures, including embedded design features (e.g., on-site WWTP, SuDS and landscaping) that serve to ensure the Proposal will not act in-combination to create any adverse effects on the local ecology of the Site, adjacent/linked habitats, including the Blackwater River SAC. As such, in-combination effects are not foreseen.

235197	**Cork County Council**	**Pending Decision**	**"Clonmore", Ballyviniter Lower, Mallow, Co.Cork**

Development Description

Application for 1) The construction of 108 no. dwelling houses, consisting of 3 no. 4 bed detached, 2 no. 3 bed detached, 68 no. 4 bed semi-detached, 32 no. 3 bed semi-detached and 3no. 3 bed terraced houses. These houses area to be assessed through the existing completed part of the housing development; 2) A crèche of 380 sqm of single/two storey construction, also accessed from the existing completed part of the housing development, including 11 carparking spaces and associated works; 3) the provision of a 1.2m diameter culvert within this development. This leads to an open water course which is to be provided in lieu of the existing pipe works along the western boundary of the site; 4) all associated site development works. Extension of Duration to Permission granted under Planning Ref. No. 16/6949, ABP-301221-18.

Potential for in-combination effects

The original application was granted with no potential impact expected to occur on designated sites, alone or in-combination. However, this extension sought to make changes to the proposal and so was refused on the basis that it was invalid. However, the original application was then submitted, with the extension of duration being granted on the 09/08/2023 until the 31/03/2024.

The Ecology Primary Report dated 03/08/2023 states: "I note the application is for the completion of a permitted development, under reg ref 16/6949, of 108 dwelling houses. I also note that a Natura Impact Statement was submitted

with the 2016 application and considered to be acceptable. As no changes, which may give rise to ecological impacts, have been made from the original application, I have no objection to the proposed Extension of Duration.". As such, in-combination effects are not foreseen.

226225	**Cork County Council**	**Permission Granted**	**Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork**

Development Description

The construction of 52 no. residential units comprising of 12 no. 3 bed units, 18 no. 2 bed units and 22 no. 1 bed units [a mix of 3 bed townhouses, 1 & 2 bed maisonettes and 1, 2 & 3 bed own-door apartments]. The units range in height from 2 to 3 storeys. Permission is also sought for the construction of 3 no. commercial units [Beauty Salon/Coffee Shop/Café and Newsagents] as well as a multi-purpose/ community space at ground floor level. The development also includes landscaping, drainage, boundary treatments, 96 no. bicycle parking spaces, 57 no. car parking spaces, bin storage, play area, planting/screening and all associated site development works at Ballydaheen Road/ Mill Street, Ballydahin, Mallow, Co. Cork. A Natura impact statement will be submitted to the planning authority with this application. The Natura impact statement will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the office of the relevant planning authority.

Potential for In-combination Effects

No in-combination impacts were identified in the NIS report for this granted application. Further information was requested regarding the overall landscape proposal at the site, which was subsequently provided and accepted with planning permission being granted. As such, in-combination effects are not foreseen.

312640 (ABP-312640-22)	**An Bord Pleanala**	**Permission Granted**	**Anabella, Mallow, Co. Cork.**

Development Description

Permission application for the construction of 299 no. residential units (185 no. houses, 114 no. apartments) creche and associated site works

Potential for In-combination Effects

The inspectors report makes reference to the AA Screening and NIS reports which were prepared in support of this application, stating: "I note the applicant submitted a Natura Impact Statement (NIS). In deciding to prepare and submit a NIS the applicant states that the precautionary principle was being applied. I am of the opinion that the application of the precautionary principle in this instance represents an over-abundance of precaution and is unwarranted. Having regard to the above assessment, I recommend that Section 9(4)(a) of the Act of 2016 be applied, and that permission is granted for the reasons and considerations and subject to the conditions set out below". As such, in-combination effects are not foreseen.

244243; ABP-320525-24	**An Bord Pleanala**	**Decision due 02/12/2024**	**Spa Glen, Mallow, Co. Cork**

Development Description

Permission for following Large Scale Residential Development (LRD) comprising the demolition of the existing farmhouse/buildings and the construction of 186 no. residential units, 1 no creche and all associated ancillary development works including the signalisation of the N72/L5331 junction to provide improved sightline visibility, amendments to part of the existing hedgerow along the N72 to improve sightline visibility, 2 no. vehicular access points, 1 no. toucan and 3 no. uncontrolled pedestrian and cycle crossing points on the L5331, footpaths, parking, drainage, landscaping/amenity areas and the undergrounding of existing 38KV overhead electricity lines. A Natura Impact Statement is submitted to the planning authority with this application.

Potential for In-combination Effects

The Ecological Impact Assessment submitted concluded that the proposed development will not result in any significant impacts on ecological receptors onsite or in the surrounding area following the implementation of appropriate design mitigation measures and ecological enhancements around the site. No in-combination impacts were identified in the NIS submitted for this development. The main potential for in-combination impacts on the Blackwater River SAC, however the NIS and CEMP for the Proposed Development at Castlelands, Mallow outline mitigation measures, including embedded design features (e.g., SuDS and landscaping) that serve to ensure the Proposal will not act in-combination to create any

adverse effects on the local ecology of the Site, adjacent/linked habitats, including the Blackwater River SAC. As such, in-combination effects are not foreseen.			
235952; Original application: ABP 301429-18, amended by ABP 311986-21.	**An Bord Pleanala**	**Granted 17th January 2024.**	**Hazel Brooke, Spaglen (townland), Mallow, Cork**
Development Description Extension of Duration application for the construction of a strategic housing development comprising of 148 no. residential units, a creche, the provision of landscaping and amenity area to include 3 no. local play areas and 3 no. neighbourhood play areas and all associated ancillary development to include the provision of improved pedestrian facilities including the installation of dropped kerbs and tactile paving, new pedestrian crossings and the realignment and improvement of the spa road junction and footpaths to the west, lighting, drainage, boundary treatments and bicycle & carparking and bin storage. Extension of Duration to Permission granted under Planning Ref. No. ABP Ref 301429-18 (as amended by ABP 311986-21). **Potential for In-combination Effects** An EcIA was conducted which found no significant impacts on designated sites, habitats, flora or fauna. An AA screening was also conducted and submitted with the conclusion of no likely significant effects. The planning authority requested further information which was submitted and reviewed, and provided evidence required to satisfy that no significant adverse effects are likely to occur in relation to any Natura 2000 site arising from an extension of the permitted development. Thus, in-combination effects are not foreseen.			
245530	**Cork County council**	**Submitted 13/08/2024, Awaiting FI**	**Annabella, Mallow, Co. Cork**
Project Description Permission for the construction of a creche facility to serve the adjacent permitted residential development (Cork County Council Ref. 15/6119 (extended under Ref. No. 20/6130) and all associated ancillary site development works including vehicular access, parking, footpaths, landscaping and amenity areas at Annabella (townland), Mallow, Co. Cork. The proposed creche will replace the creche previously permitted under Cork County Council Ref. 16/6023 (extended under ref. 22/6434). **Potential for In-combination Effects** An AA screening was conducted and submitted which concluded that the development is highly unlikely to have significant environmental impacts on any Natura 2000 sites and appropriate assessment is not required. No ecological report was submitted or required by the planning authority in respect of this development. Thus, no in-combination effects are foreseen.			

13.10.6.2 EPA Licences/Registered Facilities

In this instance, the zone of influence (ZOI) refers to the Blackwater River channel itself, whereby, licences/registered facilities along this channel or with the potential to impact on this ecological feature, could provide in-combination impacts with the Proposed Development.

A review of planning alerts mapping tool determined that there are no active wind farm planning applications at present within the ZOI of the Proposed Development.

A review of the EPA mapping tool determined that there are several IPPC, IPC or IEL facilities within the zone of influence of the subject Site (EPA, 2024).

The nearest IEL-licenced facility is Dairygold Co-Operative Society Limited (Mallow) (Active licence no. P0403-03) which is located 1.15km northeast of the Proposed Development.

There is an active commercial quarry located 2.3km northeast of the Proposed Development; Mallow Quarry, Lacknamina, Mallow, Co. Cork (Quarry no. C020). This quarry extracts and processes asphalt

macadam, RMC, general fill, and agricultural lime to produce ready mix/bulk, blocks, asphalt/macadam plant, agricultural lime, and mortars (GSI, 2024).

A review of Cork County Council Online Planner determined that there are no current planning applications pertaining to either of the facilities/quarries listed above (Cork County Council, 2024). It is considered that there is no potential for the Proposed Development to act in-combination with the above-listed EPA licenced/registered facilities in the vicinity, or those located further upstream and downstream of the Site, that may cause likely significant effects on the above European sites, based on the following:

- The spatial separation of the Proposed Development to the above listed EPA registered facilities; and,
- Accounting for the requirement for each of these facilities to produce suitable risk assessments and/or mitigations on the potential for operations to produce adverse impacts on European sites, alone or in-combination, prior to EPA/ABP/the relevant authority approval.

13.10.6.3 Mallow WWTP

Foul waters generated by the Proposed Development will be processed at Mallow WWTP. Likely significant effects on the Blackwater River SAC as a result of foul waters generated by the Proposed Development were screened out at stage one of the AA process, as detailed below.

The Mallow WWTP was identified by the EPA as being non-compliant with the Emission Limit Values (ELVs) as set out in the Wastewater Discharge Licence for 2021, according to the 2021 Annual Environmental Report (AER) for the facility (Irish Water, 2021). It is also noted that Total Ammonia was the only parameter of all ELV's that this treatment plant was non-compliant for. However, ambient monitoring of the Blackwater River from upstream (Monitoring station: RS18B021690) and downstream (Monitoring station: RS18B021720) of the WWTP discharge point shows a deterioration in Biochemical Oxygen Demand (BOD) downstream of the effluent discharge point.

The upgrade works to Mallow WWTP which involved works to upgrade its waste management and processing infrastructure, were completed in July 2023, increasing the capacity of the plant to 22,000 PE initially, with an ability of future expansion to 24,595 PE. As part of the upgrade, a new Mallow Bridge Wastewater Pumping Station, storm tank, and rising main meant excess stormwater would no longer overflow into the Blackwater River and instead would flow to the newly constructed Storm Tank with a capacity of 2,400 m3.The following is noted on Irish Waters website (Irishwater.ie) with regard to said improvement works:

"Uisce Éireann first began work on the original WWTP, which was outdated and overloaded, with Glan Agua back in early 2021. The project also involved the construction of a new pumping station and stormwater holding tank at Mallow Bridge. A separate contract to upgrade the wastewater network was signed with Ward & Burke Construction Ltd in early 2021. Work commenced in April 2021 and was completed in January 2023. The overall investment of €34m in these two projects will provide the additional capacity in the wastewater network and at the wastewater treatment plant to cater for current and future development and housing in the Mallow area and will also improve water quality in the River Blackwater through the provision of an enhanced wastewater treatment plant and the removal of eight combined storm overflows".

Note also that in the subsequent AER (Irish Water, 2022), the Mallow WwTP was assessed as compliant for its ELVs, including those relating to ammonia.

The Proposed Development is expected to take 4 years to complete, and as such, it will become operational well after the completion of the upgrade to Mallow WWTP. The upgraded WWTP therefore has capacity to treat all foul flows generated by the Proposed Development and ensure water quality in the main Blackwater Channel is of sufficient quality to meet the relevant standards.

It is not expected that foul waters generated by the Proposed Development will present any source of significant impacts to the Blackwater River SAC post treatment and discharge from the WWTP. It is noted that recent EPA water monitoring data reports Q-values of 4 (Good status) from upstream of the WWTP in 2018 (Station code: RS18B021500), and Q -values of 4 from ca. 4.6km downstream of its discharge point in 2020 (Station code: RS18B021800) (EPA, 2024).

13.11 Monitoring Required

Table 13-26 below provides a summary of the required monitoring and pre-works inspections during the Construction Phase, as well as any surveys that should be completed during the Operational Phase. The monitoring, inspections and surveys will ensure that the identified mitigation measures are implemented and maintained efficiently and have the desired effect of protecting the local ecology from adverse impacts.

The monitoring/surveys outlined below will be included in a Biodiversity Management Plan (BMP) for the Proposed Development, along with the detailed mitigation measures for the Construction and Operational Phases and Biodiversity Enhancement Phases.

In addition to the items listed below, this document should detail the landscape management operations for the Proposed Development, including cutting/trimming regimes and maintenance of bird and bat boxes (if applicable). This document will also be updated to reflect any follow-up survey results as they are carried out. The BMP will be prepared and agreed in consultation with a suitably qualified ecologist and Cork County Council.

Table 13-26: Monitoring and pre-works inspections for the identified mitigation measures during Construction Phase of the Proposed Development. To be carried out by a suitably qualified Ecologist or Ecological Clerk of Works (ECoW) or by the Development Contractor.

Measure	Monitoring
PRE-CONSTRUCTION PHASE	
Mitigation 1: Ecological Clerk of Works (ECoW)	No monitoring required – to be set up by Client/Employers Representative to bring in independent, suitably qualified Ecologist (with FPM experience) to complete all ECoW/SOWOR duties
Mitigation 2: Preparation of a Water Management System	No monitoring required – to be set up by Employers Representative
Mitigation 3: Develop a Schedule of Works Operations Record (SOWOR)	No monitoring required – to be set up by ECoW
Mitigation 4: Protection of Mammals	A pre-construction survey is to be carried out by suitably qualified Ecologist

CONSTRUCTION PHASE	
Mitigation 5: Tree Protection	Ongoing monitoring by ECoW per CEMP
Mitigation 6: Invasive Species Management	Ongoing monitoring by ECoW per CEMP
Mitigation 7: Aquatic and Surface Water Protection	Ongoing monitoring by ECoW per CEMP
Mitigation 8: Reduction of Noise Related Impacts	Ongoing monitoring by contractor.
Mitigation 9: Vegetation Clearance	Any Site vegetation clearance within the scrub, hedgerows or grassland habitats subject to supervision by an Ecologist and a phased approach.
Mitigation 10: Small Mammal and Faunal Protection	Ongoing monitoring ECoW per CEMP
Mitigation 11: Otter Protection Measures	Ongoing monitoring ECoW per NIS
Mitigation 12: Construction Phase Lighting Regime	Ongoing monitoring ECoW per CEMP
Mitigation 13: Ecological Clerk of Works	Ongoing monitoring ECoW per NIS and CEMP
OPERATIONAL PHASE	
Mitigation 14: Operational Phase Invasive Species Management	An Invasive Species Survey will be carried out by a qualified Ecologist during the next botanical season after soft landscaping has been completed.
Mitigation 15: Operational Phase Lighting	No monitoring required
Mitigation 16: Hedgehog Highways	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.
Mitigation 17: Public Signage	No monitoring required, should be established as soon as the project complete
ENHANCEMENT	
Enhancement 1: Amphibian and Reptile Hibernacula	The placement and construction of these structures should be carried out under supervision of an Ecologist to ensure they are fit for purpose.
Enhancement 2: Bird Box/Swift Brick Scheme	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.
Enhancement 3: Bat Box Scheme	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.
Enhancement 4: Wildflower Meadows	Contractor to oversee.
Enhancement 5: Native Planting	Contractor to oversee.
Enhancement 6: Insect Hotels	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.

Enhancement 7: Log Piles for Invertebrates and Fauna	The location and placement of these structures should be carried out under the advisement and supervision of an Ecologist to ensure they are fit for purpose.
Enhancement 8: Low Intervention Hedgerow Management	Management to oversee.

13.12 Residual Impact

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 13-27 below provides a summary of the impact assessment for the identified KERs and details the nature of the impacts identified, the mitigation measures proposed, and the classification of any residual impacts.

Both standard Construction Phase control measures, and specific mitigation measures, have been outlined to ensure that the Proposed Development does not impact on any species, habitats or designated sites of conservation importance. It is essential that these measures are complied with, in order to ensure that the Proposed Development complies with National conservation legislation.

Provided all recommended measures are implemented in full and remain effective throughout the lifetime of the Proposed Development, no significant negative residual impacts on the local ecology, or on any designated nature conservation sites, will occur as a result of the Proposed Development .

Table 13-27. Summary of Potential Impacts on KERs, Mitigation Proposed and Residual Impacts.

Key Ecological Resource	Evaluation	Potential Impact	Impact Without Mitigation				Proposed Mitigation / Mitigating Factors	Proposed Enhancements	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance			
DESIGNATED SITES									
As the potential for water quality impacts on designated sites has been highlighted, mitigations for same were included in the CEMP and NIS reports accompanying this report under separate cover. Once all mitigations contained in these reports are adhered to, water quality impacts on designated sites owing to the Development are not envisaged.									
HABITATS									
BL3 – Buildings and Artificial Surfaces (buildings on Site)	Local Importance (Higher Value)	**Construction Phase:** Loss of habitat **Operational Phase:** None identified.	*Neutral* *None*	*Local* *None*	*N/A* *None*	*Imperceptible* *None*	None identified.	None identified.	**Imperceptible**
GS2 – Dry Meadows and Grassy Verges	Local Importance (Higher Value)	**Construction Phase:** Loss of habitat **Operational Phase:** None identified.	*Negative* *None*	*Local* *None*	*Short-term* *None*	*Slight* *None*	None identified.	Proposed Biodiversity Enhancement by Design: Landscape Plan. Enhancement 4: Wildflower Meadows.	**Imperceptible**
WD5 – Scattered Trees and Parkland	Local Importance (Higher Value)	**Construction Phase:** Loss of habitat & degeneration due to damage to roots and overground	*Negative*	*Local*	*Short-term*	*Slight*	Mitigation 5: Tree Protection.	Proposed Biodiversity Enhancement by Design: Landscape Plan (which includes a variety of mixed native tree species planting).	**Imperceptible**

		growth of any retained trees. **Operational Phase:** None identified.	*None*	*None*	*None*	*None*			
Western boundary treelines (WL2)	Regional/County Importance	**Construction Phase:** Risk of damage to roots and overground growth (habitat being retained). **Operational Phase:** None identified.	*Negative* *None*	*Local* *None*	*Long-term* *None*	*Moderate* *None*	Mitigation 5: Tree Protection.	None.	**Imperceptible**
Habitats on Site (all)	From negligible to Local Importance (Higher Value)	**Construction Phase:** Spread of invasive flora within the Site. **Operational Phase:** Spread of invasive flora. Habitats lost will be reinstated with additional	*Negative* *Negative* *Positive*	*Local* *Local* *Local*	*Long-term* *Long-term* *Long-term*	*Moderate* *Slight* *Slight*	Mitigation 6: Invasive Species Management Mitigation 14: Operational Phase Invasive Species Management	Proposed Biodiversity Enhancement by Design: Landscape Plan	**Imperceptible**

		diversity of species being planted.							
Adjacent/Linked Habitats									
FW2 – Depositing/Lowland River (The Blackwater River)	International Importance	**<u>Construction Phase:</u>** Deterioration of water quality from construction-related pollutants. **<u>Operational Phase:</u>** Surface water run-off during operational phase.	*Negative* *Neutral*	*County* *County*	*Short-term* *Long-term*	*Significant* *Imperceptible*	Mitigation 4: Surface Water Protection Best practice development standards outlined in various sections of the CEMP. SUDS measures. On-site WWTP.	None. This habitat is located outside of the Site Boundary.	**Imperceptible**
All adjacent habitats	Local Importance (Higher Value)	**<u>Operational Phase:</u>** Spread of Invasive Flora	*Negative*	*Local*	*Long-term*	*Significant*	Mitigation 3: Construction Phase Invasive Species Management Mitigation 10: Operational Phase Invasive	None	**Imperceptible**

							Species Management		
FAUNA									
Bat Assemblage	Local Importance (Higher Value)	**Construction Phase:** Loss of foraging / commuting habitat (scrub and grassland). **Operational Phase:** Disturbance due to proposed public lighting.	*Negative* *Negative*	*Local* *Local*	*Permanent* *Permanent*	*Slight* *Significant*	Mitigation 12: Construction Phase Lighting Regime Mitigation 15: Operational Phase Lighting. Lighting Plan	Landscape Plan which includes significant tree, grass and hedgerow planting suitable for commuting/foraging bats. Enhancement 3: Bat Box Scheme	**Imperceptible**
Bird Assemblage	Local Importance (Higher Value)	**Construction Phase:** Risk of injury or death during vegetation clearance, habitat loss. Disturbance from noise, dust and/or lighting. **Operational Phase:** None identified.	*Negative* *Negative*	*Local* *Local*	*Permanent* *Short-term*	*Moderate* *Moderate*	Mitigation 9: Timing of Vegetation Clearance Mitigation 8: Reduction of Noise Related Impacts Best practice development standards outlined in various sections of the CEMP.	Landscape Plan which includes significant tree, grass and hedgerow planting for ground/tree/shrub nesting birds, shelter, and commuting/foraging. Enhancement 2: Bird Box and Swift Brick Scheme. Enhancement 8: Low Intervention Hedgerow Management.	**Negative, Local, Short-term, Slight**

Badger	Local Importance (Higher Value)	**Construction Phase:** Habitat loss. Risk of injury or death during vegetation clearance and / or entrapment in construction-related rubbish. **Operational Phase:** None identified.	*Neutral* *Negative* *None*	*Local* *Local* *None*	*Short-term* *Short-term* *None*	*Imperceptible* *Significant* *None*	Mitigation 4: Protection of Mammals Mitigation 9: Timing of Vegetation Clearance Mitigation 10: Small mammal and Fauna Protection	None	**Imperceptible**
Small mammals (hedgehog, pygmy shrew)	Local Importance (Higher Value)	**Construction Phase:** Risk of injury or death during vegetation clearance and / or entrapment in construction-related rubbish. Noise and dust related impacts. **Operational Phase:** Fragmentation of habitats.	*Negative* *Negative* *Negative*	*Local* *Local* *Local*	*Short-term* *Short-term* *Permanent*	*Significant* *Slight* *Moderate*	Mitigation 8: Reduction of Noise Related Impacts Mitigation 9: Timing of Vegetation Clearance Mitigation 10: Small mammal and Fauna Protection	Enhancement 7: Log piles for Invertebrates and Fauna	**Negative, Local, Permanent, Slight**

							Mitigation 16: Hedgehog Highways		
Amphibians	Local Importance (Higher Value)	**Construction Phase:** Risk of injury or death during vegetation clearance or from other construction activities. **Operational Phase:** Additional habitat availability within new attenuation areas.	*Negative* *Positive*	*Local* *Local*	*Short-term* *Long-term*	*Moderate* *Imperceptible*	Mitigation 9: Timing of Vegetation Clearance Mitigation 10: Small mammal and Fauna Protection Mitigation 16: Hedgehog Highways	Enhancement 1: Amphibian and Reptile Hibernacula Landscape plan includes wetland planting around attenuation pond to promote habitat for amphibians. Enhancement 1: Amphibian and Reptile Hibernacula	**Negative, Local, Permanent, Not Significant**
Common Lizard	Local Importance (Higher Value)	**Construction Phase:** Risk of injury or death during vegetation clearance, entrapment in construction-related rubbish, habitat loss.	*Negative*	*Local*	*Short-term*	*Slight*	Mitigation 5: Vegetation Clearance	Enhancement 1: Amphibian and Reptile Hibernacula	**Imperceptible**

		Operational Phase: No potential impacts identified.							
Fauna of the Blackwater River: • **Otter** • **Fish assemblage** • **Freshwater Pearl Mussel**	International Importance Local Importance (Higher Value)	**Construction Phase:** Risk of deterioration of water quality from construction-related pollutants. **Operational Phase:** None identified.	*Negative*	*Local*	*Short-term*	*Significant*	Mitigation 2: Preparation of a Water Management System Mitigation 3: Develop a SOWOR Mitigation 4: Protection of Mammals Mitigation 7: Aquatic and Surface water Protection Best practice development standards outlined in various sections of the CEMP.	None proposed.	**Imperceptible**

							SUDS measures.		

14 Conclusion

This biodiversity chapter has been completed based on the Proposed Development information supplied by the applicant regarding the particulars of the Proposed Development during both Construction and Operational Phases, including the Site layout, drainage, landscaping, and lighting, along with the results of desk and field study components.

It is considered that, provided the mitigation measures proposed within this report together with all best practice development standards as outlined in the CEMP are carried out in full, there will be no significant negative impact to any KER habitat, species group or biodiversity as a result of the Proposed Development.

Additionally, the landscaping plan for the Proposed Development was designed to offset some of the habitat loss that will result from the Proposed Development and further enhance the area. This includes the provision of the attenuation pond at the Site which allows for some additional habitat enhancements for small fauna such as reptiles and amphibians that may already be present at the Site to further offset the loss of habitats.

Furthermore, enhancement measures are proposed in tandem with the landscape plan (SRLA, 2023) to include substantial supplementary planting/sowing of trees, shrubs and wildflowers within the Proposed Development Site and Swift bricks, bird boxes, bat boxes and insect hotels will be installed within the Site. These Proposed Enhancement Features serve to provide an overall biodiversity enhancement to the Site, which at present is predominantly comprised of GS2 dry meadows and grassy verges/rank grassland habitat. The landscape plan incorporates these enhancements while maintaining connectivity through the Site and between the Site and the surrounding adjacent/linked habitats.

The Proposed Development is therefore considered to result in an overall slight positive impact to the biodiversity of the Site via the landscaping plan, which proposes the retention of the existing treeline and old stone habitat within the Site, as well as a net increase in overall tree, scrub and wildflower meadow planting throughout the Site.

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Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 14

Cultural Heritage & Archaeology

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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14.1 Introduction

This chapter assesses the potential impacts of the proposed development, as described in Chapter 2 (Project Description), on the known and potential cultural heritage resource concerning the integrity, continuity and context of same for future generations. The cultural heritage resource encompasses several aspects of tangible constraints, such as archaeological sites and monuments and architectural heritage structures, as well as intangible assets such as historical associations, folklore, oral traditions, the arts and language.

14.1.1 Author Information and Competency

This chapter was prepared by John Cronin, Tony Cummins and Peter Looney 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), post-graduate qualifications in Urban and Building Conservation (MUBC (UCD), 1999). Mr Cummins holds B.A. and M.A. degrees in archaeology (UCC) 1992/1994). Mr. Looney holds primary and postgraduate qualifications in archaeology (B.A. 2007 and MPhil. 2011, UCC). Each of these individuals have extensive experience in the compilation of archaeological, architectural, and cultural heritage impact assessments.

14.1.2 Reference to Guidelines Relevant to Discipline

The guidelines relevant to the assessment include the *Architectural Heritage Protection: Guidelines for Planning Authorities* (Department of Arts, Heritage and Gaeltacht 2011) and the *Framework and Principles for the Protection of Archaeological Heritage* (Department of Arts, Heritage, Gaeltacht and the Islands 1999). The assessment was also informed by the Environmental Protection Agency (EPA 2022) *Guidelines for Information to be Contained in EIAR* and the International Council on Monuments and Sites (ICOMOS 2011) *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties*.

14.1.3 Methodology

The assessment was based on phased programmes of desktop research, field surveys, geophysical survey and targeted archaeological test trenching of the proposed development site which were carried out in order to identify any features of cultural heritage significance likely to be impacted by the proposed development. The recorded and potential cultural heritage resource within a study area encompassing the area within the proposed development site and the surrounding lands extending for 500m in all directions from its boundary. This study area was reviewed in order to compile a comprehensive cultural heritage baseline for the location of the proposed development and surrounding lands which informed the assessment of potential impacts on any elements of the resource.

The following sections present an overview of the methodology applied to determine the baseline cultural heritage environment within the study area and the assessment of potential effects on the cultural heritage resource.

14.1.3.1 Desktop Research

Documentary research on the recorded and potential cultural heritage resource within the study area 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 hitherto unrecorded cultural heritage sites or features within the proposed development site.

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 National Monuments Service, Department of Housing, Local Government and Heritage. The current County Cork Record of Protected Structures (RPS) and structures listed in the National Inventory of Architectural Heritage (NIAH) were reviewed in order to assess the designated architectural heritage resource within the study area.

Other sources consulted as part of the assessment included the following:

- Cork County Development Plan 2022-2028 – This publication outlines the Council's policies for the protection of the archaeological and architectural heritage resource within the county and includes the Record of Protected Structures (RPS) and Architectural Conservation Areas (ACAs).
- UNESCO designated World Heritage Sites and Tentative List: A review was undertaken of the locations of the two world heritage sites in Ireland and other significant sites included in a Tentative List (2022) nominated by Ireland for inclusion.
- The Database of Irish Excavation Reports: This database contains summary accounts of licensed archaeological excavations carried out in Ireland (North and South) from 1970 to present. Current data was accessed via www.excavations.ie in September 2024.
- Archaeological Inventory of County Cork. Volume 4: North Cork – This publication dates to 2000 and presents summary descriptions of the known archaeological sites within the county at that time. A review of current SMR datasets published on the Historic Environment Viewer was carried out in September 2024 to ascertain if any archaeological sites have been identified within the study area since the publication of the inventory.
- Heritage Council's Heritage Map Viewer: This online mapping source (www.heritagemaps.ie) collates various cultural heritage datasets sourced from, among others, the National Monuments Service, National Museum of Ireland, Local Authorities, and the Office of Public Works.
- Literary Sources: Published literary sources consulted to assess the archaeological, historical, architectural heritage and folklore record of the study area are listed in Section 14.6 of this chapter.
- Cartographic sources: Available cartographic depictions of the study area dating from the 17th century onward were reviewed and relevant extracts are presented in Section 14.2.3.3 of this chapter.
- Aerial/Satellite/LiDAR imagery: A review of publicly accessible imagery from the Ordnance Survey Ireland (OSI), Google Earth, and Bing Maps was carried out to appraise whether they revealed evidence for any unrecorded archaeological sites within the proposed development

site or its environs. LiDAR datasets published on the Geological Survey Ireland's Open Topographic Viewer website were also consulted and relevant image extracts are presented in Section 14.2.3.4 of this chapter.

- 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.
- Irish National Folklore Collection: Transcribed material from the National Folklore Collection archive which has been published online at www.duchas.ie was reviewed.

14.1.3.2 Field Inspection

All areas within the site were subject to a preliminary programme of systematic field-walking in June 2023 and no access constraints were encountered. The lands were assessed in terms of existing land use, vegetation cover and the potential for the presence of surface traces of previously unrecorded archaeological and architectural heritage sites or features. The field inspection results are described within the chapter (Section 14.2.4) and extracts from the photographic record compiled during the field survey are presented in Appendix 14.1.

14.1.3.3 Geophysical Survey and Archaeological Test Trenching

A geophysical survey of the northern portion of the proposed development site was carried out by John Cronin & Associates in October 2023. A full copy of the report on this non-intrusive survey is presented in Appendix 14.4 and the results are summarised in Section 14.2.5, which includes mapping sourced from the geophysical survey report.

A programme of targeted archaeological test trenching within the proposed development site was carried out by John Cronin & Associates in January 2024. A full copy of the report on this site investigation is presented in Appendix 14.5 and the results are summarised in Section 14.2.6.

Nothing of archaeological significance was identified within the proposed development site during the geophysical survey and archaeological test trenching investigations.

14.1.3.4 Consultation

A scoping request was issued to the Development Applications Unit of the Department of Housing, Local Government and Heritage and no response was received in relation to the archaeological, architectural or cultural heritage resources. The cultural heritage content contained in the Cork County Council's LRD opinion on the proposed development was reviewed as part of this assessment. This content includes items in relation to archaeological impact assessment, mitigation measures and reporting requirements which are addressed in this chapter. A process of consultation with the Cork County Council Archaeologist was also carried out during the compilation of this assessment in relation to archaeological site investigations and the design of relevant aspects of the proposed development.

14.1.3.5 Impact Assessment

The methodology used for the assessment of potential impacts has been informed by the Environmental Protection Agency (EPA) *Guidelines for Information to be Contained in EIAR* (2022), 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 to concisely outline the methodology specifically applied to the cultural heritage resource. Assessment is achieved by a consideration of the duration, quality, type, value and magnitude of effect(s) on the cultural heritage resource:

Duration of Effect 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 on the cultural heritage resource can be positive, neutral or negative.

- Positive: 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: no change or effects that are imperceptible, within the normal bounds of variation for the cultural heritage environment.
- Negative: 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)

Types 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.

Other Types of Effect include:

- Cumulative Effects - The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
- 'Do-nothing Effects' - The cultural heritage environment as it would be in the future should the Project not be carried out.
- 'Worst-case' Effects - The effects arising from a Project in the case where mitigation measures substantially fail.
- Indeterminable Effects - When the full consequences of a change in the environment cannot be described.
- Irreversible Effects - When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost.

- Residual Effects - The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

The *Magnitude of Effect* is based on the degree of change, incorporating any mitigation measures, and is based on a consideration of the character, duration, probability and consequences (Table 14.1). The magnitude can be negative or positive and is ranked without regard to the value of the asset according to the following scale: High; Medium; Low and Negligible. The descriptions of magnitudes presented in Table 14.1 are based on guidance published in *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011, 16-7).

Table 14.1 Magnitudes of Effect on Cultural Heritage Assets

Magnitude	Description
High	Most or all key archaeological or architectural materials affected such that the resource is totally altered. Comprehensive changes to setting. 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. Major changes to area that affect Intangible Cultural Heritage activities or associations or visual links and cultural appreciation
Medium	Changes to many key archaeological or historic building materials/elements such that the resource is clearly/significantly modified. Considerable changes to setting that affect the character of the archaeological asset. Changes to the setting of a historic building, such that it is significantly modified. 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. Considerable changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.
Low	Changes to key archaeological materials/historic building elements, such that the resource is slightly altered/slightly different. Slight changes to setting of an archaeological monument. Change to setting of a historic building, such that it is noticeably changed. 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. Changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

Magnitude	Description
Negligible	Very minor changes to key archaeological materials or setting. Slight changes to historic building elements or setting that hardly affect it. Very minor changes to key historic landscape elements, parcels, or components; virtually unchanged visual effects; very slight changes to use or access; Very minor changes to area that affect the Intangible Cultural Heritage activities or associations or visual links and cultural appreciation.

The *Values* assigned to cultural heritage assets for the purposes of this assessment are intended as indicators which contribute to a wider judgment based on the individual circumstances of each asset. Other than the level of legal designations, e.g., National Monuments and recognition as World Heritage sites, there is no formal grading or rating system for Irish archaeological monuments or architectural heritage structures. The non-statutory National Inventory of Architectural Heritage (NIAH) does apply a ranking system (Regional, National and International) to structures included in that inventory and, while these rankings do not confer a graduated level of statutory protection they have been utilised as a value indicator for NIAH-listed structures for the purpose of this assessment. The criteria for assessing the value of archaeological and other cultural heritage assets as part of this assessment has been informed by the *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011, 14-16). The Value of known or potential cultural heritage assets are ranked according to the following scale: Very High, High; Medium; Low and Negligible (Table 14.2). Generally, the more criteria that are evident for a given asset, the higher in scale its respective Value is deemed to be. Criteria considered in addition to legal designations include condition / preservation; documentary / historical significance; group value; rarity; visibility in the landscape; fragility / vulnerability and amenity value. The values assigned to identified assets within the study area were determined following the completion of the desktop study combined with site inspections and are identified in Section 14.2 of this chapter.

Table 14.2 Guidance Criteria For Assessing Values of Cultural Heritage Assets

Indicative Value	Examples of Asset Types
Very High (International Significance)	World Heritage Sites (including Tentative List properties) Sites, buildings, or landscapes of acknowledged international importance. Intangible associations with individuals or innovations of global significance
High (National Significance)	Nationally designated sites, buildings and landscapes of significant quality, rarity, preservation, and importance Undesignated assets of the quality and importance to be designated Assets that can contribute significantly to acknowledged national research objectives. Archaeological Landscapes with significant group value Intangible associations with individuals or innovations of national significance

Indicative Value	Examples of Asset Types
Medium (Regional Significance)	Designated or undesignated assets that can contribute significantly to regional research objectives, including buildings that can be shown to have exceptional qualities in their fabric or historical associations. Conservation Areas and historic townscapes containing buildings that contribute significantly to its historic character. Intangible associations with individuals or innovations of regional significance
Low (Local Significance)	Assets compromised by poor preservation and/or poor survival of contextual associations. Assets of limited value, but with potential to contribute to local research objectives Historic Townscape or built-up areas of limited historic integrity in their buildings and settings Intangible associations with individuals or innovations of local significance
Negligible	Assets with very little or no surviving archaeological interest Landscapes little or no significant historical interest Buildings or urban areas of no architectural or historical note; buildings of an intrusive character
Unknown Potential	Assets whose importance has not been ascertained. Buildings with some hidden (i.e., inaccessible) potential for historic significance

The *Significance of Effects* is assessed 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 (Table 14.3 and Table 14.4).

Table 14.3 Description of Significance of Effects (per EPA EIAR Guidelines 2022)

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 14.4 Significance of Effects Matrix (based on EPA EIAR Guidelines 2022)

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 of Asset			

14.1.4 Difficulties Encountered in Compiling Information

There were no difficulties encountered during the compilation of this assessment.

14.2 Description of Existing Environment

14.2.1 Introduction

The proposed development site is located within agricultural lands in the townland of Castlelands and is c. 580m outside the east end of the Zone of Archaeological Potential around the historic core of Mallow town. The site was previously part of an unfinished housing development (Cork County Council Planning. Ref. Nos. 0755006, 0655035), and areas of the lands within its boundary were significantly disturbed by ground excavation works during clearance works carried out as part of that development. There is one recorded archaeological site located within the boundary of the proposed development (Fulacht fia CO033-090----) and details on this archaeological site, as well as other aspects of the cultural heritage environment within the reviewed study area, are provided in Section 14.2.4.

The following sections present a summary of the legal and planning frameworks relevant to the cultural heritage resource followed by a chronological overview of known settlement patterns and other human activity within the study area from prehistory to the present day which incorporates published information on recorded cultural heritage assets.

14.2.2 Legal and Planning Context

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[1] (1995) (formally the European Convention on the Protection of the Archaeological Heritage, 1992) ratified by Ireland in 1997; the European Convention on the Protection of Architectural Heritage (Granada

[1] https://www.coe.int/en/web/culture-and-heritage/valletta-convention

Convention[2], 1985), ratified by Ireland in 1997; and the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage, 2003, ratified by Ireland in 2015.

The EIA Directives (from 1985 to 2014) set out the requirement for an EIA in European law. This assessment has been prepared in accordance EIA requirements of codified Council Directive 2011/92/EU as amended by EIA Council 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).

Ireland has transposed EU Directive 2014/52/EU by way of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which came into operation on 1 September 2018. The Regulations provide for the transposition of the 2014 EIA Directive and give further effect to the 2011 EIA Directive by way of extensive amendments to existing planning law.

The national legal statutes and guidelines relevant to this assessment include:

- The Historic and Archaeological Heritage and Miscellaneous Provisions Bill 2023
- National Monuments Act 1930 (as amended);
- Heritage Act 1995 (as amended);
- National Cultural Institutions Act (1997);
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act (1999); and
- Planning and Development Act 2000 (as amended).

14.2.2.1 Summary of Legal and Planning Context

The following section presents a summary of the legal and policy frameworks designed to protect the Irish cultural heritage resource and further information is available in the *Framework and Principles for the Protection of the Archaeological Heritage* (Department of Arts, Heritage, Gaeltacht and the Islands (1999) and the *Architectural Heritage Protection Guidelines for Local Authorities* (Department Arts, Heritage and the Gaeltacht 2011).

The administration of national policy in relation to archaeological heritage management is the responsibility of the National Monuments Service (NMS) which is currently based in the Department of Housing, Local Government and Heritage (DHLGH).

The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was signed into law in October 2023. The DHLGH published an online guidance document in relation to this Act in November 2023[3] which provides an overview of its current status, and this is summarised hereafter. While the Act is now law most of its provisions will not enter into force until the Minister has made one or more "Commencement Orders". This means that section 7 of the Act (which provides for the repeal of the National Monuments Acts 1930 (as amended) and related legislation) has not entered into force. Accordingly, the National Monuments Acts 1930 (as amended) remain fully in force and will continue to do so for the time being. The Act contains transitional provisions which will, if

[2] https://www.coe.int/en/web/culture-and-heritage/granada-convention

[3] https://www.archaeology.ie/news/enactment-of-historic-and-archaeological-heritage-and-miscellaneous-provisions-act-2023-and

necessary, enable certain aspects of the existing National Monuments Acts (as amended) to continue in operation notwithstanding their repeal post-commencement of the Act while successor provisions are being brought fully into operation. This includes provisions enabling the Record of Monuments and Places to continue to have effect pending the establishment of a new Register of Monuments.

The National Monuments Act of 1930 (as amended), therefore, remains the primary means of ensuring the protection of the archaeological resource and includes a number of provisions that are applied to secure the protection of archaeological monuments. These include the designations of nationally significant sites as National Monuments as well listing sites in the Register of Historic Monuments, the Record of Monuments and Places, the Sites and Monuments Record as well as the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

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 National Monuments through agreement with landowners or under compulsory orders. The prior written consent of the Minister is required for any works at, or in proximity to, a National Monument in the ownership or guardianship of the State, the Minister or a local authority, or those which are subject to a Preservation Order. There are no National Monuments located within the study area and the nearest example, Mallow Castle (National Monument no. 281), is located *c.*680m to the west of the proposed development site.

The locations of World Heritage Sites (Ireland) and the Tentative List of World Heritage Sites submitted by the Irish State to UNESCO in 2022 were also reviewed and none are located within County Cork.

The National Monuments (Amendment) Act, 1994 made provision for the establishment of the Record of Monuments and Places (RMP) which comprises the known archaeological sites within the State. The RMP, which is based on the earlier Register of Historic Monuments (RHM) and Sites and Monuments Record (SMR), provides county-based lists of all recorded archaeological sites with accompanying maps. All RMP sites receive statutory protection under the National Monuments Act 1994 and the NMS must be given two months' notice in advance of any work proposed at their locations. The Archaeological Survey of Ireland (ASI) lists 13 recorded archaeological sites within the 500m study area (see Figure 14.1 and Table 14.5 below). Details on these recorded archaeological sites are presented in Section 14.2.3.1 and their published ASI inventory descriptions are provided in Appendix 14.2.

The protection of the architectural heritage resource is provided for through a range of legal instruments that include the Heritage Act 1995 (as amended), the Architectural Heritage (National Inventory) and National Monuments (Misc. Provisions) Act 1999, and the Planning and Development Act 2000 (as amended). 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. There are no Protected Structures located within the proposed development site or the 500m study area surrounding the proposed development site.

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 Cork County Development Plan 2022-2028 identifies three ACAs in Mallow town (Spa Glen, Main Street and Bearforest) and none of these are located within 350m of the boundary of the proposed development site.

The National Inventory of Architectural Heritage (NIAH) was established under the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 to record architectural heritage structures within the State. While inclusion in the NIAH does not provide statutory protection to a structure it is intended to advise Local Authorities on compilation of their Record of Protected Structures. The NIAH also includes a Designed Landscapes and Historic Gardens Survey which comprises a non-statutory, desk-based survey of such features. There are no NIAH-listed structures located within the study area.

The Cork County Development Plan 2022-2028 includes the following objectives in relation to the protection of the archaeological and architectural heritage resources:

> *Objective HE 16-5: Zones of Archaeological Potential – Protect the Zones of Archaeological Potential (ZAPs) located within historic towns, urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the upstanding and potential for subsurface archaeology, through appropriate archaeological assessment.*
>
> *Objective HE 16-9: Archaeology and Infrastructure Schemes – All large scale planning applications (i.e. development of lands on 0.5 ha or more in area or 1km or more in length) and Infrastructure schemes and proposed roadworks are subjected to an archaeological assessment as part of the planning application process which should comply with the Department of Arts, Heritage and the Gaeltacht's codes of practice. It is recommended that the assessment is carried out following pre planning consultation with the County Archaeologist, by an appropriately experienced archaeologist to guide the design and layout of the proposed scheme/development, safeguarding the archaeological heritage in line with Development Management Guidelines.*
>
> *Objective HE 16-10: Management of Monuments within Development Sites – Where archaeological sites are accommodated within a development it shall be appropriately conservation/ protection with provision for a suitable buffer zone and long-term management plan put in place all to be agreed in advance with the County Archaeologist.*
>
> *Objective HE 16-13: Undiscovered Archaeological Sites – To protect and preserve previously unrecorded archaeological sites within County Cork as part of any development proposals. The Council will require preservation in situ to protect archaeological monuments discovered. Preservation by record will only be considered in exceptional circumstances.*
>
> *Objective HE 16-14: Record of Protected Structures*

a) The identification of structures for inclusion in the Record will be based on criteria set out in the Architectural Heritage Protection Guidelines for Planning Authorities (2011).
b) Extend the Record of Protected Structures in order to provide a comprehensive schedule for the protection of structures of special importance in the County during the lifetime of the Plan as resources allow.
c) Seek the protection of all structures within the County, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. In accordance with this objective, a Record of Protected Structures has been established and is set out in Volume Two Heritage and Amenity, Chapter 1 Record of Protected Structures.
d) Ensure the protection of all structures (or parts of structures) contained in the Record of Protected Structures.
e) Protect the curtilage and attendant grounds of all structures included in the Record of Protected Structures.
f) Ensure that development proposals are appropriate in terms of architectural treatment, character, scale and form to the existing protected structure and not detrimental to the special character and integrity of the protected structure and its setting.
g) Ensure high quality architectural design of all new developments relating to or which may impact on structures (and their settings) included in the Record of Protected Structures.
h) Promote and ensure best conservation practice through the use of specialist conservation professionals and craft persons.
i) In the event of a planning application being granted for development within the curtilage of a protected structure, that the repair of a protected structure is prioritised in the first instance i.e. the proposed works to the protected structure should occur, where appropriate, in the first phase of the development to prevent endangerment, abandonment and dereliction of the structure.

Objective HE 16-15: Protection of Structures on the NIAH - Protect where possible all structures which are included in the NIAH for County Cork, that are not currently included in the Record of Protected Structures, from adverse impacts as part of the development management functions of the County.

Objective HE 16-16: Protection of Non- Structural Elements of Built Heritage - Protect non-structural elements of the built heritage. These can include designed gardens/garden features, masonry walls, railings, follies, gates, bridges, shopfronts and street furniture. The Council will promote awareness and best practice in relation to these elements.

14.2.3 Desktop Study

14.2.3.1 Archaeological and Historical Context

The following section presents a description of the archaeological and historical context of the study area and identifies the recorded archaeological sites and designated architectural structures located within the area. Datasets have been interrogated and retrieved largely from State organisations and are considered accurate and current per publicly available information. The dating framework used for archaeological periods is based on the *Guidelines for Authors of Reports on Archaeological Excavations* published by the National Monuments Service (2006).

The proposed development site is located c. 580m outside the east end of the Zone of Archaeological Potential around the historic core of Mallow town, as designated by the National Monuments Service. There is one recorded archaeological site located within the boundary of the proposed development, and this comprises a levelled *fulacht fia* (CO033-090----). There are an additional 12 recorded archaeological sites located within the surrounding 500m study area (Table 14.5 and Figure 14.1) and the ASI has designated one of these as a 'redundant record'. Summary details on the archaeological sites located within the study area are provided below and their ASI inventory descriptions are presented in Appendix 14.2.

Table 14.5 Recorded Archaeological Sites in Study Area

Monument no.	Class	Townland	ITM E	ITM N	Approx. Distance from development boundary
CO033-007001-	Kiln – lime	CASTLELANDS (Fermoy By.)	556442	598498	480m west
CO033-010----	Ringfort – rath	CASTLELANDS (Fermoy By.)	556918	598178	250m southwest
CO033-011001-	Ringfort - rath	CASTLELANDS (Fermoy By.)	556919	598247	45m southwest
CO033-011002-	Redundant record	CASTLELANDS (Fermoy By.)	556890	598252	65m to southwest
CO033-012----	Ringfort - rath	CASTLELANDS (Fermoy By.)	557178	598736	20m east
CO033-013----	Enclosure	KEATLEYSCLOSE	557089	599393	420m north
CO033-068----	Designed landscape - tree ring	BALLYELLIS	557080	597860	425m south
CO033-088----	Kiln – lime	CASTLELANDS (Fermoy By.)	556773	598093	245m southwest
CO033-089----	Enclosure	KEATLEYSCLOSE	556831	599346	395m north
CO033-090----	Fulacht fia	CASTLELANDS (Fermoy By.)	556898	598653	Within site
CO033-091----	Fulacht fia	CASTLELANDS (Fermoy By.)	556867	598572	65m southwest
CO033-117----	Kiln – lime	BALLYELLIS	557445	598003	390m south
CO033-140----	Excavation miscellaneous	CASTLELANDS (Fermoy By.)	556880	598236	75m southwest


CO033-089----
CO033-013----
CO033-012----
CO033-090----
CO033-091----
CO033-007001-
Mallow Castle
CO033-011002-
CO033-011001-
CO033-010----
CO033-140----
CO033-088----
CO033-068----
400
800 m

Figure 14.1 Locations of Recorded Archaeological Sites Within Study Area (NMS zones of notification surrounding these sites are shown in yellow)[4]

Prehistoric Periods

Until the recent identification of Palaeolithic human butchery marks on animal bones recovered from cave sites in Munster, 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 tended to favour coastal, lake and river shores which provided a transport resource and also provided elements of their varied diet. These groups did not construct any settlements or monuments that have left above ground traces although their presence in an area can often be identified by scatters of worked flints in ploughed fields or during earth-moving works undertaken as part of development projects. 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, begin to appear in the archaeological record during this period.

Metalworking arrived in Ireland with the advent of the Bronze Age period (c. 2400–500 BC) and saw the introduction of a new artefactual assemblage and was also associated with the construction of new monument types such as standing stones, stone rows, stone circles and burnt mounds known as *Fulachtai 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). This period has traditionally been associated with a Celtic 'invasion', although recent archaeological evidence points instead to a gradual development following centuries of contacts with Celtic-type cultures in Europe. Relatively little was known about Iron Age settlement and ritual practices in Ireland until recent decades when the corpus of evidence has been greatly increased by the discovery of sub-surface sites dating to this period during archaeological investigations carried out as part of development projects.

There are two recorded prehistoric archaeological sites located within the study area and these comprise two *fulachta fiadh* (CO033-090---- and CO033-091----) (Figure 14.1). These sites comprise spreads of burnt stones within charcoal-rich deposits and are generally interpreted as the remains of cooking sites, although other interpretations have also been postulated. They functioned by placing fire-heated stones into a water-filled trough, which in some instances can be timber-lined, in order to raise the water to boiling point and the mounds gradually built up from material cleaned out from the trough after each use. They are one of the most numerous sites in the Irish archaeological record and are typically located near or adjacent to natural water sources, such as streams, springs or marshy areas. Archaeological evidence indicates that this process may have originated in the Neolithic period but did not become widespread until the Bronze Age (Hawkes 2018). While many examples have been levelled by ploughing or land improvement works, in their undisturbed form they can comprise

[4] Archaeological mapping datasets shown on Figure 14.1 were downloaded from NMS Historic Environment Viewer in August 2024

horseshoe-shaped mounds built up around a sunken trough. While there are no other extant early prehistoric monuments located within the study area, a programme of archaeological monitoring of construction works within the south end of the area uncovered a pit containing sherds of pottery potentially dating to the Neolithic or Bronze Age periods. This pit feature was fully excavated, and its former location was subsequently added to the SMR (CO033-140----).

Early Medieval Period

The early medieval (c. AD 400–1169) period in Ireland broadly commences with the arrival of Christianity to Ireland. While this period saw the emergence of the first phases of urbanisation around the large monasteries and the Hiberno-Norse ports, including Waterford, the dominant settlement pattern of the period continued to be rural-based and centred on enclosed farmsteads known as ringforts. Ringforts 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. There are three recorded ringforts located within the study area (CO033-010----, CO033-011001- and CO033-012----). The potential exists that two other recorded enclosures (CO033-013---- and CO033-089----) within the study area may comprise unclassified ringforts, but this cannot be ascertained without recourse to archaeological excavation.

High, Late and Post Medieval Periods

The arrival and conquest of large parts of Ireland by the Anglo-Normans in the late 12th century broadly marks the advent of the high medieval period which continued to c.1400 AD and was followed by the late medieval period which extended to c.1550 AD. These periods saw the continuing expansion of Irish urbanisation as many of the port cities developed into international trading centres and villages and towns began to develop as local or regional market centres. While earlier masonry castles were already in existence, the descendants of the Anglo-Norman gentry began the widespread construction of tower-houses as fortified residences within their landholdings at the start of the 15th century and this trend was subsequently adopted by wealthy Irish families within areas under Gaelic control. The centuries following AD 1550 are referred to as the post-medieval period, which is generally considered to continue into the mid-19th century and the period thereafter is described as early modern. The early part of the post-medieval period was a turbulent time in Irish history and in the later decades of the 16th century the Tudors sought to re-assert English control over the country. The resultant wars between the 1560s and 1603 brought this unsettled period to a temporary end although further widespread strife ensued during the Cromwellian Wars (1649–53) which ended with extensive dispossession of forfeited Gaelic lands. An agricultural boom in the late 18th and early 19th centuries saw a rise in prices for both tillage and dairy produce which resulted in landlords investing in extensive land improvement works within their holdings to increase land productivity. This included the extensive enclosure of open lands into field systems that survive to the present-day. The post-medieval period also 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 in the 19th century. The settlement pattern throughout much of the rural landscape was greatly affected by the famine period in the middle of the 19th century and subsequent decades saw an intensification of agricultural practices which was further increased by the advent of mechanised farming practices in the 20th century.

While little is known of the origins of the Anglo-Norman occupation of the Mallow area, they are recorded as arriving in north County Cork by 1176 and details on the origins and development of their settlement of the Mallow area during the subsequent centuries have been described by Crowley (1992 and 1993). The siting of their initial settlement in Mallow is likely to have been influenced by its strategic location in the centre of Munster at a crossing point over the River Blackwater. The Mallow area initially formed part of the possessions of the Flemings in c.1200 and thereafter it passed to the Roches and then to the Thomas Fitzmaurice, one of the Desmond Fitzgerald's, during the late 13th century (Leask 1944). Despite references to a murage grant received by Fitzmaurice in 1286, there are no other records or any physical evidence to suggest that a defensive town wall was built around the settlement. The existing settlement at Mallow has its origins in the Munster Plantations of the 1580s when it came into the ownership of Sir Thomas Norreys, Lord President of Munster. The town was made a free borough by James I in 1612 who issued a grant for the establishment of a market and two fairs. By 1641 the town contained 'nearly 200 houses, thirty of which were of stone, strong and slated' but it suffered greatly in 1642 when the Irish 'set fire to the town in several places' (Berry 1906). The town was concentrated on the north side of the river until it began to expand into the lands on the south bank following the construction of Mallow Bridge (CO033-094----) in 1712. The 18th century bridge was replaced by the existing structure in 1856. Mallow continued to develop as a market and spa town during the 18th and 19th centuries and the principal buildings of the present town date to this period. The proposed development site was located outside the east end of the historical core of the settlement and likely formed part of its agricultural hinterland.

The most notable concentration of archaeological monuments within the town is within the Mallow Castle property in the east end of the existing town. The earliest development at this site appears to have been the construction of a castle in c. 1185 at a location overlooking a river crossing point. A later tower house (CO033-009004-) was constructed at the location by the Earls of Desmond and this was replaced during the late 16th century when a fortified house (CO033-009001-) was built to the north of its location by Sir Thomas Norreys, Lord-President of Munster. This fortified house was assaulted by the Confederate forces in 1645 and was subsequently burnt in 1689. A new house was then constructed within its stable block to the north and this was gradually expanded into a large country house (CO033-009002-) known as Mallow Castle during a number of phases of construction dating from the 18th century onward. While the locations of the fortification buildings and the later Mallow Castle country house are outside the west end of the study area, at a distance of c. 680m to the west of the proposed development site, areas of lands associated with Mallow Castle do extend into the study area. The layout of these lands in relation to the proposed development site are detailed in the below review of cartographic sources (Section 14.2.3.3).

There are four post medieval archaeological sites located within the study area and these comprise three lime kilns (CO033-007001-, CO033-088---- and CO033-117----) and a designed landscape feature:

tree-ring (CO033-068----) (Figure 14.1). The recorded sites of one of the lime kilns (CO033-007001-) and the tree-ring (CO033-068----) are now occupied by modern housing estates.

Database of Irish Excavation Reports

This database contains summary accounts of licensed archaeological excavations carried out in Ireland from 1970 to present. A review of the database revealed that a number of programmes of archaeological investigations have taken place in the vicinity of the study area and the full Database entries for these investigations are presented in Appendix 14.3. Two of these site investigations were carried out within lands adjacent to the proposed development site. A programme of test trenching was carried out in advance of the construction of a school in a property adjacent to the northern end of the proposed development site and this revealed nothing of archaeological significance.[5] Advance archaeological test trenching was carried out at the locations of two *fulachta fia* (CO033-090---- and CO033-091----) prior to the construction of an area of the Castle Park housing development to the west of the proposed development site[6]. This identified sub-surface remains of both sites, which were then cordoned off and remain *in situ* within the housing development. A subsequent programme of archaeological monitoring of the construction phase of that housing development revealed nothing of archaeological significance.[7] Another programme of archaeological monitoring of the construction phase of that housing development within the study area revealed a pit feature containing prehistoric pottery which was subsequently subject to archaeological excavation.[8] The former location of this pit feature has been added to the SMR (CO033-140----) (see Figure 14.1).

14.2.3.2 Designated Architectural Heritage Constraints

The *Cork Development Plan 2022-2028* does not list any Protected Structures within the study area and the proposed development site is not located within any of the Architectural Conservation Areas identified in the development plan. The National Inventory of Architectural Heritage (NIAH) also does not list any structures within the study area. The proposed development site is within lands that formerly formed part of the demesne of Mallow Castle country house. The lands associated with that country house are listed in the NIAH Designed Landscapes and Historic Gardens Survey (Survey ID 2963), The entry notes that "*houses have been built on the site",* referring to the existing housing developments to the west of the proposed development site.

14.2.3.3 Review of Cartographic Sources

The cartographic sources examined for the study area comprised the 17th-century Down Survey mapping (Figure 14.2), the 1st edition 6-inch Ordnance Survey (OS) map (1844) (Figure 14.3) and the 25-inch OS map (1904) (Figure 14.4).

Mallow town and Mallow Castle to the east are both depicted on the 17th century Down Survey map. The castle is named as *Coll Jepson house*, after the Jepson (Jephson, Jephson-Norreys) family, who were granted ownership of the area in the late 16th century.[9] The map does not show any large

[5] https://excavations.ie/report/2015/Cork/0024749/

[6] https://excavations.ie/report/2004/Cork/0011433/

[7] https://excavations.ie/report/2005/Cork/0013281/

[8] https://excavations.ie/report/2002/Cork/0007650/

[9] https://landedestates.ie/estate/2900

structures or settlement centres within the location of the proposed development in lands to the east of the town and castle.

The 1st edition 6-inch OS map (1844) shows the lands within the proposed development divided into rectangular fields bound with tree-lined boundaries and a field in the south end is shown with internal trees. There is one structure depicted within the proposed development site and this comprises a small, unnamed T-shaped building shown in the southwest corner. This structure is shown within a small plot and is adjacent to a walkway shown within the demesne lands. There is no formal entrance way to the demesne located within the environs of the structure and, therefore, it does not appear to comprise a gate lodge building situated at a main entrance to the property. There are also no other buildings shown within the lands in the eastern half of the demesne and it appears to comprise an isolated structure within an area of enclosed fields. A review of the mid-19th century Griffith's Valuation revealed that, other than the Jepshon-Norrey family in Mallow Castle, it lists only one tenant (named Denis Daly) who was resident within a building in Castlelands townland but no locational information for this house is provided[10]. A section of a walkway is shown extending east to west through the central area of the proposed development site which also continues outside its east and west boundary. This walkway is labelled *Bower Walk* on the map and connects with another walkway to the west, named *Long Walk*, which continues toward Mallow Castle country house. These features appeared to form formal access routes within an area of agricultural fields within the east end of the country house demesne. The section of *Bower Walk* within the proposed development site now retains no surface traces and the section of its route in the lands to the west, as well as the route of the *Long Walk*, are now occupied by the Castle Parks housing estate. The name *Bower Walk* has since been incorporated as a street name in that housing estate. There is no other demesne features depicted within the proposed development site, and it appears to have comprised as area of enclosed fields within the eastern margins of the demesne, which were potentially in agricultural use during the 1840s.

The 1st edition 6-inch map also shows the townland boundary between Castlelands and Carrigoon Beg extending through the central area of the proposed development site in a south-southeast to north-northwest direction. The southern end of this section of the townland boundary is depicted as tree lined but may not have had a physical component in the northern area which is indicated on the map with a dotted line. The enclosures delimiting the two ringforts (CO033-012---- and CO033-011001-) located outside the boundary of the proposed development site are also depicted on this map and both are indicated as univallate ringfort (single bank/ditch) sites.

The detail on the 25-inch OS map (1904) indicates that the layout of the lands within the interior of the proposed development site had remained largely unchanged during the second half of the 19th century, with the *Bower Walk* and the unnamed building within the southwest end of the proposed development site still present. One change of note within the internal area is the alteration of the line of the townland boundary between Castlelands and Carrigoon Beg which no longer is shown extending within the interior of the proposed development site and is instead shown along a field boundary to

[10] https://www.askaboutireland.ie/griffith-valuation/index.xml?action=doNameSearch&PlaceID=325104&county=Cork&barony=Fermoy&parish=Mallow&townland=%3Cb%3ECastlelands%3C/b%3E

the east, which delimits the east side of the proposed development site. The field boundary that the townland division followed within the interior of the proposed development site on the 1st edition 6-inch map is no longer present and appears to have been levelled during the late 19th century. Another landscape change of note within the environs of the proposed development is an extension to the northeast end of a tree-lined access route that extends towards Mallow Castle. This access route is shown on the 1st edition 6-inch OS map as terminating in lands to the west of the proposed development while the detail on the 25-inch map indicates that it was extended to the public road to the north of the proposed development during the second half of the 19th century. This extension was contained within the school property located to the northeast and it did not extend into the proposed development site.

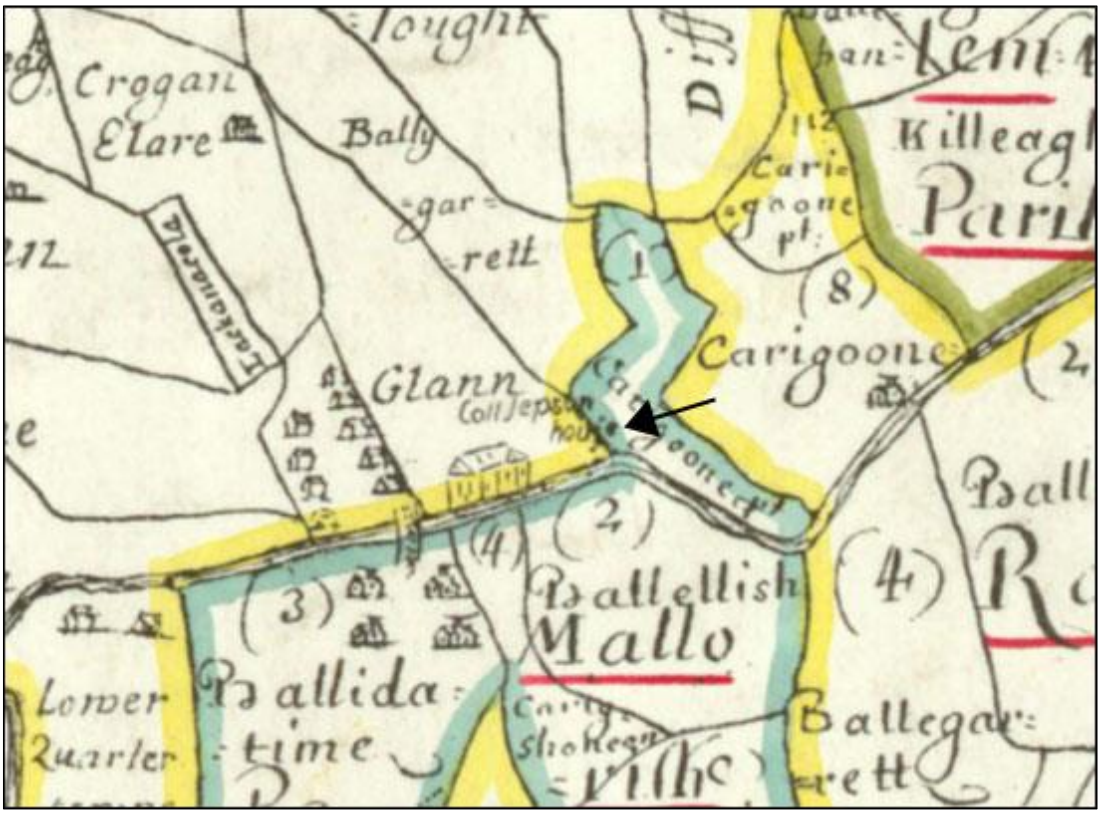

Figure 14.2 Down Survey Map showing Mallow (Mallo) area with approximate location of proposed development indicated by arrow

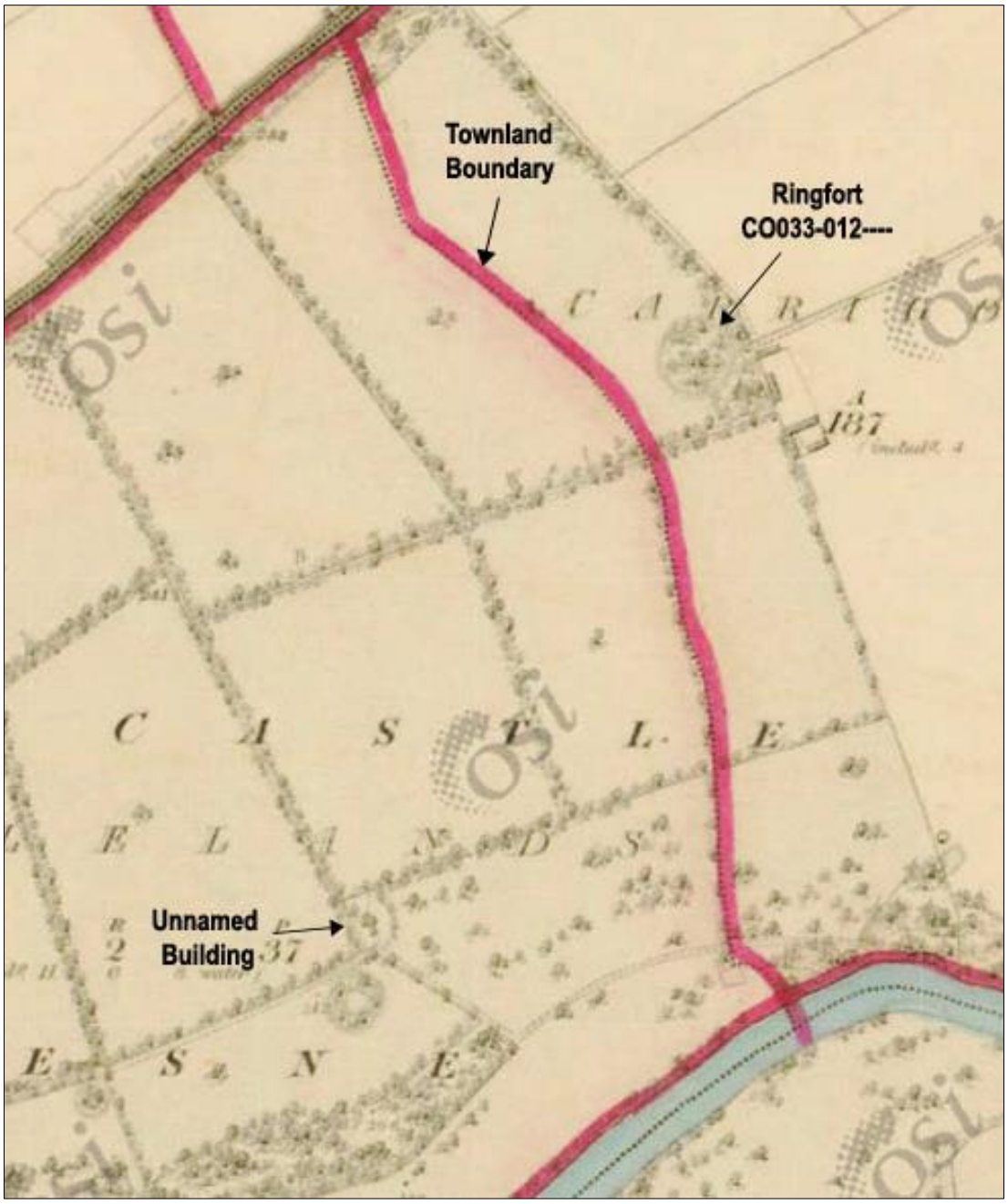

Figure 14.3 Extract from 1st edition 6-inch OS Map (1844) showing location of proposed development

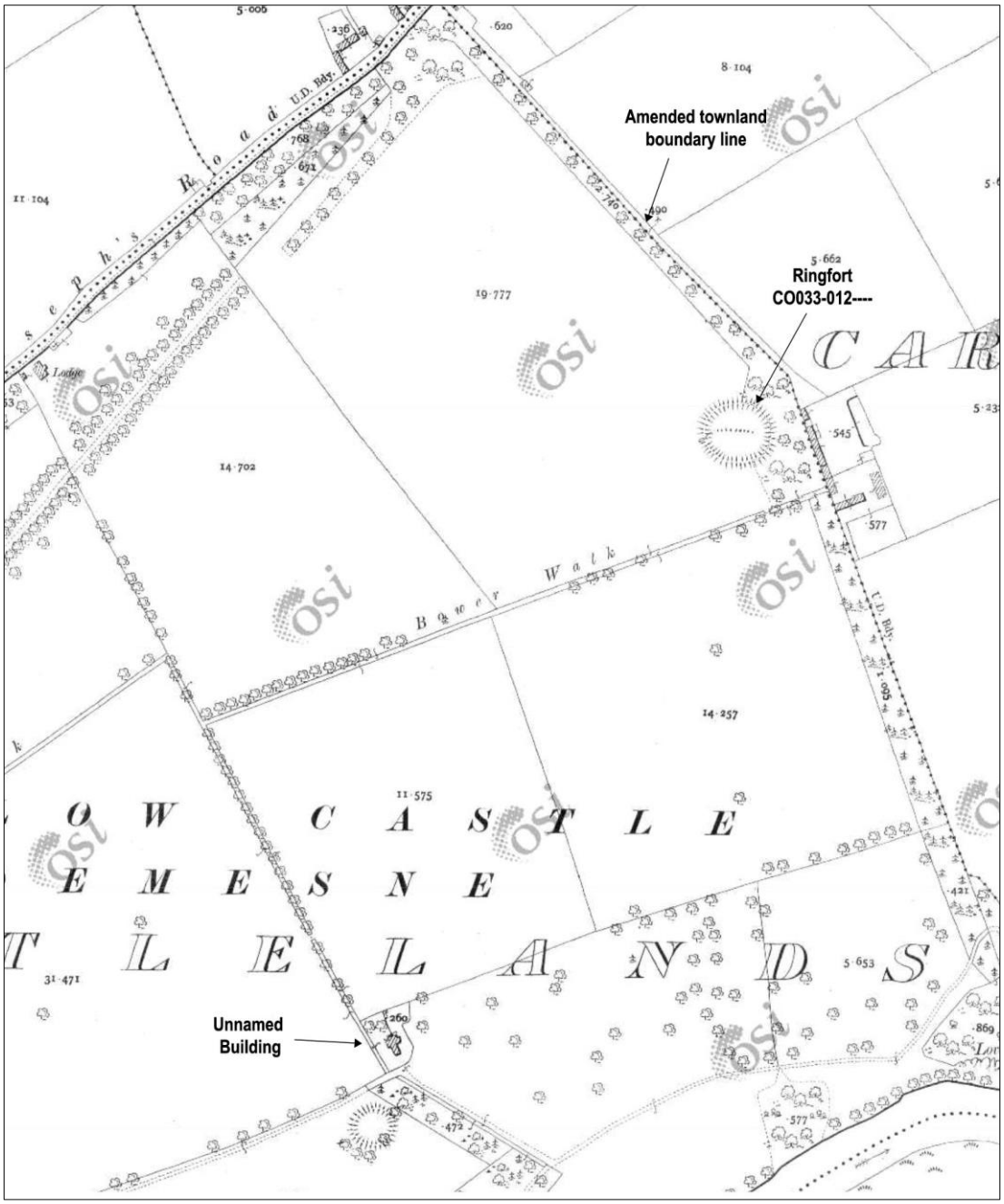

Figure 14.4 Extract from 25-inch OS Map (1904) showing location of proposed development

14.2.3.4 Aerial, Satellite and LiDAR Imagery

A review of modern aerial and satellite images published online by Tailte Éireann, Google Earth and Bing as well as LiDAR datasets published online by the Geological Survey of Ireland[11] revealed no potential unrecorded archaeological sites within the proposed development site but they do show the areas of ground disturbance within its boundary created by construction works in the 2000s (Figure

[11] https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b7c4b0e763964070ad69bf8c1572c9f5

14.5 and 14.6). There are also no visible extant traces of the *Bower Walk* feature or the field boundaries shown within the proposed development site on the historic OS maps.

Figure 14.5 Image of proposed development site in 2005-06 (source: OSI)

Figure 14.6 LiDAR image of proposed development site

14.2.3.5 Undesignated Cultural Heritage Assets

While encompassing the designated archaeological and architectural heritage resources, cultural heritage also includes various undesignated assets such as settlements, demesne landscapes, vernacular structures, folklore, cultural traditions and place names. The proposed development site was contained within the historic demesne of Mallow Castle country house but has been disconnected from the house by the construction of the extensive Castle Park housing estate to the west of the proposed site. There are no extant demesne landscape features present within the proposed development site, including former field boundaries shown on historic OS maps. The building shown on the historic OS maps in the southwest corner of the proposed development remains extant and is detailed in Section 14.2.4.

The online archive of the National Folklore Collection (www.duchas.ie) was consulted and contains no records of folklore or traditions associated with potential unrecorded cultural heritage sites within the proposed development site.

The proposed development site is now contained entirely within the townland of Castlelands but as previously noted it formerly contained a section of Carrigoon Beg townland prior to an alteration of the townland boundary during the late 19th century. Townlands are the smallest unit of land division in the Irish landscape, and many may preserve early Gaelic territorial boundaries that pre-date the Anglo-Norman conquest. The boundaries and names of Irish townlands were recorded and standardised by the Ordnance Survey in the 19th century. The Irish roots of townland names often

refer to natural topographical features, but some name elements may also give an indication of the presence of past human activity within the townland, e.g., lios or rath may indicate the presence of a ringfort while temple, saggart, termon or kill indicate associations with church sites. The townland name Castlelands is English in origin (*Fearann an Chaisleáin* in Irish, which is a direct translation) and has been used as the townland name since at least 1724 according to the Placenames Database (www.logainm.ie). This name can be clearly traced to the history of the area as part of the demesne lands associated with Mallow Castle. The name Carrigoon Beg (*Carraig Dhúin Bheag*) may refer to *'rock of the calves, little'* although Dhúin can also refer to a fort and it is noted that the ringfort (CO033-012----) outside the east end of the proposed development site was located formerly within the boundary of this townland before the townland boundary was altered in the late 19th century.

14.2.4 Field Inspection

The proposed development site was inspected in June 2023 during mixed weather conditions that afforded good landscape visibility. Extracts from the photographic record, including drone photographs, are presented in Appendix 14.1.

The ground terrain in the north end of the proposed development site is relatively level while the terrain slopes gradually downward within the southern area. This majority of the lands within the proposed development site were subject to ground disturbance during site clearance works carried out during the 2000s but the north-eastern area was less disturbed than the central and southern areas. In general, the surrounds of the proposed development site are dominated by the extensive Castle Parks housing estate to the west. A school campus has also been constructed in the northwest corner of the field in the north end of the proposed development site and a private access road delimits the eastern boundary of this portion of the site. Additional modern housing adjoins the north end of the site with agricultural lands located to the east. The area between the southern boundary of the proposed development contains detached modern houses and areas of treelines which screen views to the river, which is located c. 60m to the south of the proposed development site.

The ringfort (CO033-012—) located outside the east boundary of this area of the proposed development site is contained within private third-party lands and, therefore, was not accessible. The ringfort is separated from the proposed development site by a hedgerow forming the boundary of the private property to the east. A review of aerial/satellite imagery revealed that a private access road and with a tall hedgerow on its east side curves along the west edge of the ringfort, the interior of which completely obscured by a copse of mature trees. The field inspection confirmed that there are no views of any above ground remains of the ringfort visible from within the proposed development site as it is completely screened by hedgerows (Appendix 14.1; Plates 14.8 and 14.9). The only indication of the location of this archaeological site from within the proposed development site are views of the trees planted within its enclosure.

A *fulacht fia* (CO033-090----) is located within the west end the proposed development. The sub-surface remains of this archaeological site were revealed during archaeological test trenching carried out in advance of the construction of the adjacent housing development to the west (see Section 14.2.3). The *fulacht fiadh* was preserved *in situ* within a green area as part of that development. No surface traces of this archaeological site were noted during the field inspection and its location is occupied by a green area within the existing housing estate (Appendix 14.1; Plate 14.11). The well-

maintained green area containing its location is bound by a fence line at east and by a road within the housing estate to the west.

The central and southern areas of the proposed development site consist of a brown field area with extensive areas of disturbed ground created during site clearance works during the 2000s. These areas contain hardstanding areas, distributor roads, mounds of topsoil and construction waste. In addition, the incomplete foundations of over 20+ buildings are present in the west end of this portion of the proposed development site.

The unnamed building shown on the historic OS maps within the southwest corner of the proposed development site remains extant and it comprises a single storey building which measures c. 14.3m north-south by 8.2m east-west (Appendix 14.1; Plates 14.12, 14.13 and 14.14). The detached structure consists of a three-bay, single-storey T-plan dwelling or lodge, built c. 1820 but it is much modified and modernised. On its southern side, the dwelling has a canted gable end, and the projecting roof is supported at the corners by timber uprights. The main roof, which is intact, is hipped and low-pitched and has a wide soffit; a single chimney sits atop the roof ridge. The walls have a wet-dash finish, and the windows and doors are boarded-up. A later lean-to annex has been built against the rear/northern wall of the building. Two modern detached shed structures are located to the east of the building. While the building is located within an area of the proposed development site that underwent ground disturbance during the 2000s, no impacts on the structure appear to have occurred although there are no surface traces of its tree-lined property boundary shown on the historic OS maps. It is located directly adjacent to a modern housing estate road to the west and is currently located within the fence line extending around the proposed development site. The presence of a television aerial on the chimney indicates that it was occupied in modern times and two small detached modern sheds on its east side may be associated with this occupation.

No surface traces of any potential unrecorded archaeological sites or historic field boundaries were noted within the interior of the proposed development site during the field inspection.

There was no intervisibility between the proposed development site and any extant archaeological sites located within the surrounding study area noted during the field inspection. In addition, no views of Mallow Castle, which is located outside the west end of the study area, were noted.

14.2.5 Geophysical Survey

A geophysical survey of the undisturbed green field areas within northern end of the proposed development site was carried out by John Cronin and Associates (Licence 23R0470) in October 2023. Due to the disturbance associated with previous ground works carried out as part of an earlier unfinished development during the 2000s, the lands in the northern end of the proposed development site were the only areas suitable for geophysical survey (c.3.7ha). No anomalies that indicated definitive evidence for archaeological sites were identified during the geophysical survey, however several anomalies of low to moderate archaeological potential were identified, though without any recognisable pattern that was indicative of potential archaeological sites. These anomalies were mostly concentrated in the southeast of the survey area (Figure 14.7). Further magnetic responses of limited archaeological potential were noted within the survey area. The dataset also comprised responses indicative of agricultural activity; potential field drains, levelled field boundaries and

ploughing activity. The anomalies of archaeological potential origin were subsequently investigated by targeted archaeological test trenching (see Section 14.2.6). A full copy of the report on the geophysical survey is presented in Appendix 14.4.

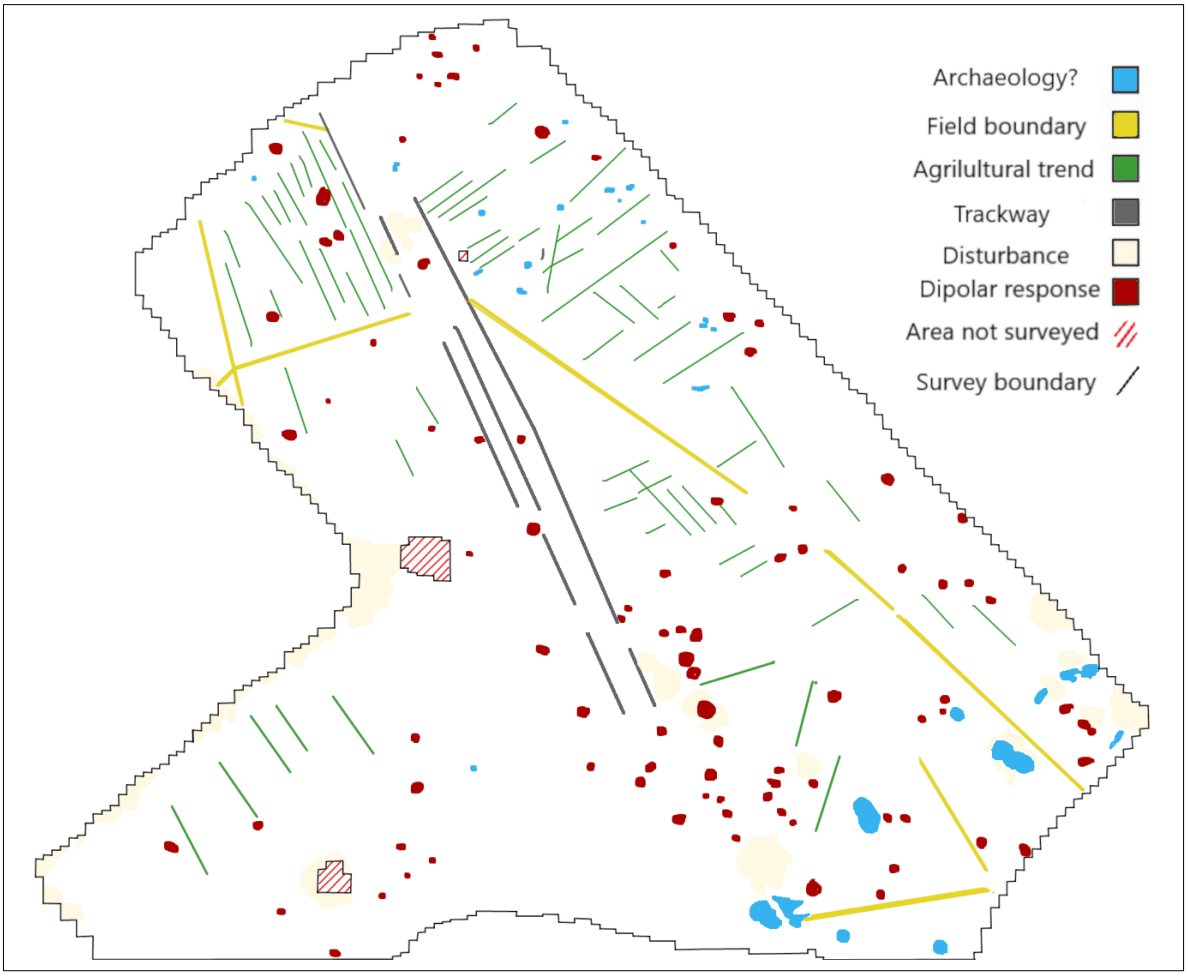

Figure 14.7 Interpretative plan based on geophysical survey 23R0470

14.2.6 Archaeological Test Trenching

Archaeological test trenching was carried within the proposed development site by John Cronin and Associates in January 2024, under excavation licence number 24E0007, as issued by the National Monuments Service. A total of 19 test trenches were excavated and 15 of these were in the northern portion of the proposed development site, most of which targeted anomalies identified from the results of the geophysical survey (Licence 23R0470). The remaining four test trenches were excavated within the southern end of the proposed development site in areas that had been subject to prior ground disturbance and were not suitable for geophysical survey. Overhead powerlines crossed areas of the proposed development site and for health and safety reasons, it was not possible to excavate test trenches below or immediately adjacent to these constraints.

Natural subsoil was identified in the trenches at depths of 0.05m and 1.2m below modern surface level. While evidence of agricultural activity, including field drains, levelled field boundaries and furrows, was revealed in a number of the test trenches which targeted geophysical anomalies, nothing

of archaeological significance was encountered. Considerable ground disturbance was evident in many of the trenches. This was associated with initial site clearance works carried out as part of the unfinished construction project within the proposed development site during the 2000s. A number of these areas of modern disturbance accounted for some of the anomalies identified during the geophysical survey.

A section of the townland boundary between Castlelands and Carrigoon Beg had previously extended through the proposed development site but this has since been changed and the line of the former townland boundary, as depicted on the 1st edition 6-inch OS map (Figure 14.3) has no above-ground element. Test trenching along the former townland boundary did not identify any features associated with this land division. A full copy of the archaeological test trenching report is presented in Appendix 14.5.

14.3 Predicted Impacts

14.3.1 Do Nothing Scenario

A 'Do Nothing Scenario' will see the continued preservation of recorded and potential cultural heritage features within the study area.

14.3.2 Construction Phase

There is one recorded archaeological site located within the boundary of the proposed development and this comprises a *fulacht fia* (CO033-090----) which is currently within a green area in the east end of the existing housing development to the west (Figure 14.1). No visible surface traces of this site were noted during the site inspection, and the green area containing its location is bound by a fence line at east and a housing estate road at west. The nearest proposed development area to the recorded location of this archaeological site is an access road located to adjacent to the north end of the green area which is currently occupied by an existing section of a modern cul-de-sac road, which will be utilised as the access route. A proposed access road is also located c. 25m to the south of the archaeological site and this forms a connection between an existing housing estate road to the west and an existing construction access road located within the proposed development site. The nearest proposed houses from the *fulacht fiadh* are located at distances of c. 35m-50m to the north and south of its location and a proposed creche is located c. 60m to the northeast. The construction phase of the proposed development will, therefore, not result in any predicted direct effects on this archaeological site although protective mitigation measures will be required during this phase (see Section 14.4).

A ringfort (C0033-012----) within a private third-party property outside the eastern boundary of the proposed development is located 30m from the nearest proposed houses to the north of its location. It is located 20m south of a proposed access road to the south of these houses. The proposed houses to the west and south of the ringfort are a distance of c. 50m from its outer extent. The geophysical survey and test trenching investigations carried out as part of this assessment encompassed the lands within the proposed development site located adjacent to the property containing the ringfort and no traces of any potential unrecorded archaeological features associated with the ringfort were identified. The construction phase of the proposed development will, therefore, not result in any

predicted direct or indirect effects on this archaeological site which is entirely contained within a third-party property and is completely screened by vegetation. In addition, the construction phase of the proposed development will also result in no predicted effects on any of the other recorded archaeological sites within the surrounding study area as these are also located within third-party properties where no construction works will occur.

The geophysical survey within undisturbed areas in the northern half of the proposed development site identified a number of anomalies of low to moderate archaeological potential (see Section 14.2.5 and Appendix 14.4). These anomalies were subsequently targeted during the programme of archaeological test trenching and found to not relate to archaeological sites or features. Nothing of archaeological significance was identified within the proposed development site during these investigations.

There are no Protected Structures or structures listed in the NIAH located within the study area and the proposed development site is not within an Architectural Conservation Area. The construction phase of the proposed development will, therefore, have no predicted effects on the designated architectural heritage resource.

The 19th century building located within the southwest corner of the proposed development is not listed as a Protected Structure or included in the NIAH. This building will be retained, repaired and converted to a café and interpretative centre as part of the proposed development. The existing internal layout within the north end of the original building will be retained as part of this proposal. An internal east-west wall within the southern end of the building and a later lean-to annex which has been attached to the northern elevation will be removed.

The southern end of the building will be converted into a café (internal area 24.5 m.sq) with a counter space and seating. The northern end of the building will be converted into an interpretive centre (internal area 18.8 m.sq) with exhibition spaces and a WC in an existing room on the west side. The later lean-to annex attached to the northern end of the building will be removed and this will result in the exposure of the original northern elevation of the building.

In summary, the following works to the external elevations on the north and south sides of the building are proposed:

<u>South elevation</u>

- Café signage to be installed over entrance.
- Existing windows to be retained or replaced where required.
- Existing external wall plaster to be retained or replaced where required.

<u>North elevation</u>

- Later lean-to annex to be removed.
- Canopy to be added over interpretative centre entrance.
- Signage to be added near interpretive centre entrance.
- Existing external wall plaster to be retained or replaced where required.
- Existing doorway to be converted to window.
- Retained walls on north elevation to be rendered to match existing.

The construction phase interventions to this undesignated structure will entail the removal of a later lean-to annex attached to its northern elevation and the removal of an internal wall in the southern end of the building. This will result in a permanent, direct, adverse effect of moderate significance on the building.

The construction phase will also entail appropriate repairs of the building which will result in a permanent, direct, positive effect of slight to moderate significance. All repairs will be carried out based on a conservation method statement which will be prepared by a suitably qualified built heritage specialist (see Section 14.4).

A section of the townland boundary between Castlelands and Carrigoon Beg previously extended through the centre of proposed development site but this land division feature was altered during the late 19th century to extend along the public road outside the east end of the proposed development site (see Section 14.2.3). The southern line of the former route of townland boundary within the proposed development site, as depicted on the 1st edition 6-inch OS map of 1844 (Figure 14.3), followed a field boundary which is not present on the 25-inch OS map of 1904 (Figure 14.4). There are no surface traces of this field boundary surviving and test trenching along the line of the former townland boundary within the proposed development site did not identify any features associated with this land division. The potential exists that traces of this boundary were removed during the late 19th century when the field boundary was levelled or during the site clearance works carried out in this area of the site during the 2000s. The construction phase of the proposed development will, therefore, result in no predicted effects on this element of the undesignated cultural heritage resource.

The River Blackwater is located c. 60m to the south of the proposed development site and no construction works will be carried out within the environs of this river or its northern bank. In addition, there are no watercourses located within the proposed development site. The construction phase will, therefore, result in no predicted effects on any potential unrecorded underwater archaeological sites or features that may exist within the study area.

14.3.3 Operational Phase

There is no direct intervisibility between the proposed development site and the overgrown ringfort (C0033-012----) located within an area in a private third-party property outside the nearest section of the eastern boundary of the proposed development. The location of the ringfort is screened by tall hedgerows and an existing access road located within the adjoining property and the only indication of its location from within the proposed development site is the upper sections of a copse of trees planted within the interior of its enclosure. Given the absence of any intervisibility between the ringfort and the internal area of the proposed development, a negligible magnitude, indirect, imperceptible, adverse effect on the setting of ringfort C0033-012---- is predicted to occur during the operational phase.

While the recorded location of *fulacht fia* (CO030-090----) is located within the boundary of the proposed development, this archaeological site is currently contained within a green area within the existing housing estate to the west and will also be retained within this location as part of the proposed development. As there are no visible surface traces of this archaeological site, the proposed

development will result not result in any direct or indirect visual effects on its current setting. There is no intervisibility between the proposed development site and other recorded archaeological sites located within the study area and no operational phase effects on these archaeological sites are predicted.

Following the successful implementation of archaeological mitigation measures presented in Section 14.4, it is predicted that no effects will arise in relation to the potential archaeological resource within the proposed development site during the operational phase.

The assessment of potential visual effects of the proposed development is provided in Chapter 10 (Landscape and Visual) and this includes an assessment of potential effects on Mallow Castle, and its associated lands, and the town centre which includes various Protected Structures and recorded archaeological sites. The significance of visual effects on Mallow Castle and its associated lands is predicted to be slight in significance during the operational phase. The significance of visual effects on the town centre is predicted to be imperceptible in significance during the operational phase.

There are no NIAH-listed structures or Protected Structures located within the study area and the proposed development site is not within an Architectural Conservation Area. The operational phase of the proposed development will, therefore, have a neutral effect on the designated architectural heritage resource during the operational phase.

The proposed development will entail the construction of houses in the area c.10m to the north of the 19th century building in the southwest corner of the site. The existing baseline within the wider environs of this structure comprises an extensive modern housing estate and the operational phase of the proposed development will result in a permanent, indirect, adverse, slight effect on its current setting. The operational phase of the proposed development will also result in the use of the building as a café and interpretive centre. This will result in ongoing appropriate maintenance of the building and will also facilitate public access to a historic structure which is currently boarded up and in danger of becoming derelict through disuse. This will result in a direct, permanent, positive effect of moderate significance.

14.3.4 Risks to Human Health

There are no predicted risks to human health associated with potential effects on the cultural heritage resource.

14.3.5 Cumulative Impacts

A review of the Cork County Council planning enquiry system was carried out in relation to the following developments within the wider environs of the proposed development site.

53 no. residential units at Ballydaheen Road (CCC ref. 226225): This development site is located c. 1km to the west of the proposed development site and does not contain any recorded cultural heritage constraints.

186 no. residential units at Spa Glen, Mallow, Co. Cork (CCC ref. 244243): This development site is located c. 860m to the north of the proposed development. It contains the location of a mound site

(CO033-146----) which has been designated as a 'redundant record' by the ASI as comprises a modern feature.

96 no. dwelling units at Old Course Spa Glen, Mallow (CCC ref. 224676): This development site is located c. 1km to the northwest of the proposed development site and does not contain any recorded cultural heritage constraints.

Extension to Scoil Aonghusa CNS, Kingsfort Avenue (CCC ref. 226156): This development site is located adjacent to the north end of the proposed development site and does not contain any recorded cultural heritage constraints. As detailed in Section 14.2.3 of this chapter, a programme of archaeological test trenching within the property did not reveal anything of archaeological significance.

The proposed development site is located c. 580m outside the east end of the Zone of Archaeological Potential around the historic core of Mallow town and is not located within an Architectural Conservation Area. The proposed development will not result in any predicted significant adverse effects on the cultural heritage resource in combination with the above developments and, therefore, is not predicted to contribute to any potential cumulative effects on the resource.

14.4 Mitigation Measures

14.4.1 Construction Phase Mitigation

There is one recorded archaeological located within the proposed development site and this is a *fulacht fia* (CO033-090----) which is currently contained within a green area in Castle Parks housing estate to the west. This archaeological site will be preserved *in situ* within a fenced off buffer zone extending 10m from its outer recorded extent for the duration of the construction phase. No ancillary activity, including ground works, vehicular movements, compounds, landscaping and equipment/soil storage will take place within this buffer zone during the construction phase (Figure 14.8).

A ringfort (C0033-012----) located outside the east end of the proposed development site is contained within private third-party lands and is separated from the proposed development by hedgerows and a roadway within that property. No construction works will be carried out within 20m of its location. No potential unrecorded features associated with this archaeological site were identified during the geophysical survey and test trenching investigations carried out within the area of the proposed development within the wider environs of the ringfort. As this archaeological site is entirely located outside of the development boundary, no protective mitigation measures are, therefore, required within the boundary of the proposed development.

There are no Protected Structures or structures listed in the NIAH located within the proposed development site and it is not within an Architectural Conservation Area. No mitigation measures for these elements of the cultural heritage resource are, therefore, required during the construction phase.

The location of the 19th century building in the southwest corner of the proposed development site will be preserved *in situ* and protected by fencing for the duration of the construction phase. A pre-works historic building survey, including drawn, written, and photographic records, will be prepared

by a suitably qualified conservation specialist in advance of the construction phase. The appointed conservation specialist will also prepare a conservation method statement which will provide details on the appropriate repair, treatment of extant original fabric and correct application of the proper new material as required on the building. This method statement will be based on the following core principles:

- Authentic structure and fabric of importance to maintain the structure's special character are to be respected and retained.
- All existing sound fabric and features are to be retained and protected.
- It is the objective to carry out works limited to the minimum intervention essential for the survival of the property and its restoration as a café/interpretative centre.
- It is intended in all cases where possible to carry out repairs rather than replacement, which will only be carried out where relevant elements of original fabric have perished.
- It is intended that unsatisfactory alterations which disfigure earlier work of greater merit should be reversed.
- New repairs are to be discernible but sympathetic to the visual integrity of the structure.
- Alterations are to be as far as possible reversible.

The locations of *fulacht fia* (CO033-090----) and the 19th century building in the southwest corner of the proposed development site will be identified as part of site inductions during the construction phase and will be clearly designated as exclusion areas where no construction activity will occur.

A range of archaeological site investigation mitigation measures have already been carried out in relation to the proposed development as part of this assessment. The results of the geophysical survey and test trenching carried out within the proposed development site are described above (Sections 14.2.5 and 14.2.6) and the full reports on these site investigations are included in Appendices 14.4 and 14.5. Nothing of archaeological significance was identified during these site investigations, which in combination with extensive ground disturbance carried out in the 2000s, indicates that there is low potential for the presence of unrecorded archaeological features within the proposed development site. As a precautionary measure, licensed archaeological monitoring of topsoil stripping works within 50m of the buffer zones around *fulacht fia* (CO033-090----) and ringfort (C0033-012----) will be carried out by a suitably qualified archaeologist during the construction phase (Figure 14.8). In the event that any archaeological sites or features are identified during monitoring, ground works will halt at that location, and they will be recorded and will be left to remain securely in situ within a cordoned off area. The National Monuments Service and the Cork County Council Archaeologist will be notified of the discovery and consulted to determine further appropriate mitigation measures, which may entail preservation *in situ* by avoidance or preservation by record through a licensed archaeological excavation.

Figure 14.8 Location of archaeological buffer zones and monitoring areas around Ringfort (C0033-012----) and Fulacht Fiadh (CO033-090----)

14.4.2 Operational Phase Mitigation

The location of the *fulacht fia* (CO033-090----) and its surrounding 10m buffer area will be excluded from any potential future development proposals within the boundary of the proposed development. A suitably qualified archaeologist will be retained to advise on the design of any future proposed development works, if any, located within the environs of the archaeological exclusion zone and to prepare an archaeological impact assessment of any such development. This will include a process of consultation with the Cork County Council Archaeologist and the National Monuments Service.

The location of the *fulacht fia* and surrounding 10m buffer area will also be clearly identified (and mapped) as an archaeological exclusion area on all relevant future site management plan documents.

No landscaping, tree-planting, tree root removal, car parking, drainage, traffic, storage or other works which will have the potential to result in ground disturbance that may directly impact any sub-surface archaeological deposits, features or objects will occur within the archaeological exclusion zone during the operation phase. The maintenance of the archaeological exclusion area will be limited to periodic grass cutting during the operational phase. All of the other recorded archaeological sites within the study area are located in private third-party lands and, therefore, no operational phase mitigation measures are required for these constraints.

14.4.3 Monitoring

There are a number of obligatory processes to be undertaken as part of applications to the National Monuments Service for licences to carry out archaeological site investigations, and these will allow for monitoring of the successful implementation of mitigation measures. A revised method statement for any required excavation works will be submitted to the National Monuments Service and National Museum of Ireland as part of an application for a licence to complete these works. Reports on the archaeological site investigations will then be submitted to the National Monuments Service, the National Museum of Ireland and the Planning Authority which will clearly describe the results of all archaeological works in written, mapped and photographic formats.

14.5 Residual Impacts

The proposed development site contains one recorded archaeological site, which comprises a levelled *fulacht fia* (CO033-090----) which retains no visible surface traces and is currently located within a green area in a modern housing estate. Following the implementation of mitigation measures detailed in Section 14.4, no residual effects on this archaeological site are predicted as it will be preserved *in situ* by avoidance. The archaeological site investigations carried out within the proposed development site to date have not identified any potential unrecorded archaeological sites within its boundary and have demonstrated the extent of the disturbance of the lands during site clearance works carried out during the 2000s. The archaeological monitoring mitigation measures presented in Section 14.4 will provide for the identification of any currently unknown archaeological features within the environs of two recorded archaeological sites (ringfort C0033-012---- and *fulacht fia* CO033-090----) located in proximity to proposed construction areas. Preservation *in situ* of any identified features within these areas shall allow for a negligible magnitude of impact resulting in a potential not significant/imperceptible significance of effect in the context of residual impact on the archaeological resource. Preservation by record through archaeological excavation shall allow for a high magnitude of impact, albeit ameliorated by the creation of a full and detailed archaeological record, the results of which shall be publicly disseminated. This shall result in a potential slight/moderate range of significance of effect in the context of residual impacts on the unrecorded archaeological resource.

No potential adverse residual effects on elements of the cultural heritage resource located within the surrounding study area are predicted.

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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 (Heritage Council)

https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b7c4b0e763964070ad69bf8c1572c9f5 (LiDAR)

https://corkdigitalarchive.ie/ (Cork County Library local history)

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 15

Significant Interaction of Impacts

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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15 Significant Interaction of Impacts

15.1 Introduction

The construction, operational and cumulative impacts of the proposed development have been assessed within each chapter of the EIAR. This chapter describes any interactions of impacts identified in the previous chapters and identifies where any of these are significant.

The potential cumulative effects of the proposed project in combination with other permitted developments in proximity has been considered in each chapter as relevant.

15.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy. Saoirse holds a Bachelor's degree in Arts (International), majoring in Geography, and a Master's in Planning and Sustainable Development. She has over 5 years' experience working with multi-disciplinary teams and has provided input into a variety of projects. In particular, she has co-ordinated the preparation of the following three Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Population and Human Health, and Screening for Major Accidents chapters.

- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Bennetstown Large Scale Residential Development, Dunboyne, Co. Meath
- Clonmagadden Sheltered Housing Development, Navan, Co. Meath

15.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Site Location and Project Description' of this EIAR.

15.4 Methodology

The EIAR has considered and assessed the interactive effects and cumulative impacts arising from the construction and operation of the proposed development based on best scientific knowledge. Interactive effects (or interactions), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Article 3 (1) of the amended EIA Directive:

> *"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”*
>
> *EU Guidance identifies that;*
>
> *“Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from:*
>
> *the interaction between all of the different Projects in the same area;*
>
> *the interaction between the various impacts within a single Project (while not expressly required by the EIA Directive, this has been clarified by the CJEU – see the box below).*
>
> *The coexistence of impacts may increase or decrease their combined impact. Impacts that are considered to be insignificant, when assessed individually, may become significant when combined with other impacts.”*

The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in Table 15.1.

15.5 Difficulties Encountered

There were no difficulties encountered in completing this EIAR chapter.

15.6 Potential Significant Interactions

15.6.1 Population and Human Health

Chapter 4 assesses the likely impacts to Population and Human Health arising from the proposed development. During the construction phase, the following aspects would interact with Population and Human Health and in the absence of mitigation may give rise to significant effects.

- Land, Soil, and Geology: Site clearance has the potential to result in increased dust and particulate emissions to air as well as the potential to release contaminated soils to the local environment.
- Hydrology: Site clearance has the potential to release contaminated soils to the local environment.
- Air Quality: Construction activities may result in a decrease in local air quality which has the potential to negatively impact on human health.
- Noise and Vibration: Increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents.

- Landscape and Visual Impact: There will be visual changes associated with removal of some trees and hedgerows and emerging plant and machinery.
- Traffic and Transport: Construction traffic has the potential to negatively impact local residents and businesses through increased delays and potential impacts on health and safety.
- Material Assets: Service Infrastructure and Utilities: Extended power or telecommunications outages, or disruption to water supply or sewerage systems for existing properties in the area could negatively impact on the surrounding human population and their overall health.

During the operational phase, the potential interactions are:

- Landscape and Visual Impact: There will be permanent visual changes to the landscape which may impact the residential dwellings surrounding the proposed development.
- Traffic and Transportation: Increased traffic once the development is fully operational has the potential to negatively impact local residents and temporary receptors.

The potential significant impacts to Population and Human Health have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.2 Land, Soil and Geology

Chapter 5 assesses the likely impacts to Land, Soil and Geology arising from the proposed development. During the construction phase, the following aspects would interact with Land, Soil and Geology and in the absence of mitigation may give rise to significant effects.

- Population and Human Health: There is a potential risk of dust generated from excavation and stockpiling of soil posing a human health risk in the absence of standard avoidance and mitigation measures.
- Biodiversity: Site clearance and earth works may result in disturbance or displacement of fauna and birds.
- Hydrology: In the absence of avoidance, remedial and mitigation measures, there is a potential for sediment from excavated soils entering runoff and discharging into the Blackwater River and local drainage within the Castlelands Park estate during the construction phase of the Proposed Development.
- Air Quality and Climate: The excavation of soils across the site and the temporary stockpiling of soils pending reuse or removal offsite has the potential to generate nuisance impacts (i.e., dust) during the Construction Phase of the Proposed Development.
- Service Infrastructure and Utilities: Potential impacts on the receiving land soils and geology environment could also impact on material assets.
- Landscape and Visual: The site landscape will undergo a change from undeveloped lands to residential with associated landscaping.
- Traffic and Transportation: The removal of excavated soil offsite will require additional traffic to and from the site.

During the operational phase, the potential interactions are:

- Landscape and Visual Impact: There will be permanent visual changes to the landscape which may impact the residential dwellings surrounding the proposed development.

15.6.3 Hydrology and Hydrogeology

Chapter 6 assesses the likely potential impacts on Hydrology and Hydrogeology arising from the proposed development. Hydrology and Hydrogeology attributes interact with other environmental attributes are summarised as follows:

- Population and Human Health: Potential impacts on the receiving hydrology and hydrogeology environment could also impact on human health.
- Biodiversity: Any negative impacts on water quality as a result of excavations and discharge of silt, sediment or pollutants to surface waters may result in impacts to biodiversity downstream of the site. Potential impacts on the receiving hydrology and hydrogeology environment could also impact on biodiversity conditions present.
- Land, Soil and Geology: there is a potential for runoff with entrained sediment or other contaminants from groundworks areas and stockpiled soils entering the Blackwater [Munster] River via overland flow or via existing surface water drainage within the Castle Park residential estate adjacent the Site.
- Material Assets Service Infrastructure and Utilities: Potential impacts on the receiving hydrology and hydrogeology environment could also impact on material assets.

The potential significant impacts to Hydrology and Hydrogeology have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.4 Air Quality

Chapter 7 assesses the likely potential impacts on Air Quality arising from the proposed development. During the construction phase, the following aspects would interact with Air Quality and in the absence of mitigation may give rise to significant effects.

- Population and Human Health: Dust and emissions from the construction phase of the proposed development have the potential to impact on the local population and human health.
- Land, Soils and Geology: Construction activities have the potential for interactions between land and air quality in the form of dust emissions.
- Biodiversity: Dust generation during the construction phase can coat vegetation leading to a reduction in the photosynthesising ability.
- Traffic: Emissions from construction traffic may result in a decrease in local air quality.
- Climate: Air Quality and Climate have interactions as the emissions from the burning of fossil fuels.

During the operational phase the potential interactions are:

- Population and Human Health: Emissions from the operational phase of the proposed development have the potential to impact on the local population and human health.

- Traffic: Emissions from operational traffic may result in a decrease in local air quality.
- Climate: Air Quality and Climate have interactions as the emissions from the burning of fossil fuels.

The potential significant impacts to Air Quality have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.5 Climate Change

Chapter 8 assesses the likely potential impacts on the climate arising from the proposed development. Climate interacts with the following environmental aspects:

- Land, Soils, Geology, and Hydrology: Increased rainfall and flooding events as a result of climate change have the potential to impact the proposed development during the construction and operational phase.
- Air Quality: Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts.
- Traffic and Transportation: Construction and operational traffic will result in emissions of CO_2, a greenhouse gas.
- Waste: Waste entering landfill has higher associated embodied carbon emissions than other waste management. The production of waste heading to landfill in both construction and operation phases therefore interacts with climate change.

The potential significant impacts of climate have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.6 Noise and Vibration

Chapter 9 assesses the likely potential impacts on Noise and Vibration arising from the proposed development. During the construction phase, the following aspects would interact with Noise and Vibration and in the absence of mitigation may give rise to significant effects.

- Population and Human Health: Noise and vibration associated with the construction phase has the potential to impact the amenity of local residents.
- Traffic and Transportation: Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents.
- Biodiversity: Construction noise and vibration may impact local biodiversity.

During operation, the potential interactions are;

- Traffic and Transportation and Population and Human Health: Additional construction traffic may give rise to increased local noise and vibration which may have an impact on the amenity of local residents.

The potential significant impacts of Noise and Vibration have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.7 Landscape and Visual Impact

Chapter 10 assesses the likely potential impacts on Landscape and any visual impacts arising from the proposed development.

- Biodiversity: Changes to the landscape associated with the proposed development have the potential to impact the local biodiversity.
- Cultural Heritage: Changes to the landscape associated with the proposed development have the potential to impact the local cultural heritage and archaeology.

No other potential significant interactions have been identified other than those already described. The potential significant impacts of Landscape and any visual impacts have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.8 Material Assets: Traffic and Transport

Chapter 11 assesses the likely impacts on Traffic and Transport arising from the proposed development. Traffic and Transportation interacts with other environmental attributes as follows:

- Air Quality: Particulates and gaseous emissions from traffic (both on and off-site) and residual dust dispersal associated with traffic movements could negatively impact the local air quality.
- Climate: Increased emissions due to the burning of fossil fuels generates impacts on the climate.
- Noise: Increased traffic levels associated with the proposed development will increase noise levels in the area.

The potential significant impacts of Traffic and Transport have been considered within the relevant discipline and mitigation measures outlined where required. No other significant interactions have been identified, other than those discussed above. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.9 Material Assets: Service Infrastructure and Utilities

Chapter 12 assesses the likely impacts on Services and Infrastructure arising from the proposed development. During the construction phase, the following aspects would interact with Services and Utilities, and in the absence of mitigation may give rise to significant effects:

- Biodiversity: Construction lighting within the footprint of the proposed development has the potential to cause increased light pollution of adjacent areas and could potentially impact on fauna (bats, mammals, or birds) foraging in adjacent habitats.
- Land Soil and Geology: Site clearance may result in disturbance to service infrastructure and utilities, in turn impacting the local population.

- Cultural Heritage and Archaeology: There may be an impact to Cultural Heritage and Archaeology if previously undiscovered sub-surface remains are damaged or destroyed during excavations to provide utilities.

During the operational phase the potential interactions are as follows:

- Biodiversity: disturbance to fauna (bats, mammals, or birds) arising from artificial light spillage into the environment from the associated lighting scheme.

The potential significant impacts to Services Infrastructure and Utilities have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.10 Biodiversity

Chapter 13 assesses the likely impacts on Biodiversity arising from the proposed development. The potential significant impacts to Biodiversity have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

15.6.11 Cultural Heritage and Archaeology

Chapter 14 assesses the likely impacts to Cultural Heritage and Archaeology arising from the proposed development. The potential significant impacts to Cultural Heritage and Archaeology have been considered within the relevant discipline and mitigation measures outlined where required. With mitigation measures in place, no significant residual negative impacts are predicted.

Table 15.1 below provides an overview of the above interactions. Potential Interactions are represented by an 'X'. Cells without an 'X' indicate that no interaction is expected. 'X' in the columns headed 'C' represent interactions expected in the construction phase while an 'X' in the columns headed 'O' represent interactions expected in the operational phase.

Table 15.1 Table of Interactions

	Population & Human Health		Land, Soil & Geology		Hydrology		Air Quality		Climate		Noise & Vibration		Landscape & Visual		Traffic & Transport		Service Infrastructure and Utilities		Biodiversity		Cultural Heritage and Archaeology	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
Population and Human Health			X		X		X		X		X		X	X	X	X	X					
Land, Soil and Geology	X				X		X		X				X	X	X				X			
Hydrology	X	X	X	X													X	X	X	X		
Air Quality	X	X	X						X	X					X	X			X			
Climate			X	X	X	X	X	X							X	X						
Noise & Vibration	X	X													X	X			X			
Landscape and Visual																			X	X	X	X
Traffic and Transport							X	X	X	X	X	X										
Service Infrastructure and Utilities			X																X	X	X	
Biodiversity			X	X	X		X				X		X	X			X	X				
Cultural Heritage and Archaeology													X	X			X					

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 16

Summary of Mitigation Measures & Monitoring

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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16 Summary of Mitigation Measures and Monitoring

16.1 Introduction

This chapter includes the full schedule of mitigation measures and monitoring where proposed.

16.1.1 Mitigation

The EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022) identifies that there are 4 established strategies for the mitigation of effects; avoidance, prevention, reduction and offsetting.

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 many situations, 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.

16.1.2 Monitoring

Some disciplines have proposed monitoring following their assessment of impacts and implementation of proposed mitigation measures. Monitoring will take place after consent is granted in order to demonstrate that the project in practice conforms to the predictions made during the EIA process. Monitoring provides assurance that proposed systems are operating as intended. This allows adjustments of operations to be made to ensure continued compliance with consent conditions such as emission limit values, conditions of operation, performance criteria/ indicators and detection of unexpected mitigation failures.

The EPA Guidelines also state that:

> *"If consent has been granted and the project proceeds, then the developer is obliged to adhere to the specific mitigation measures and monitoring commitments contained in the EIAR, as modified by any conditions attached to the consent."*

The following mitigation and monitoring measures have been proposed by the specialist consultants during preparation of the EIAR, and approved by Reside (Castlepark) Ltd.

Table 16.1 Table of Mitigation Measures

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Chapter 4 Population and Human Health	
Health and safety risks are the primary concern during the construction phase. These will be managed in accordance with Safety, Health, and Welfare at Work (Construction) Regulations, 2013. The design of the proposed development will be subject to safety design reviews to ensure that all requirements of the project are safe. A project supervisor for construction stage (PSCS) will be appointed and a contractor safety management program will be implemented to identify potential hazards associated with the proposed works. When issues are identified, corrective actions will be implemented to amend design issues prior to the issuance of final design for construction. Temporary contractor facilities and areas under construction will be fenced off from the public with adequate warning signs of the risks associated with entry to these facilities. Entry to these areas will be restricted and they will be kept secure when construction is not taking place. Site lighting and camera security may be used to secure the site, and any lighting will be set up with consideration of the adjoining property. Measures to ensure public safety, with respect to construction traffic and the construction phase have been included in the be included in the Construction and Environment Management Plan (CEMP) and outline Construction Traffic Management Plan (OCTMP) submitted with the application. A final CEMP and CTMP will be agreed with the Planning Authority prior to commencement of development. Mitigation measures have been proposed by other disciplines within this EIAR.	Measures to avoid potential negative impacts on Population and Human Health have been fully considered in the design of the project and are integrated into the final layout and design. Compliance with the layout and design will be a condition of the permitted development. As such no mitigation measures are required. Mitigation measures have been proposed by other disciplines within this EIAR.
Chapter 5 Land Soil and Geology	
Enviroguide Consulting have prepared a Construction Environmental Management Plan (CEMP) (Enviroguide Consulting, 2024a) and a preliminary Resource Waste Management Plan (RWMP) (Enviroguide Consulting, 2024b) for the Construction Phase of the Proposed Development. Following appointment, the contractor will be required to implement the measures set out CEMP and RWMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground with regard to the relevant industry standards (e.g.,	There is no requirement for mitigation measures for the Operational Phase taking account of the design measures for the Proposed Development.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. **Import of Aggregates and Materials** Contract and procurement procedures will ensure that all imported aggregates and materials required for the construction of the Proposed Development will be sourced from reputable suppliers operating in a sustainable manner and in accordance with industry conformity/compliance standards and statutory obligations. The importation of aggregates and materials will be subject to management and control procedures which will include testing for contaminants, invasive species and other anthropogenic inclusions and assessment of the suitability for use in accordance with engineering and environmental specifications for the Proposed Development. Therefore, any unsuitable material will be identified prior to unloading / placement onsite. **Airborne Dust Generation** Excavated soils will be carefully managed and maintained in order to minimise potential impact on soil quality and soil structure. Handling of soils will be undertaken in accordance with documented procures outlined in the CEMP (Enviroguide Consulting, 2024a) that will be set out in order to protect ground and minimise airborne dust. The normal measures required to prevent airborne dust emissions and associated nuisance arising from Site work will be in place including measures to prevent uncovered soil drying out leading to wind pick up of dust and mud being spread onto the local road network and adjoining properties. This may require additional wetting at the point of dust release, dampening down during dry weather and wheel cleaning for any vehicles leaving the Site. Potential impacts and avoidance and mitigation measures associated with generation of dust are addressed in Chapter 7 Air Quality of this EIAR. **Reuse of Soil** Soil and subsoil materials to be reused within the Proposed Development (i.e., for engineering fill and landscaping) will be subject assessment of the suitability of for use in accordance with engineering and environmental specification for the Proposed Development.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Management and Control of Soils and Stockpiles Segregation and storage of soils for re-use onsite or removal offsite and waste for disposal offsite will be segregated and temporary stored onsite pending removal or for reuse onsite in accordance with the measures outlined in the CEMP (Enviroguide Consulting, 2024a). Where possible, stockpiling of soils and subsoils onsite will be avoided. However, in the event that stockpiling is required, stockpiled materials, pending reuse onsite, will be located away from the location of any sensitive receptors (watercourses and drains). In accordance with Inland Fisheries Ireland guidelines, stockpiles will not be allowed within 50m of the open water where sufficient working areas are available within the Site boundary. The re-use of suitable cut material onsite for the Proposed Development (i.e., landscaping, raising levels or engineering fill) will be undertaken in accordance with the engineered design of the Proposed Development. Surplus or unsuitable soils will be removed offsite. Surplus material, not suitable for reuse onsite, will be segregated, and stockpiled appropriately for removal offsite. For any excavated material identified for removal offsite, while assessment and approval of acceptance at a destination re-use, recovery Site or waste facility is pending, excavated soil for recovery/disposal shall be stockpiled as follows: ▪ A suitable temporary storage area shall be identified and designated. Storage areas must be on flat ground located as far as feasible from any existing surface water drains and the River Blackwater (a minimum set back of 50m from watercourses will be maintained). ▪ Stockpiles will not be located near Site boundaries. ▪ All stockpiles shall be assigned a stockpile number. ▪ Material identified for reuse on Site, off Site and waste materials will be individually segregated and all segregation, storage and stockpiling locations will be clearly delineated on the Site drawings. ▪ Soil stockpiles will be sealed to prevent run-off from the stockpiled material and/or the generation of dust either via revegetation of stockpiles or where this is not possible via geotextile (e.g., hessian). ▪ Silt fencing / bunding will be installed around the stockpile to ensure no soils and sediments are	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
washed out overland to the existing surface water networks, or directly into River Blackwater. The silt fencing / bunding will be monitored daily by the appointed contractor and silt will be removed as required. ▪ Material identified for reuse on Site, off Site and waste materials will be individually segregated. ▪ Any waste that will be temporarily stored / stockpiled will be stored on impermeable surface high-grade polythene sheeting, hardstand areas or skips to prevent cross- contamination of the soil/subsoil below and covered with impermeable sheeting. ▪ Stockpiles will be graded to a <1:4 profile. Topsoil and subsoils will be stored separately. Stockpiles of mineral soils and peat (in the unlikely event that peat soils are encountered) will be <2m and <1m respectively. Stockpiles will be covered with plastic sheeting during wet weather to prevent run-off of silt. Excavated material will be used for backfill where possible. Surplus material will be removed from Site. ▪ Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the Site. ▪ Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. Any waste generated from construction activities, including concrete, asphalt and soil stockpiles, will be managed in accordance with the procedures outlined in the CEMP (Enviroguide Consulting, 2024a), and the RWMP (Enviroguide Consulting, 2024b) and will be stored onsite in such a manner as to: ▪ Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/odour 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. ▪ Prevent hazards to Site workers and the general public during Construction Phase (largely noise, vibration and dust.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Soil Structure The extent of the required work area and the bulk excavation at the Site will be minimised where appropriate to prevent unnecessary excavation of soil and tracking over soil and subsoil outside of the excavation work areas as a result of compaction and rutting from construction traffic. Dedicated internal haul routes will be established and maintained by the contractor to prevent tracking over unprotected soils. The following criteria for the siting of haul routes must be adhered to: ▪ The length of haul routes on the site shall be minimised. ▪ The contour of the natural ground shall be followed as much as possible. ▪ The slope of haul routes shall not exceed 15%. ▪ Haul routes shall be constructed using permeable material, laid on geotextile. ▪ Trenchless gravel banks shall be used to filter runoff, and where possible existing vegetation along the perimeter of the haul routes shall be retained to provide an effective buffer against sediment leaving the area. ▪ Haul routes shall be at least 10m from a watercourse and shall be isolated from any watercourses with silt fencing. Exclusion zones will be established where soft landscaping is proposed in particular along Site boundaries which are outside of the excavation areas to ensure soil structure is maintained. **Export of Resource (Soil and Subsoil) and Waste** All surplus materials and any waste will be removed offsite in accordance with the requirements outlined in the CEMP (Enviroguide Consulting, 2024a) and the RWMP (Enviroguide Consulting, 2024b) and will be managed in accordance with all legal obligations. It will be the contractor's responsibility to either; obtain a waste collection permit or, to engage specialist waste service contractors who will possess the requisite authorisations, for the collection and movement of waste offsite. The re-use of soil and subsoil offsite will be undertaken in accordance with all statutory requirements and obligations including where appropriate re-use as by-product in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 (SI No. 126 of 2011) as amended.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Any surplus material not suitable for re-use as a by-product and other waste materials arising from the Construction Phase will be removed offsite by an authorised contractor and sent to the appropriately authorised (licensed/permitted) receiving waste facilities. As only authorised facilities will be used, the potential impacts at any authorised receiving facility Sites will have been adequately assessed and mitigated as part of the statutory consent procedures. Any waste soils will be transported under a valid waste collection permit issued under the Waste Management (Collection Permit) Regulations 2007, as amended and will be delivered to an appropriately authorised waste management facility. Materials and waste will be documented prior to leaving the Site. All information will be entered into a waste management register kept on the Site. Vehicles transporting material with potential for dust emissions to an offsite location shall be enclosed or covered with a tarpaulin at all times to restrict the escape of dust. Public roads outside the Site will be regularly inspected for cleanliness and cleaned as necessary. The main contractor will carry out road sweeping operations, employing a suction sweeper or similar appropriate method, to remove any project related dirt and/or material deposited on the road by construction/ delivery vehicles. All vehicles exiting the Site will make use of a wheel wash facility where appropriate, prior to exiting onto public roads. **Concrete Works** The cementitious grout and other concrete works during the Construction Phase, will avoid any contamination of ground through the use of appropriate design and methods implemented by the Contractor and in accordance with the CEMP (Enviroguide Consulting, 2024a) and relevant industry standards. Pre-cast concrete will be used where technically feasible to meet the design requirements for the Proposed Development. Where cast-in-place concrete is required (i.e., building foundations), all work must be carried out in dry conditions and be effectively isolated from any groundwater. All ready-mixed concrete will be delivered to the Site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge. **Handling of Fuels, Chemicals and Materials** Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP (Enviroguide Consulting, 2024a), in a designated area of the Site away from any watercourses and drains (at least 50 m from a spring or borehole and 10 m from a watercourse or drain where not possible to carry out such activities offsite). Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas (Enviroguide Consulting, 2024a). These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following: ▪ 110% of the capacity of the largest tank or drum within the bunded area; or ▪ 25% of the total volume of substance that could be stored within the bunded area. The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan (Enviroguide Consulting, 2024a). As outlined in the CEMP (Enviroguide Consulting, 2024a), spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the Site will also be equipped with its own spill kit. **Emergency Procedures** Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
▪ Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site. ▪ Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants. ▪ Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained. ▪ In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed from the Site and compliantly disposed offsite. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards. ▪ All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages. ▪ All construction works staff onsite will be fully trained on the use of equipment. This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the Construction Phase of the Proposed Development. **Welfare Facilities** Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the Construction Phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste off site by an appropriately authorised contractor. Any connection to the public foul drainage network during the Construction Phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by UE.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures

Monitoring
During the Construction Phase of the Proposed Development the following monitoring measures will be considered:
▪ Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.
▪ Inspections and monitoring will be undertaken during excavations and other groundworks to ensure that measure that are protective of water quality are fully implemented and effective.
▪ Materials management and waste audits will be carried out at regular intervals to monitor the following:
  ▪ Management of soils onsite and for removal offsite.
  ▪ Record keeping.
  ▪ Traceability of all materials, surplus soil and other waste removed from the Site.
  ▪ Ensure records are maintained of material acceptance at the end destination.	

Chapter 6 Hydrology and Hydrogeology	
Enviroguide Consulting have prepared a Construction Environmental Management Plan (CEMP) (Enviroguide Consulting, 2024a) and a Resource Waste Management Plan (RWMP) (Enviroguide Consulting, 2024b) for the Construction Phase of the Proposed Development. Following appointment, the contractor will be required to implement the measures set out CEMP and RWMP to provide detailed construction phasing and methods to manage and prevent any potential emissions to ground with regard to the relevant industry standards (e.g., Guidance for Consultants and Contractors, CIRIA-C532', CIRIA, 2001). The CEMP and RWMP will be implemented for the duration of the Construction Phase, covering construction and waste management activities that will take place during the Construction Phase of the Proposed Development. These measures will address the main activities of potential impact which include: ▪ Control and Management of water and surface runoff. ▪ Control of Management of works nears water courses. ▪ Management and control of soil and materials	It is considered that the design of the Proposed Development is in line with the objectives of the Water Framework Directive (2000/60/EC as amended) (WFD) to prevent or limit any potential impact on water quality of the receiving environment. Within the Site where possible, existing ditches, trees and hedgerows will be maintained. Incorporating these existing drainage features into the proposed overall SuDS strategy would provide for greater storage volume capacity within the site and will assist in the conveyance and treatment of the generated surface water runoff. The retention of existing trees and hedgerows will also assist in the reduction of surface water runoff by evapotranspiration. Any existing ditches that are to be retained, particularly along the existing field boundaries shall be cleaned out and assessed during the construction of the development. All ditches and existing drainage features being retained shall be incorporated into the proposed overall surface water network for the overall Site. With regard to the proposed discharge of treated operational surface water from the Proposed Development to the offsite surface water drainage within the Castle Park residential

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
▪ Control of Management of materials from offsite sources. ▪ Appropriate fuel and chemical handling, transport and storage. ▪ Management of accidental release of contaminants at the site. ▪ Control and handling of cementitious materials The construction works will be managed in accordance with all statutory obligations and regulations and with standard international best practice. Good construction management practices will minimise the risk of pollution from construction activities at the Site including but not limited to: ▪ Construction Industry Research and Information Association (CIRIA), 2001. Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors. ▪ CIRIA, 2015. Environmental Good Practice on Site (C741). ▪ Enterprise Ireland Oil Storage Guidelines (BPGCS005). ▪ Environmental Protection Agency (EPA), 2013. IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities. ▪ CIRIA, 2007. The SuDS Manual (C697). ▪ UK Environment Agency, 2004. UK Pollution Prevention Guidelines (PPG); ▪ CIRIA, 2006. Control of Water Pollution from Linear Construction Projects: Technical Guidance (C648). ▪ National Roads Authority (now Transport Infrastructure Ireland), 2016. Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. ▪ Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters. **Control and Management of Water and Surface Water Runoff** There will be no direct discharge to groundwater or surface water during the Construction Phase of the Proposed Development. There may be a temporary increase in the exposure of the underlying shallow groundwater during excavation works. Surface water runoff will be prevented from entering open excavations with sandbags or other approved methods proposed by the appointed contractor. Furthermore, the appointed contractor will ensure that machinery does not enter the groundwater if encountered during construction.	estate and eventually discharging to the Blackwater [Munster] River, the potential for surface water generated at the Proposed Development to cause significant effects to downstream sensitivities during the Operational Phase would be considered negligible due in part to the SuDS measures and petrol interceptors incorporated in the overall design. **Monitoring** Ongoing regular operational monitoring and maintenance of drainage and the SuDS measures will be incorporated into the overall management strategy for the Proposed Development. This will ensure that there are no impacts on water quality and quantity (flow regime) during the Operational Phase of the Proposed Development.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
All run-off from the Site or any areas of exposed soil will be managed as required with temporary pumping and following appropriate treatment as required. Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to temporary onsite settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge at a controlled rate. Furthermore, a temporary interceptor drain and silt fence or bunding will be installed at the southern boundary of the site to divert surface runoff to an onsite settlement pond. Settlement ponds will be excavated to a depth. All ponds constructed in the poorly draining areas of the Site will be fully and securely lined with terram and dressed in clean stone across the base. Limestone will not be used within the ponds. For the well-drained areas of the site to the south the ponds will be dressed in clean stone across the base and water will be allowed to infiltrate to ground, however contingencies will be put in place in the event that a discharge is required for these settlement ponds should the infiltration prove to be unsuccessful. Where this is the case, the discharge will be managed in the same way as the lined settlement ponds. If settlement tanks are required, the tanks must be sited as per the criteria listed above, with the discharge directed to a designated percolation area. The ponds will be securely fenced off and appropriate safety signage erected. The silt fencing, bunds and settlement ponds will be monitored daily by the appointed contractor and silt will be removed as required. Where relevant, discharge water from the settlement pond will be inspected on a daily basis by the Environmental Clerk of Works (ECoW) with a handheld turbidity probe. If turbidity is elevated, the flow will be stopped immediately and appropriate remedial works (e.g., enlargement of the pond, deployment of mobile 'siltbusters') will be carried out. Where dewatering of shallow groundwater is required or where surface water runoff must be pumped from the excavations, water will be managed in accordance with best practice standards (i.e., CIRIA C750), the CMP, the CEMP and regulatory consents to minimise the potential impact on the local groundwater flow regime of the underlying aquifer. Unauthorised discharge of water (groundwater / surface water runoff) to ground, drains or watercourses will not be permitted. Existing surface water drainage located along public roads (i.e., within the Castle Park residential estate) will be protected for the duration of the works. The appointed Contractor will ensure that the discharge of water to ground, drains or watercourses will be in accordance with the necessary discharge licences issued by UE under Section 16 of the Local Government (Water Pollution) Acts and	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Regulations for any water discharges to sewer or from Kildare County Council under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990 for discharges to surface water. Where required, stockpiles of loose materials pending re-use onsite will be managed in accordance with the procedures outlined in the CEMP (Enviroguide Consulting 2024a). A suitable temporary storage area shall be identified and designated. Storage areas must be on flat ground located as far as feasible from any existing surface water drains and the River Blackwater (a minimum set back of 50m from watercourses will be maintained) and will be appropriately sealed / covered and a silt fence or bunding will be installed around it to ensure no soils and sediments are washed out overland to the existing surface water networks, or directly into River Blackwater. The silt fences will be monitored daily by the appointed contractor and silt will be removed as required. A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible. **Concrete Works** The use of cementitious grout used during the Construction Phase of the Proposed Development will avoid any contamination of the receiving hydrogeological environment through the use of appropriate design and methods implemented by the appointed contractor and in accordance with the CEMP (Enviroguide Consulting, 2024a) and relevant industry standards to prevent impact on groundwater and surface water quality such as the use of water compatible grout. All ready-mixed concrete will be delivered to the Site by truck. Concrete batching will take place offsite, wash down and wash out of concrete trucks will take place into a container located within a controlled bunded area which will then be emptied into a skip for appropriate compliant removal offsite in accordance with all relevant waste management legislation. Any excess concrete is not to be disposed of onsite. Shuttering will be designed to accommodate increases in the volume of material contained within the shuttered area due to rainfall. Discharge water generated during placement of concrete will be stored and removed off site for treatment and disposal.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
A suitable risk assessment for wet concreting shall be completed prior to works being carried out. Pumped concrete will be monitored to ensure there is no accidental discharge. **Drainage and Water Supply** All drainage and water supply works will be in accordance with the UE Code of Practice for Wastewater and Water Supply, the Wastewater Infrastructure Standard Details (Document Number: IW-CDS-5030-01) and the Water Infrastructure Standard Details (Document Number: IW-CDS-5020-01). Drain inlets will be protected with a drain guard designed to filter oil and silt from stormwater run-off. sandbags will be placed around the inlet to provide additional protection from sediment. Inlet protection can only be removed once all construction activity that could generate sediment or result in emissions of other pollutants such as chemicals and fuel has ceased in a given location and the drainage infrastructure is operational (e.g., to allow for the discharge of stormwater from the roofs of newly constructed and completed dwellings into the stormwater network). Measures will be employed to prevent soil wash out which will Include: ▪ Closing and stabilising open trenches as soon as possible. ▪ Sequencing the works so that open portions of the trench are closed before a new section of trenching is begun. ▪ No more than 500m of pipeline will be constructed before a trench is backfilled. All new drainage will be tested by means of an approved air test during the Construction Phase in accordance with Irish Waters Code of Practice and Standard Details. All private drainage will be inspected and signed off by the design engineer in accordance with the Building Regulations Part H and BCAR requirements. Drainage will be surveyed by CCTV to identify possible physical defects. The connection of the new drainage to the public sewer will be carried out under the supervision of Irish Water and will be checked prior to commissioning. Prior to commencement of excavations in public areas, all utilities and public services will be identified and checked, to ensure that adequate protection measures are implemented during the Construction Phase. **Handling of Fuels, Chemicals and Materials** Fuelling and lubrication of equipment will be carried out in accordance with the procedures outlined in the CEMP	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
(Enviroguide Consulting, 2024a), in a designated area of the Site at a minimum distance on 50m away from any watercourses and drains (where not possible to carry out such activities onsite). Any diesel, fuel or hydraulic oils stored onsite will be stored in designated areas. These areas will be bunded and located away from surface water drainage and features. Bunds will have regard to Environmental Protection Agency guidelines 'Amendment to IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities' (EPA, 2013). All tank and drum storage areas will, as a minimum, be bunded to a volume not less than the greater of the following: ▪ 110% of the capacity of the largest tank or drum within the bunded area; or ▪ 25% of the total volume of substance that could be stored within the bunded area. The main contractor will maintain an emergency response action plan and emergency procedures will be developed by the appointed contractor in advance of any works commencing. Construction staff will be familiar with the emergency response plan. Spill kits will be made available onsite and identified with signage for use in the event of an environmental spill or leak. A spill kit will be kept in close proximity to the fuel storage area for use in the event of any incident during refuelling or maintenance works. Heavy machinery used on the Site will also be equipped with its own spill kit. **Emergency Procedures** Emergency procedures will be developed by the appointed Contractor in advance of works commencing and spillage kits will be available onsite including in vehicles operating onsite. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. Remedial action will be immediately implemented to address any potential impacts in accordance with industry standards and legislative requirements. ▪ Any required emergency vehicle or equipment maintenance work will take place in a designated impermeable area within the Site. ▪ Emergency response procedures will be put in place, in the unlikely event of spillages of fuels or lubricants. ▪ Spill kits including oil absorbent material will be provided so that any spillage of fuels, lubricants or hydraulic oils will be immediately contained. ▪ In the event of a leak or spill from equipment in the instance of a mechanical breakdown during operation, any contaminated soil will be removed	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
from the Site and compliantly disposed offsite. Residual soil will be tested to validate that all potentially contaminated material has been removed. This procedure will be undertaken in accordance with industry best practice procedures and standards. ▪ All construction works staff will be familiar with emergency procedures for in the event of accidental fuel spillages. ▪ All construction works staff onsite will be fully trained on the use of equipment. This procedure will be undertaken in accordance with industry best practice procedures and standards. These measures will ensure that there is minimal risk to the receiving land, soil and geological environment associated with the Construction Phase of the Proposed Development. **Welfare Facilities** Welfare facilities have the potential, if not managed appropriately, to release organic and other contaminants to ground or surface water courses. Foul drainage from temporary welfare facilities during the Construction Phase of the Proposed Development will be discharged to temporary holding tank(s) the contents of which will periodically be tankered off Site to a licensed facility. All waste from welfare facilities will be managed in accordance with the relevant statutory obligations by tankering of waste offsite by an appropriately authorised contractor. Any connection to the public foul drainage network during the Construction Phase of the Proposed Development will be undertaken in accordance with the necessary temporary discharge licences issued by UE. **Monitoring** During the Construction Phase of the Proposed Development the following monitoring measures will be considered: ▪ Inspections will be undertaken during excavations and other groundworks to ensure that measures that are protective of water quality outlined in this EIAR and the CEMP (Enviroguide Consulting, 2024a) are fully implemented and effective; ▪ As documented in the CEMP (Enviroguide Consulting, 2024a), the construction of the Development will be managed through a Schedule of Work Operation Record (SOWOR) system. The SOWOR for the construction phase of the Proposed Development will be managed by the Environmental Clerk of Works (ECoW), who is, or	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
will be, trained to implement the process. Together with the ECoW, environmental triggers for the safe undertaking of high, intermediate, and low-risk activities associated with the construction of the Development will be agreed upon between the contractor, employer's representative, and any other experts or technical specialists needed for high-risk aspects of the project. An experienced ECoW can assist with determining these values, but the responsibility rests with the developer/employer. The SOWOR will specify commencement and abandonment triggers for key works activities (e.g., rainfall levels, water levels, weather, soil conditions, Flow in the Blackwater [Munster] River, turbidity in the Blackwater [Munster] River, upstream and downstream of the works area, hydrocarbon sheen, integrity of implemented mitigation measures etc.). ▪ All water protection measures will be incorporated into a detailed Water management System (WMS), which will be prepared by the contractor (once appointed) in consultation with the appointed ECoW and Employer's Representative. The WMS will take into account any changes in the physical conditions of the site (e.g., river flows or ground conditions) that may have occurred subsequent to the submission of the application. All elements of the WMS will be managed and maintained in line with the provisions of a detailed maintenance program. Daily inspections of the WMS will be carried out by the ECoW. The WMS will provide detailed designs for each stage of development and will detail how surface water management will be carried out. The WMS will include the following provisions: ▪ The surface water protection and management measures outlined in the CEMP (Enviroguide Consulting, 2024a). ▪ The design of the WMS will take due consideration of the requirements given in the document "Control of water pollution from Construction Sites – Guidance for consultants and contractors (Ciria C532)". ▪ The WMS will be contained within the redline boundary of the Site, unless prior agreement from adjacent landowners is received and permission to discharge	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
treated water to land outside of the redline boundary is attained. ▪ Detailed methodologies for the construction of silt management systems (e.g., settlement ponds, silt traps, silt fences) and detailed procedures for pumping water from excavations. ▪ At least three mechanical siltbusters will be on standby to be employed sequentially if turbidity levels from pond outfalls are exceeded. ▪ At no time will any chemical coagulants be used to remove silt, whether in siltbusters or other areas. ▪ In advance of the construction phase commencing, and throughout the construction phase, the ECoW will undertake turbidity monitoring to establish baseline turbidity levels at the Blackwater River. Turbidity will be monitored via fixed sondes located upstream and downstream of the works area. The sondes will be set up to issue an alert via SMS to nominated individuals, including the ECoW, Construction Management Team (CMT), and Environmental Manager (once appointed), if turbidity levels at the downstream sonde increase by 20% over the baseline levels. An exact turbidity level will need to be decided above which works are suspended for investigation and remedial action. The monitoring data will be transmitted to the ECoW via SMS or to a central server so that records can be retained. ▪ Visual inspections of the Blackwater [Munster] River for hydrocarbon sheen, as well as ongoing monitoring of the weather forecast, onsite weather conditions, overland flow, and soil wetness conditions on Site, will also be undertaken by the ECoW. ▪ Discharges to surface water / foul sewers will be monitored where required in accordance with statutory consents (i.e., discharge licence). ▪ Routine monitoring and inspections during refuelling, concrete works to ensure no impacts and compliance with avoidance, remedial and mitigation measures.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Chapter 7 Air Quality	
The proposed development has been assessed as having a high risk of dust soiling impacts and a low risk of dust related human health impacts during the construction phase as a result of earthworks, construction and trackout activities (see Section of Chapter 7). Therefore, the following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a high risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities. *Communications* ▪ Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses. ▪ The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details. *Site Management* ▪ During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions. Dry and windy conditions are favourable to dust suspension therefore mitigations must be implemented if undertaking dust generating activities during these weather conditions. ▪ A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out *Preparing and Maintaining the Site* ▪ Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	The impact of the operational traffic associated with proposed development on air quality is predicted to be imperceptible with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required. There is no monitoring recommended for the operational phase of the development as impacts to air quality are predicted to be imperceptible.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
▪ Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. ▪ Avoid site runoff of water or mud. ▪ Keep site fencing, barriers and scaffolding clean using wet methods. ▪ Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. ▪ Cover, seed or fence stockpiles to prevent wind whipping. ▪ Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period. *Operating Vehicles / Machinery and Sustainable Travel* ▪ Ensure all vehicles switch off engines when stationary - no idling vehicles. ▪ Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. ▪ Impose and signpost a maximum-speed-limit of 15 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). ▪ Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. ▪ Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) *Operations* ▪ Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. ▪ Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. ▪ Use enclosed chutes and conveyors and covered skips. ▪ Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
▪ Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. *Waste Management* ▪ Avoid bonfires and burning of waste materials. *Measures Specific to Demolition* ▪ Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). ▪ During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used. ▪ Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed. ▪ Avoid explosive blasting, using appropriate manual or mechanical alternatives. *Measures Specific to Earthworks* ▪ Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. ▪ Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. ▪ Only remove the cover in small areas during work and not all at once. ▪ During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust. *Measures Specific to Construction* ▪ Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. ▪ Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
▪ For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. *Measures Specific to Trackout* ▪ A speed restriction of 15 kph will be applied as an effective control measure for dust for on-site vehicles. ▪ Avoid dry sweeping of large areas. ▪ Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. ▪ Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. ▪ Record all inspections of haul routes and any subsequent action in a site log book. ▪ Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. ▪ Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). ▪ Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. ▪ Access gates to be located at least 10 m from receptors where possible. *Monitoring* ▪ Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results in the site inspection log. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. ▪ Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. Monitoring of construction dust deposition along the site boundary to nearby sensitive receptors during the construction phase of the proposed development is recommended to ensure mitigation measures are working satisfactorily. This can be carried out using the Bergerhoff method in accordance with the requirements of the German	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
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/m^2/day during the monitoring period of 30 days (+/- 2 days).	
Chapter 8 Climate	
Embodied carbon of materials and construction activities will be the primary source of climate impacts during the construction phase. During the construction phase the following best practice measures shall be implemented on site to prevent significant GHG emissions and reduce impacts to climate: ▪ 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. A construction waste management plan will be implemented to minimise construction waste sent to landfills. Recycling of materials will be promoted to and reduce the environmental footprint of the site. ▪ Sourcing materials locally will be prioritised. This will help to reduce transport related CO_2 emissions and helps support local suppliers, further promoting economic sustainability. ▪ Timber-framed construction will be used for the houses instead of more carbon-intensive materials like steel or concrete. Timber is a renewable material with a lower embodied energy compared to concrete and steel, making it a more eco-friendly choice. Additionally, timber provides excellent insulating properties, enhancing the energy efficiency of the homes, which contributes to a high Building Energy Rating (BER). Additional material choices and quantities will be reviewed during detailed design, to identify and implement any additional lower embodied carbon options, where feasible. In terms of impact on the proposed development due to climate change, during construction the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments and method statements. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments and method	A number of mitigation measures have been incorporated into the design of the development to reduce the impact on climate wherever possible. The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards and will achieve a Building Energy Rating (BER) in line with the NZEB requirements. The following sustainability measures were outlined by the project developer and will be committed to across the project. ▪ **Energy-Efficient Insulation** Houses will be equipped with high-performance insulation, to reduce heat loss and enhance energy efficiency. Proper insulation is essential for achieving a high Building Energy Rating (BER), as it ensures that minimal heat escapes during winter and that homes remain cool in summer. This will contribute to lower energy consumption and reduced carbon emissions. ▪ **Heat Recovery Ventilation (HRV) Systems** Houses will include HRV system in all homes, capturing heat from outgoing air and reusing it to pre-warm incoming fresh air. This process significantly reduces energy consumption for heating and improves indoor air quality. HRV systems are crucial in maintaining low energy demand. ▪ **Double-Glazed Argon filled Windows** Installation of Double-Glazed Argon filled windows throughout all homes. This ensures that heat loss is minimized, further contributing to the energy efficiency of the houses, enhancing both the thermal insulation and soundproofing, providing comfort to residents while reducing energy use, which is critical for achieving a high Building Energy Rating (BER). ▪ **Underfloor Heating** Energy-efficient underfloor heating systems will be installed in all homes. Underfloor heating provides a more even distribution of heat compared to traditional radiators, enhancing comfort and reducing energy consumption. It works efficiently with renewable energy sources and helps to lower overall heating

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
statements. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.	costs, contributing to a higher energy efficiency rating. ▪ **Electric Vehicle Charging Points in Homes** Each home will be equipped with a dedicated electric vehicle (EV) charging point, encouraging residents to adopt electric vehicles. This reduces dependency on fossil fuels and lowers the community's carbon footprint by making it easier for homeowners to transition to sustainable transportation. ▪ **Public Electric Charging Points** Public EV charging stations will be strategically located throughout the estate, encouraging the use of electric vehicles for both residents and visitors. By providing easily accessible charging infrastructure, the development will promote greener transportation options and help reduce overall carbon emissions within the community. ▪ **Bike Racks Across the Estate** Bike racks will be installed in multiple locations throughout the development, making it easy for residents to choose cycling as a mode of transportation. By promoting cycling, the estate aims to reduce the number of car journeys, lower traffic congestion, and contribute to improved air quality and reduced greenhouse gas emissions. ▪ **Sustainability Measures in Green and Landscaped Areas** In the green areas and landscaped spaces throughout the estate, the development will focus on implementing low-maintenance planting to reduce resource consumption and promote environmental sustainability. ▪ **Maintenance and Conservation of Existing Trees** Mature trees act as natural carbon sinks, absorbing and storing carbon dioxide, thus contributing to climate change mitigation. By conserving these trees, the development actively reduces its carbon footprint. Existing trees provide important habitats for local wildlife, including birds and insects. Preserving these trees supports local biodiversity and enhances the ecological balance within the estate. ▪ **Landscaping** It is proposed to plant a large quantity of trees throughout the development along with wildflower meadows which help pollinators, biodiversity and carbon sequestration. In addition, the location of the greenway and linkage to it encourages people to use pedestrian

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
	mobility methods and reduces the need for private vehicle journeys. In addition to the above sustainability measures the following measures are outlined within the Building Lifecycle Report prepared by Deady Gahan Architects in relation to the apartment units within the proposed development. ▪ The apartment units will aim to achieve a BER of A2. ▪ U-values and thermal bridging in line with the Technical Guidance Documents Part L, *'Conservation of Fuel and Energy Buildings other than Dwellings'* requirements will be achieved. ▪ The white goods proposed will be of a very high standard and have a high energy efficiency rating. ▪ Low voltage, energy efficient LED lighting will be utilised in the external areas. The operation of the lighting shall be on a dusk-dawn profile to reduce unnecessary artificial light usage. ▪ The design, separation distances and layout of the apartment units have been designed to optimise the ingress of natural daylight/ sunlight to the proposed dwellings to provide good levels of natural light. This has the benefit of reducing the need for artificial lighting. ▪ The building materials chosen will be long-lasting and have a high durability which will reduce the requirements for ongoing maintenance and replacement which will reduce the embodied carbon emissions associated with this element. These identified measures will aid in reducing the impact to climate during the operational phase of the proposed development in line with the goals of the Climate Action Plan. A number of measures have been incorporated into the design of the development to mitigate against the impacts of future climate change. For example, adequate 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. Additionally, SuDS measures have been incorporated into the landscaping elements of the proposed development. The plant palette has been chosen so as to be suitable to fluctuating weather such as droughts and flooding. Street trees have been included so as to provide cooling of the urban environment. These measures have been considered when assessing the vulnerability of the proposed development to climate change (see Section of Chapter 8).

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Chapter 9 Noise and Vibration	
The assessment detailed in Section 9.4.3.1 of Chapter 9 has determined that construction activities can operate within the adopted construction noise threshold levels at NSLs 50m and beyond for the Site Clearance and Preparation phase and 20m and beyond for the general construction phase of the proposed development. At NSLs situated close to the site there is a high potential for the CNT to be exceeded during both phases of works. Vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 9.3 to avoid any cosmetic damage to buildings. A suite of noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid exceedance of the adopted construction noise threshold values at the nearest NSLs. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to: ▪ Selection of quiet plant; ▪ Noise control at source; ▪ Screening, and; ▪ Liaison with the Public Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, hours of work and noise monitoring, where required. <u>Selection of Quiet Plant</u> The potential for any item of plant to result in exceedance of construction noise thresholds will be assessed prior to the item being brought onto the site. The least noisy item of plant will be selected wherever practicable (e.g., plant items with sound attenuation incorporated). Should a particular item of plant already on the site be found to exceed the construction noise thresholds, the first action will be to identify whether the item can be replaced with a quieter alternative. The appointed contractor will evaluate the choice of excavation, breaking, piling or other working methods taking into account various ground conditions and site constraints. Where alternative lower noise generating equipment are available that will provide equivalent structural / excavation results, these will be selected to control noise within the relevant thresholds, where it is practicable to do so.	*<u>Traffic Along Surrounding Road Network</u>* Changes to traffic flows will result in a not significant increase in noise level in the surrounding environment. Therefore, no mitigation measures are necessary in this case. *<u>Building Services Noise</u>* With consideration at the detailed design stage, the selection and location of plant items within the proposed development and associated buildings will ensure that noise emissions from any mechanical and electrical building services plant do not exceed the relevant noise criteria within Section 9.9.2.1 of Chapter 9, therefore no further mitigation is required. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. Once operational noise emissions are controlled within the development site, there will be no perceptible noise impact at sensitive receivers off-site. *<u>Cumulative</u>* Mitigation in relation to the operational phase will be in the form of detailed design to ensure that the operational from proposed development operate within the outlined criteria. Any other proposed development near the proposed development site will also be required to prepare an EIAR where in operational noise and associated cumulative impacts will also be considered.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Noise Control at Source The following measures will be implemented, by the appointed contractor to control noise at source. These measures relate to specific site considerations: ▪ For mobile plant items such as dump trucks, cranes, excavators and loaders, the installation of an acoustic exhaust, utilising an acoustic canopy to replace the normal engine cover and / or maintaining enclosure panels closed during operation can reduce noise levels by up to 10 dB. Mobile plant will be switched off when not in use and not left idling. ▪ For percussive tools such as pneumatic concrete breakers and tools a number of noise control measures include fitting a muffler or sound reducing equipment to the breaker 'tool' and ensuring any leaks in the air lines are sealed; ▪ Where compressors, generators and pumps are located in proximity to NSLs and have the potential to exceed the construction noise thresholds, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation; and ▪ Resonance effects in panel work or cover plates can be reduced through stiffening or the application of damping compounds, while other noise nuisance can be controlled by fixing resilient materials in between the surfaces in contact. ▪ For all materials handling, ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials. Screening Screening is an effective method of reducing CNLs at a receiver location and can be used successfully as an additional measure to other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen, its mass, and its position relative to both the source and receiver. Standard construction site hoarding (2.4 m in height) with a mass per unit of surface area greater than 7 kg/m2 can provide adequate sound insulation. This is recommended, as a minimum around all site boundaries of the proposed development site. Erection of localised demountable enclosures or screens will be used around particularly noisy equipment as required, when in operation in proximity to NSLs with the potential to exceed the construction noise thresholds. Annex B of BS 5228–1 (Figures B1, B2 and B3) provide typical details for temporary and mobile acoustic screens, sheds and	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
enclosures that can be constructed on-site from standard materials. A well placed and designed mobile temporary screen around a pile, breaker or excavation can effectively reduce noise emissions by 10 dB(A). In addition, careful planning of the construction site layout will also be considered. The placement of site buildings such as offices and stores between the site and sensitive locations can provide a good level of noise screening. <u>Hours of Work</u> Working hours will be restricted to 08:00 to 18:00 Monday to Friday & 08:00 to 14:00 on Saturdays. Sunday or Bank Holiday work will only take place periodically at the agreement with Cork County Council. Similarly, any other out of hours working will be only permitted by arrangement with site management and Cork County Council. <u>Liaison with the Public</u> A designated Community Liaison Officer (CLO) will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the CLO. In addition, prior to particularly noisy construction activity, the CLO will inform the nearest noise sensitive locations of the time and expected duration of the noisy works. <u>Monitoring</u> During the construction phase the contractor will carry out noise monitoring at representative NSLs to evaluate and inform the requirement and / or implementation of noise management measures. Noise monitoring will be conducted in accordance with ISO 1996–1 (ISO 2016) and ISO 1996–2 (ISO 2017). <u>Vibration Control</u> On review of the likely vibration levels associated with construction activities, construction activities associated with the proposed development are not expected to give rise to vibration that is either significantly intrusive or capable of giving rise to structural or cosmetic damage to buildings. Vibration from construction activities will be limited to the values set out in Table 9.3 to avoid any form of potential cosmetic damage to buildings and structures. Monitoring will be undertaken at sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values in Table 9.3.	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Cumulative To ensure that construction activities associated with the proposed development are controlled at the closest NSLs, a series of mitigation measures have been included within Section 9.10.1. Any planned development within the vicinity of the proposed development will require similar measures to ensure that cumulative noise levels from construction do not result in a significant effect.	
Chapter 10 Landscape and Visual Impact	
Temporary moderate impacts are expected during the construction phase as a result of the proposed development to the visual amenity of receptors R0 and R1. At these locations the combination of the magnitude of change of the existing view and the visual noise expected to be created from the construction traffic are expected to locally significantly reduce the visual amenity. It is proposed that during construction hoarding is put in place around the site boundary to reduce the perceived movement of heavy pant and construction activity. This should be in the form of timber solid panels, 2 to 2.5m in height, allowing no viewing gaps between them. These panels should be painted one of the following colours: dark green, dark blue, grey or brown or should be left in their natural colour. In addition, it is advised that the existing 2.4m high paladin fence along the southern and western boundaries are retained for the construction period.	No significant impacts are expected during operation. Therefore, no mitigation is required.
Chapter 11 Traffic and Transport	
The following mitigation measures are proposed for the construction phase of the proposed LRD with reference to Material Assets: Traffic and Transport: To address the Construction Phase impacts raised, the appointed Contractor shall prepare a Construction Transport Management Plan (CTMP) prior to the commencement of development. All deliveries shall be provided with instructions/directions on accessing the site from the Dock Road, and deliveries shall be scheduled outside of peak commuting hours. Construction operations on site and deliveries to the site will be in accordance with the Construction and Environmental Management Plan (CEMP). The preparation of the CTMP will entail an assessment of existing nearby employment, educational, recreational and commercial facilities to establish the peak times for vehicles, cyclists and pedestrians. This information would be used to	The following mitigation measures are proposed for the operational phase of the proposed LRD with reference to Material Assets: Traffic and Transport: 1. Provision of bike parking spaces above minimum requirements, including dedicated cargo bike spaces. 2. Opting for fewer car parking spaces than the maximum allowed under the Cork County Council Development Plan. This reduction, coupled with initiatives promoting cycling as a viable alternative mode of transport, will significantly contribute to sustainability by diminishing reliance on private cars while fostering increased usage of more eco-friendly transportation options, notably cycling and bus services for commuting. 3. Enhancing pedestrian and cyclist connectivity within the development and its adjacent residential areas to public transport, the nearby River Walk,

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
develop the optimum start/finish/delivery times to minimise impact on these existing facilities. The CTMP issued at construction stage would identify haulage routes and restrictions as appropriate in discussion with the Local Authority. There will also be a requirement for comprehensive measures as part of the construction management. To address the Construction Phase impacts raised, the construction vehicle movements will be minimised through: a) Consolidation of delivery loads to/from the site and manage large deliveries on site to occur outside of peak traffic periods; b) Use of precast/prefabricated materials where possible; c) Cut' material generated by the construction works will be re-used on site where possible, through various accommodation works; d) Adequate storage space on site will be provided; e) A strategy will be developed to minimize construction material quantities as much as possible; f) Construction staff vehicle movements will also be minimized by promoting the use of public transport, shared use of vehicles, cycling and walking. A Construction & Demolition Plan shall be prepared and implemented by the appointed Contractor prior to commencement of development to include: g) Provision of temporary warning signs and Banksmen controlling access and egress from the site; h) All marshalling areas and site offices will be contained within the site boundary and will therefore have little impact on external roads; i) Wheel washers/judder bars to clean off vehicles exiting the site during spoil removal; j) All loads to be properly stowed and secured with a tarpaulin, where appropriate; k) Routine sweeping/cleaning of the road and footpaths in front of the site; l) No uncontrolled runoff to the public road from dewatering/pumping carried out during construction activity. m) Hoarding will be provided along the site frontage to protect pedestrians using the footpaths. n) Existing public lighting will be maintained The contractor will be obliged to appoint a traffic liaison officer/traffic manager who will be involved in preparing the CTMP and to monitor the performance of the CTMP (MA:TT-C1). The traffic liaison officer will be available to receive	and public parks. This will be achieved through the construction of Part-M compliant links and improvements along the existing Greenway. 4. Establishing a 4m wide amenity route dedicated to cyclists throughout the development. 5. Installing four cycle priority crossings within the development as part of the aforementioned amenity route. 6. Undertaking improvement works on the existing pedestrian paths to the Town. 7. Ensuring all footpaths within the development adhere to Part M compliance standards, incorporating crossing points in accordance with DMURS and Traffic Management Guidelines. 8. Implementation of a number of initiatives and active monitoring within the development to promote modal change. 9. There is a significant opportunity to optimise the cycle times of signalised junctions. They are currently modelled with a 90 second cycle time to accurately reflect the existing scenario queuing. By increasing the cycle time to an acceptable 120 second cycle time, the modelled throughput on heavily congested approaches can be enhanced, which will also help to reduce queuing and improve overall traffic flow. 10. Phasing of the proposed development to allow for future infrastructure improvements to be implemented outside of the control of the applicant.

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complaints, comments and queries about the traffic generated by the construction site and traffic issues associated with the site. Regular meetings will be held on-site to which with all relevant stakeholders will be invited. The traffic liaison officer/traffic manager will liaise with: a) Cork County Council including Elected Members b) An Garda Siochana c) Irish Rail d) Bus Eireann e) Other relevant statutory bodies f) Members of the community g) Adjacent contractors The traffic liaison officer/traffic manager will be sufficiently senior in position and will be responsible for dealing with any complaints and remedying any non-compliance and developing solutions to prevent re-occurrence.	
Chapter 12 Material Assets: Service Infrastructure and Utilities	
A Construction and Environmental Management Plan (CEMP) has been prepared and submitted with this application. The final CEMP, which will include any additional construction phase mitigation measures required pursuant to conditions attached to any grant of permission, along with all measures currently set out in the CEMP, will be implemented in full. Site inductions for all construction staff and sub-contractors aim to ensure all are aware of the procedures and best practices as outlined in the CEMP. Control measures shall be put in place to protect surface waters from contamination prior to the commencement of any site works. Control measures will also be provided to control surface run-off during the construction phase. These proposed measures follow best practice and are set out in full in the CEMP.	All installed assets including watermain, foul, storm and utility services will be and surveyed prior to being made operational. In relation to stormwater assets this will include pressure testing. Irish Water assets (i.e. – foul sewer and watermain) will be tested in accordance with the codes of practice prior to being commissioned by Irish Water. The purpose of this will be to identify any possible defects. Any defects will be made good prior to operation. Waste generated by the development during operation will be removed by licensed waste contractors only and in accordance with the Operational Waste Management Plan, submitted with the application. Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into the proposed dwellings to reduce water volumes entering the foul water network. This measure will also reduce the demand on the public water supply. The proposed storm water drainage system has been designed to cater for all surface water runoff from all hard surfaces within the proposed development including roadways, roofs, parking areas etc. Surface water generated from the proposed residential development will be conveyed through a proposed surface water network including SuDS measures and an attenuation system on site prior to final discharge at Qbar greenfield run-off rates. Surface water discharge will also pass via a full retention fuel / oil separators (sized in accordance with permitted discharge from the site). Surface water discharge rates from the proposed surface water drainage network will

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	be controlled by a vortex flow control devices (Hydrobrakes or equivalent) The storm water network and infiltration basin are designed to accommodate the 100-year return period plus an additional 20% to account for the effects of climate change.
Chapter 13 Biodiversity	
Mitigation 1: Ecological Clerk of Works (ECOW) Prior to the commencement of the Construction Phase, the Site Ecologist will be on Site to ensure that the silt fences and bunding are correctly positioned in the correct locations and are effectively managed to ensure any run-off from these areas is intercepted. In addition, the ECOW will prepare a Schedule of Work Operation Record (SOWOR) for the Development, in consultation with the Employers Representative and Contractor. All method statements prepared for the Construction Phase will be included and transferred into the SOWOR. **Mitigation 2: Preparation of a Water Management System** All water protection measures will be incorporated into a detailed Water Management System (WMS) which will be prepared by the contractor. The WMS will be drawn up in consultation with the ECoW and Employers Representative and will take into account any changes in the physical conditions of the Site e.g. river flows or ground conditions, which may have occurred subsequent to the submission of the application. **Mitigation 3: Develop a Schedule of Works Operations Record (SOWOR)** The construction of the Development will be managed through the SOWOR system. The SOWOR for the Development will be run by the ECoW, who is, or will be, trained to implement the process. The Construction Management Team with their Environmental Manager will provide the numbered Method Statements for the SOWOR. Together with the ECoW, environmental triggers for safe undertaking of the high, intermediate and low risk activities associated with the construction of the Development will be agreed between the contractor, employer's representative along with any other experts or technical specialists needed for high risk aspects of the project. An experienced ECoW	**Mitigation 14: Operational Phase Invasive Species Management** Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls. Despite the measures identified in the CEMP for the importation of only clean materials, there is the potential for the inadvertent import of invasive species to the Site. If established, there is a risk of further spread both within and out of the Site. As such, it is recommended that any newly landscaped areas, particularly where infill materials and soils have been imported for soft landscaping, are assessed during the Operational Phase within the next botanical season for the presence of any inadvertently introduced invasive species, with particular focus on those listed on Schedule III of SI 477 of 2011. If invasive species are detected, an Invasive Species Management Plan will be prepared, agreed with the Local Authority and implemented at the earliest possibility to limit the potential for further spread by ongoing operations at the Proposed Mixed-use Development. **Mitigation 15: Operational Phase Lighting** In order to minimise disturbance to bats utilising the site in general, the lighting and layout of the Proposed Development will be designed to minimise light-spill onto habitats used by the local bat population foraging or commuting. This can be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance' and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'. Therefore, where possible, the lighting scheme will include the following:

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
can assist with determining these values, but the responsibility rests with the developer / employer. The SOWOR will specify commencement and abandonment triggers for the following parameters for key works activities (which will be monitored for the duration of the works): ▪ Rainfall levels; ▪ Water levels; ▪ Weather forecast; ▪ Weather conditions on the ground; ▪ Soil conditions on the ground (such as soil wetness, whereby a check that the soils in the works area are not so saturated that they could result in slippage, soil movement, or overland flow of contaminated water); ▪ Flow in the Blackwater River; ▪ Turbidity in the Blackwater River, upstream and downstream of the works area; ▪ Hydrocarbon sheen on the Blackwater River, upstream and downstream of the works area, and; ▪ Integrity of mitigation measures The ECoW will have the power to stop any works where the SOWOR established a risk of failure to properly implement the planning conditions and mitigation measures included in the CEMP. Further information on the structure of the SOWOR system are provided in the CEMP that accompanies the application under separate cover. **Mitigation 4: Protection of Mammals** A combined survey for the presence of Badger and Otter is to be carried out pre-commencement/construction works, in order to rule out that either species have moved into the Site/nearby Blackwater River before any construction works take place. This survey is to be completed by a qualified Ecologist during the optimal survey period (November – April) when vegetation has died back sufficiently to make the search to detect these species clearer, easier, and more precise. Should either of these species be found to be present on Site. Works will not be allowed to commence, and NPWS will be consulted on how to proceed. The following mitigation measures are recommended for otter in line with the following best practice guidance document 'Guidelines for Treatment of Otters Prior to the Construction of National Road Schemes' (TII, 2008): ▪ A pre-construction survey for otter should be carried out by a suitably qualified ecologist prior to the commencement of any works to search for signs of otter activity in the vicinity of the works, in	▪ Lighting will only be installed where necessary for public safety in known Bat Foraging and Roosting locations (Riparian corridor/pedestrian greenway). These lights have been designed and selected with specific shutters and filters to minimise any potential for back spills into the sensitive locations while still providing the primary function of safely lighting the pedestrian routes. ▪ Lighting along the riparian corridor and existing treelines, hedgerows and woodland margins (notably to the north) will be avoided where possible and bat friendly; using low level bollards, motion sensors where applicable once health and safety standards are met. ▪ Reflectance's – Downward lighting can be reflected from bright surfaces. To minimize bat disturbance, the design avoids the use of bright surfaces and incorporates darker colour lamp heads and poles to reduce reflectance. Only luminaires with an upward light ratio of 0% and with good optical control to be used. ▪ Lighting controls and dimming shall be utilised for post-curfew times. ▪ Shielding of Luminaires & Light - To minimize bat disturbance, the design avoids the use of upward lighting by shielding or by downward directional focus. i.e., no upward tilt. ▪ Type of Light – To minimize bat disturbance, the design avoids the use of strong UV lighting. The lighting design is based on the use of LED lighting which has minimal or no UV output of significance. Warmer 2700°K LED lighting will be utilized for amenity areas, as the warmer colour temperatures with peak wavelengths greater than 550nm (~3000°K) cause less impacts on bats. **Mitigation 16: Hedgehog Highways** By creating a number of separate private dwellings and gardens at a Site, the land becomes fragmented and largely inaccessible to species such as Hedgehog, which like to roam each night in search of food (garden pests e.g., slugs) (Figure 13-29). This can easily be fixed by ensuring that the boundaries and barriers within and surrounding the Site i.e., garden fencing, railings and gates, are permeable for Hedgehogs. This can be achieved by: ▪ The use of fence panels with 13 x 13 cm holes at ground level (Hedgehog holes); ▪ Leaving a sufficient gap beneath gates, and; ▪ Leaving brick spaces at the base of brick walls.

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particular any breeding and/or resting sites which may be pre-sent along the Blackwater River, to the south of the Proposed Development Site. Otter breeding may take place at any season of the year, so breeding activity at holts will need to be determined on a case by case basis. ▪ Where potential holts are identified, a period of monitoring over several days (e.g., five or more days of checking activity at the holt either with sticks or with sand pads to identify footprints) may be required to determine whether holts are active, inactive or disused. Otters do not tolerate disturbance at or near holts that are in active use. ▪ If a period of time has elapsed between the recommended pre-construction survey and commencement of the works (>10-12 months, TII 2008), a further inspection of the development area, immediately prior to the works, should be carried out to ensure that no new holts have been created in the intervening period and to check if any of the previously identified holts are in active use by breeding females or have otter cubs present. **Mitigation 5: Tree Protection** Protective tree fencing in compliance with BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations' will be erected prior to any Construction works being undertaken to prevent damage to the canopy and root protection areas of existing trees at the Site. The fencing will be signed off by a qualified arborist prior to Construction to ensure it has been properly erected. No ground clearance, earthworks, stock-piling or machinery movement will be undertaken within these areas. **Mitigation 6: Invasive Species Management** No species of plant listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded at the Site of the Proposed Development during site surveys. As such, no significant risk of impacts relating to the spread of invasive plant species exists at the Site. Nevertheless, efforts should be made to remove such plants and minimise any risk of spread offsite. All of the medium impact invasives and their respective distributions at the Site are not significant and their removal will not be an issue. Transport Infrastructure Ireland (2020) guidance 'The Management of Invasive Alien Plant Species on National	The inclusion of hedgehog highways will be considered as part of the landscape design of the Site, specifically the private garden boundary fencing. A variety of fence suppliers stock specific hedgehog-friendly fencing options, which can be easily incorporated at little or no additional cost. These simple measures will provide habitat connectivity at the Site for Hedgehogs and reduce the impact of the land-use change on this species. Including details of hedgehog-friendly features in the new home owner's welcome pack will raise awareness and prevent home owners from reversing these features, for instance blocking fence holes. **Mitigation 17: Public Signage** In order to mitigate against an increase in human traffic with pets (specifically pet dogs) to the Blackwater River, signage should be erected, upon exiting the Site that clearly states all pet owners should be kept on leads at all times and not allowed to enter the river as flea and tick treatments can pose a threat to aquatic life, and that all dog foul must be picked up per existing national legislation. **Enhancement 1: Amphibian and Reptile Hibernacula** It is recommended to enhance the proposed attenuation area for amphibian and reptile use by providing suitable refuge and hibernacula around it. It is recommended that 2-3 areas of hibernacula are provided at the southeastern boundary of the attenuation area, as this is furthest removed from traffic and likely human activity, and the location would provide a potential link to the adjoining scrub and trees to the south. Hibernacula for amphibians and reptiles are relatively easy to create from rubble, wood and soil, all of which can likely be sourced from the Site during works. Rubble and wood in various sizes should be piled either in a shallow depression or on the slope of the attenuation pond in a disorganised way to create nooks and crevices. Larger tree trunks or rocks should be placed so that they will protrude through the final mound to provide open entrances to the mound. This pile should then be covered in soil to allow the inner crevices to maintain a stable temperature through the winter and allow for hibernation. The top can be planted with for example grass and native wildflowers. **Enhancement 2: Bird Box/Swift Brick Scheme** A bird box/Swift brick scheme is proposed to be installed at the Site of the Proposed Development and should be

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Roads – Technical Guidance' will be consulted with regards the treatment, removal and disposal of invasive flora at the Site. Biosecurity Measures The following measures will be adhered to, to avoid the introduction or dissemination of invasive species to and from the Site of the Proposed Development site. For the Construction Phase the contractor will prepare a project specific IAPS standard operating procedure document, in advance of work commencement. The document should be prepared by an IAPS specialist and should cover the bio-security measures to be taken, including the maintenance of records, to screen for the introduction of IAPS onsite, and to enable their tracing if such an introduction occurs; and to ensure no transmission of IAPS offsite. These measures to include: • Validation that all machinery / vehicles are free of IAPS, prior to their first introduction to site. • Certification from the suppliers that all imported soils and other fill/landscaping materials are free of IAPS • A regular schedule of site inspections across the IAPS growing seasons, for the duration of the construction works programme. • Validation that all machinery / vehicles are free of IAPS, prior to leaving the site. • Appropriate and effective site biosecurity hygiene to ensure that no IAPS are transmitted off-site for the duration of the Proposed Works. **Mitigation 7: Aquatic and Surface Water Protection** To ensure that no contaminated waters containing silt, fuel, cementitious materials etc., have the potential to enter the receiving surface water network during the Construction Phase of the Proposed Development, a suite of mitigation measures will be put in place, all of which have been outlined in the CEMP which accompanies the application, along with all other relevant measures recommended to protect environmental sensitivities during the Proposed Works (including those listed in the NIS report). **Mitigation 8: Reduction of Noise Related Impacts** Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction/Infill Phase can have a range of impacts depending upon the sensitivity of the ecological	implemented with the landscape plan so as to enhance the potential bird nesting habitat in the area during its Operational Phase. A total of 6 No. bird boxes are proposed to be installed on suitable trees around the Site, to provide nesting habitat for breeding birds that may be using the Site. The location of bird boxes will be advised by a suitably qualified ecologist. In addition, and as part of this scheme, it is proposed to include 20 No. Swift bricks. These nest bricks will be installed at least 5 metres above the ground, in safe areas where they will not be disturbed. As the bricks tend not to overheat, they can be placed on any aspect, N, S, E, W. Care will be taken to ensure no obstacles or plate glass windows are located below the bricks. The Swift bricks are installed side by side, in sets of 10 on each block, as Swifts are a social nesting species, on suitable buildings within the proposed development. Guidelines for the bird box scheme should also follow guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitle "Saving Swifts" (2009/2010). **Enhancement 3: Bat Box Scheme** It is proposed to place a total of 4 No. bat boxes on suitable retained trees within the Site. These will provide an important roost habitat for bat species which may be using the Site. As such, a suitably qualified ecologist will be required to select and oversee the placement of these bat boxes in suitable locations, paying consideration factors such as aspect and height. These bat boxes, will work in tandem with the following, to ensure that the Proposed Development will not result in a significant adverse impact on bat species: ▪ The reinstatement of grassland habitat and wildflower meadows along edge habitat (e.g., scrub and hedgerow edges); ▪ The planting of multiple tree species within the Site; ▪ The bat friendly lighting plan, and; ▪ The planting of hedgerows and trees to provide connectivity and additional foraging and commuting habitat throughout the Site. **Enhancement 4: Wildflower Meadows** The Landscape Plan includes the planting of wildflower meadows lost due to Construction works. It is recommended that wherever possible proposed wildflower areas are allowed to regenerate naturally by way of the

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
receptor, the nature and duration of the disturbance and its timing. To mitigate this disturbance, the following measures will be implemented: ▪ Selection of plant with low inherent potential for generating noise. ▪ Siting of plant as far away from sensitive receptors as permitted by Site constraints. ▪ Avoidance of unnecessary revving of engines and switch off plant items when not required. ▪ Keep plant machinery and vehicles adequately maintained and serviced. ▪ Proper balancing of plant items with rotating parts. ▪ Keep internal routes well-maintained and avoid steep gradients. ▪ Minimize drop heights for materials or ensure resilient material underlies. ▪ Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate. ▪ Limiting the hours during which Site activities likely to create high levels of noise are permitted. ▪ Appointing a Site representative responsible for matters relating to noise. ▪ Monitoring typical levels of noise during critical periods and at sensitive locations. These measures will ensure that any noise disturbance to nesting birds or any other fauna species in the vicinity of the Site of the proposed development will be reduced to a minimum. **Mitigation 9: Timing of Vegetation Clearance** To ensure compliance with the Wildlife Act 2000 as amended, the removal of areas of vegetation will not take place within the nesting bird season (March 1st to August 31st inclusive) to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. Where any removal of vegetation within this period is deemed unavoidable, a qualified Ecologist will be instructed to survey the vegetation prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged. Table 13-24 in Chapter 13 provides guidance for when vegetation clearance is permissible. Information sources include The Herpetological Society of Ireland, the British	existing seedbank within the soils present on Site. In addition, this can be supplemented by locally sourced wildflower seeds where necessary. At the very least, it is recommended that all wildflower seeds will be Irish Provenance Certified Seed, from a reputable source such as Design by Nature (Wildflowers.ie). To maximise the biodiversity value of the landscaping at the Site, consideration has been made to the All-Ireland Pollinator Plan planting code (NBDC, 2022). **Enhancement 5: Native Planting** The Landscape Plan also includes the planting of trees, scrub, and hedgerows. Whilst higher value trees will be retained, the majority of trees planted as part of the Proposed Development will be native species and will comprise a mix of species already present on Site. The planting of native shrubs in the ground layer of the woodland habitat will provide cover and nesting opportunities for birds and small mammals. While the mixed planting of wildflowers, lawns, and hedgerows will attract insects which are a food resource for multiple species including birds, bats, and small mammals. **Enhancement 6: Insect Hotels** The landscape plan includes the insertion of 2 No. insect hotels in select areas around the Site, during its Operational Phase. Insect hotels will be located in areas that are destined to be undisturbed, such as the areas bounding the perimeter where dense scrub vegetation is proposed. **Enhancement 7: Log Piles for Invertebrates and Fauna** Piles of logs and other woody vegetation arising from the proposed tree felling will be left in suitable secluded margins of the Site where they will remain undisturbed. These will provide habitat for Common Frog and small mammals such as Hedgehog and Pygmy Shrew. These areas of woody debris will also benefit local invertebrate species through the provision of shelter and food sources (precise locations to be proposed by ECoW). **Enhancement 8: Low Intervention Hedgerow Management** The proposed hedgerows will be managed in a way that maximises the ecological value they provide at the Site, with habitat connectivity maintained along the margins of the Site; connecting it in with the wider field boundary network in the area.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
Hedgehog Preservation Society's Hedgehogs and Development and The Wildlife (Amendment) Act, of 2000. The preferred period for vegetation clearance is within the months of September and October. Vegetation will be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., Hedgehog). Where this seasonal restriction cannot be observed, a check for active roosts and nests, as well as signs of amphibians, will be carried out immediately prior to any Site clearance by an appropriately qualified ecologist and repeated as required to ensure compliance with legislative requirements. **Mitigation 10: Small Mammal and Fauna Protection** The following general avoidance measures will be incorporated to minimise impacts to mammals during the Construction Phase: <u>Hours of work</u> The hours of working will be limited to daylight hours where possible, so as to limit disturbance to nocturnal and crepuscular animals. <u>Waste management</u> As best practice, all construction-related rubbish on Site e.g., plastic sheeting, waste, wires, bags, netting in which animals can become entangled etc. will be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death. <u>Excavations & Pipes</u> Trenches/pits must be either covered when not in use/at the end of each working day with caps (especially at night) or include a means of escape for any animal falling in and getting stuck. If this is not possible, then a strategically placed plank or object should be placed in the corner of an excavation to enable animals to safely escape (Badgers will continue to use established paths across a Site even when construction work has started). Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers from gaining access as may happen when contractors are off-site. **Mitigation 11: Otter Protection Measures** With regards to Site works in the vicinity of active otter holts, where they are identified during the pre-construction otter survey outlined in Mitigation 4 above, the following will be adhered to:	This connectivity is vital for wildlife such as birds, bats, mammals and insect pollinators in a human landscape such as that which will be provided by the Proposed Development. Additionally, by managing hedgerows and treelines in a more natural way, they will provide more in terms of biodiversity; through increased plant diversity, increase provision of food resources and higher quality shelter to wildlife inhabiting and commuting through the area. For the hedgerows running along the outer margins of the Site, the following management approach is proposed to maximise their biodiversity value and offset the loss of any sections of existing hedgerows at the Site. Should planning be granted, a Hedgerow Management Plan will be prepared by a suitably qualified ecologist; for the hedgerows at the Site. This management plan will include the following, with a focus on maintaining these hedges in as natural a state as possible to maximise their ecological value: ▪ The hedgerows located along the outer boundaries of the Site will, as much as is practicable, link up with each other. The provision of an almost continuous vegetative margin around the Site; through planted native hedgerows and trees, will maintain habitat connectivity with the surrounding environment. ▪ Hedgerows will be maintained with a natural meadow strip of 1-2m at their base wherever possible. Hedges with plenty of naturally occurring flowers and grasses at the base support will provide higher quality habitat for local wildlife using the hedges. ▪ The 1-2m strip at the base of the hedgerow will be cut on a reduced mowing regime to encourage wildflower growth and maximise the value of the hedgerow for pollinators. A two-cut management approach is ideal for suppressing coarse grasses and encouraging wild flowers. Cut the hedgerow basal strip once during February and March (this is before most verge plants flower and it will not disturb ground-nesting birds). Cut the verge once again during September and October (this slightly later cutting date allows plants that were cut earlier in the year time to grow and set seed). ▪ N.B. Raising the cutter bar on the back cut will lower the risk to amphibians, reptiles and small mammals. ▪ Hedgerows, where possible, will be allowed to reach at least 2.5m in height, and should be

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
▪ No works should be undertaken within 150m of any holts at which breeding females or cubs are present. Following consultation with NPWS, works closer to such breeding holts may take place provided appropriate mitigation measures are in place, e.g., screening and/or restricted working hours on site. ▪ No wheeled or tracked vehicles (of any kind) should be used within 20m of active, but nonbreeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15m of such holts, except under licence. ▪ The prohibited working area associated with otter holts should, where appropriate, be fenced with temporary fencing prior to any possibly invasive works. Appropriate awareness of the purpose of the enclosure should be conveyed through notification to site staff and sufficient signage should be placed on each exclusion fence. All contractors or operators on Site should be made fully aware of the procedures pertaining to each affected holts. ▪ Where holts are present in close proximity to invasive construction works but are determined not to require destruction, construction works may commence once recommended alternative mitigation measures to address otters have been complied with. **Mitigation 12: Construction Phase Lighting Regime** Where possible, Construction Phase lighting will be switched off during non-working hours. However, during use, directional lighting will be the lighting of choice as this will minimise light spill from the site, into any surrounding areas which may be in use by bats or other nocturnal animals that may be commuting/foraging in the area. It is recommended that LED luminaires possessing a warm white spectrum (2700k – 3000k) be used so as to reduce the blue light component. LED lights are also ideal due to their sharp cut-off, lower intensity, and dimming capabilities. **Mitigation 13: Ecological Clerk of Works (ECoW)** A suitably qualified Ecological Clerk of Works (ECoW) will be present on-site for the duration of the works until monitoring for each construction element listed in the SOWOR is no longer required and has been signed off by the ECoW and the Employers Representative. The ECoW will ensure that all targeted ecological mitigation measures	trimmed in an A-shape; maintaining a wider base to compliment the natural meadow strip at their base. Existing hedgerows being retained at the Site that are taller than 2.5m should be retained as is and pruned lightly as required. ▪ Where hedgerow trimming needs to occur delay trimming as late as possible – until January and February as the surviving berry crop will provide valuable food for wild-life. The earlier this is cut; the less food will be available to help birds and other wildlife survive through the winter. Any hedgerow cutting will be done outside of the nesting season and due consideration of the Wildlife Act 1976 (as amended) needs to be taken. ▪ Where possible, cut these outer boundary hedgerows on a minimum 3-year cycle (cutting annually stops the hedgerow flowering and fruiting), and cut in rotation rather than all at once - this will ensure some areas of hedgerow will always flower (Black-thorn in March, Hawthorn in May etc.). ▪ Where they occur naturally, Bramble and Ivy should be allowed grow in hedgerows, as they provide key nectar and pollen sources in summer and autumn. **Methods to Avoid** Hedgerows will not be over-managed. Tightly cut hedges mean there are fewer flowers and berries, thus reducing available habitats, feeding sources and suitable nesting sites. Hedgerows will not be cut between March 1st and August 31st inclusive. It is both prohibited (except under certain exemptions) and very damaging for birds as this is the period they will have vulnerable nests containing eggs and young birds. Red-listed bird species Yellowhammer (recorded on Site) in particular nest up until the end of August. **DO NOT** use pesticide/ herbicide sprays or fertilisers near hedgerows as they can have an extremely negative effect on the variety of plants and animals they support.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
identified in this EcIA, the NIS and CEMP that accompany this report under separate cover are adhered to in full. The ECoW will also ensure that the silt fences and bunding are correctly positioned in the correct locations as per the CEMP and are effectively managed to ensure any run-off from these areas is intercepted. Protecting both the Blackwater River SAC and it's QI features from adverse water quality impacts. In addition, a qualified Ecologist will act as Clerk of Works (ECoW) during demolition of the existing buildings (Gate Lodge) whereby the buildings will be inspected for the presence of bats and breeding birds at least 24 hours prior to demolition works taking place. Should any evidence of bats or breeding birds be found. Then works will be halted until the breeding birds have fledged at the end of the season. While the presence of bats will result in the works being halted so that NPWS can be contacted for advice on how to proceed, under a derogation licence.	
Chapter 14 Cultural Heritage and Archaeology	
There is one recorded archaeological located within the proposed development site and this is a *fulacht fia* (CO033-090----) which is currently contained within a green area in Castle Parks housing estate to the west. This archaeological site will be preserved *in situ* within a fenced off buffer zone extending 10m from its outer recorded extent for the duration of the construction phase. No ancillary activity, including ground works, vehicular movements, compounds, landscaping and equipment/soil storage will take place within this buffer zone during the construction phase (Figure 14.8). A ringfort (C0033-012----) located outside the east end of the proposed development site is contained within private third-party lands and is separated from the proposed development by hedgerows and a roadway within that property. No construction works will be carried out within 20m of its location. No potential unrecorded features associated with this archaeological site were identified during the geophysical survey and test trenching investigations carried out within the area of the proposed development within the wider environs of the ringfort. As this archaeological site is entirely located outside of the development boundary, no protective mitigation measures are, therefore, required within the boundary of the proposed development. There are no Protected Structures or structures listed in the NIAH located within the proposed development site and it is not within an Architectural Conservation Area. No mitigation measures for these elements of the cultural heritage	The location of the *fulacht fia* (CO033-090----) and its surrounding 10m buffer area will be excluded from any potential future development proposals within the boundary of the proposed development. A suitably qualified archaeologist will be retained to advise on the design of any future proposed development works, if any, located within the environs of the archaeological exclusion zone and to prepare an archaeological impact assessment of any such development. This will include a process of consultation with the Cork County Council Archaeologist and the National Monuments Service. The location of the *fulacht fia* and surrounding 10m buffer area will also be clearly identified (and mapped) as an archaeological exclusion area on all relevant future site management plan documents. No landscaping, tree-planting, tree root removal, car parking, drainage, traffic, storage or other works which will have the potential to result in ground disturbance that may directly impact any sub-surface archaeological deposits, features or objects will occur within the archaeological exclusion zone during the operation phase. The maintenance of the archaeological exclusion area will be limited to periodic grass cutting during the operational phase. All of the other recorded archaeological sites within the study area are located in private third-party lands and, therefore, no operational phase mitigation measures are required for these constraints.

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
resource are, therefore, required during the construction phase. The location of the 19th century building in the southwest corner of the proposed development site will be preserved *in situ* and protected by fencing for the duration of the construction phase. A pre-works historic building survey, including drawn, written and photographic records, will be prepared by a suitably qualified conservation specialist in advance of the construction phase. The appointed conservation specialist will also prepare a conservation method statement which will provide details on the appropriate repair, treatment of extant original fabric and correct application of the proper new material as required on the building. This method statement will be based on the following core principles: ▪ Authentic structure and fabric of importance to maintain the structure's special character are to be respected and retained. ▪ All existing sound fabric and features are to be retained and protected. ▪ It is the objective to carry out works limited to the minimum intervention essential for the survival of the property and its restoration as a café/interpretative centre. ▪ It is intended in all cases where possible to carry out repairs rather than replacement, which will only be carried out where relevant elements of original fabric has perished. ▪ It is intended that unsatisfactory alterations which disfigure earlier work of greater merit should be reversed. ▪ New repairs are to be discernible but sympathetic to the visual integrity of the structure. ▪ Alterations are to be as far as possible reversible. The locations of *fulacht fia* (CO033-090----) and the 19th century building in the southwest corner of the proposed development site will be identified as part of site inductions during the construction phase and will be clearly designated as exclusion areas where no construction activity will occur. A range of archaeological site investigation mitigation measures have already been carried out in relation to the proposed development as part of this assessment. The results of the geophysical survey and test trenching carried out within the proposed development site are described in Chapter 14 (Sections 14.2.5 and 14.2.6) and the full reports on these site investigations are included in Appendices 14.4 and 14.5. Nothing of archaeological significance was identified during these site investigations, which in	

Construction Phase Mitigation Measures	Operational Phase Mitigation Measures
combination with extensive ground disturbance carried out in the 2000s, indicates that there is low potential for the presence of unrecorded archaeological features within the proposed development site. As a precautionary measure, licensed archaeological monitoring of topsoil stripping works within 50m of the buffer zones around *fulacht fia* (CO033-090----) and ringfort (C0033-012----) will be carried out by a suitably qualified archaeologist during the construction phase (Figure 14.8 in Chapter 14). In the event that any archaeological sites or features are identified during monitoring, ground works will halt at that location, and they will be recorded and will be left to remain securely in situ within a cordoned off area. The National Monuments Service and the Cork County Council Archaeologist will be notified of the discovery and consulted to determine further appropriate mitigation measures, which may entail preservation *in situ* by avoidance or preservation by record through a licensed archaeological excavation. **Monitoring** There are a number of obligatory processes to be undertaken as part of applications to the National Monuments Service for licences to carry out archaeological site investigations, and these will allow for monitoring of the successful implementation of mitigation measures. A revised method statement for any required excavation works will be submitted to the National Monuments Service and National Museum of Ireland as part of an application for a licence to complete these works. Reports on the archaeological site investigations will then be submitted to the National Monuments Service, the National Museum of Ireland and the Planning Authority which will clearly describe the results of all archaeological works in written, mapped and photographic formats.	

Castlelands LRD, Mallow

Volume II

Main Statement

CHAPTER 17

Screening of Major Accidents

Ocotober 2024

McCutcheon Halley
CHARTERED PLANNING CONSULTANTS

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17 Screening for Major Accidents

17.1 Introduction

In order to ensure a comprehensive assessment of potential environmental effects due to risks of major accidents and/or disasters as relevant to the development, this chapter presents a review of the characteristics of the proposed development and of the project location to consider potential for accident scenarios.

In assessing likely potential and predicted impacts, account has been taken of both the importance of the attributes and the predicted scale and duration of the likely impacts. Section 8 of Annex IV of the EIA Directive specifies that the EIAR must include:

> *"A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".*

A major accident can be defined as an acute or chronic accident or disaster, of human or natural origin, which occurs either as a consequence of, or which interacts with, the construction or operation of the proposed Scheme, and which has substantial consequences for people or the environment.

The Seveso III Directive (2012/18/EU) also requires Member States to apply land-use or other relevant policies to ensure that appropriate distances are maintained between residential areas, areas of substantial public use and the environment, including areas of particular natural interest and sensitivity and hazardous establishments (commonly referred to as Seveso sites). For existing establishments, Member States are required to implement, if necessary, additional technical measures so that the risk to persons or the environment is maintained at an acceptable level.

The Health and Safety Authority (HSA) is the Competent Authority in Ireland as defined by Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (COMAH Regulations 2015) which implements the Seveso III Directive in Ireland. The HSA is responsible for ensuring that the impacts of facilities which fall within the remit of this legislation are taken into account with respect to land use planning. This

The HSA does not currently consider the proposed development to be a COMAH facility. However, in order to ensure a comprehensive assessment of potential environmental effects due to risks of major accidents and/or disasters as relevant to the development, this chapter presents a review of the

characteristics of the proposed development and of the project location to consider potential for accident scenarios that do not fall under COMAH reporting requirements.

17.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy. Saoirse holds a Bachelor's degree in Arts (International), majoring in Geography, and a Master's in Planning and Sustainable Development. She has over 5 years' experience working with multi-disciplinary teams and has provided input into a variety of projects. In particular, she has co-ordinated the preparation of the following three Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Population and Human Health, and Screening for Major Accidents chapters.

- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Bennetstown Large Scale Residential Development, Dunboyne, Co. Meath
- Clonmagadden Sheltered Housing Development, Navan, Co. Meath

17.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 'Development Description' of this EIAR.

17.4 Methodology

In the EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that attribute.

The principal attributes (and impacts) to be assessed include the following:

- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any).
- Potential Seismic Activity (if any).
- Proximity to any COMAH/SEVESO sites.

COMAH/Seveso sites are defined as industrial sites that, because of the presence of dangerous substances in sufficient quantities, are regulated under the Seveso II Directive.

17.4.1 Relevant Legislation & Guidance

The assessment has been carried out generally in accordance with the following guidelines:

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022),
- EPA 'Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2015), and;
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).

17.4.2 Site Surveys/Investigation

The collection of baseline regional data was undertaken by reviewing the following sources:

- Office of Public Works (OPW) flood mapping data (www.floodinfo.ie).

Site specific data was derived from the following sources:

- Engineering reports prepared by DOSA Consulting Engineers.
- Site plans and drawings prepared and submitted with the planning application.

17.4.3 Consultation

The Health Safety Authority (HSA) were contacted in October 2023 regarding the proposed development and were notified that an EIAR was being completed. The Authority did not provide any feedback in relation to the proposed development or the content of the EIAR.

17.5 Difficulties Encountered

There were no difficulties encountered during the compilation of this chapter.

17.6 Baseline Environment

The description of the site context and proposed development is presented in detail in Chapter 2 – Project Description.

17.6.1 Site Description

The subject site is located within the townland of Castlelands, to the east of, and within the defined development boundary of, Mallow, Co. Cork.

The existing Castlepark Estate is to the immediate west of the site and the recently constructed Scoil Aonghusa Community National School is located to the immediate north of the site. The lands to the east and south consist of greenfield lands.

17.6.2 Flood Risk

A desktop study of the flood history at the site was carried out by ARUP Consulting Engineers.

According to Geological Survey Ireland (GSI) and floodinfo.ie, there are no historic records of flooding near the site.

Fluvial risk

The Castlelands LRD development is located approximately 100m north of Blackwater River. The majority of the site is in Flood Zone C, an area at low risk of flooding (less than 0.1% Annual Exceedance Probability - AEP). Small parts of the site at the southern boundary are within Flood Zone A, are at high risk of flooding (more than 1%AEP). The proposed use at this area is for an open space and footpath, a water compatible use and, as such, appropriate for development in Flood Zone A. The extreme flood water level from Blackwater River is at 46.37m AOD for the 0.1%AEP. All highly and less

vulnerable development is proposed above this level, between 61.75m AOD and 85.15m AOD. The risk of fluvial flooding to the development is therefore low.

A Justification Test will not be required for the proposed development.

Pluvial risk

The development is located on a sloping greenfield site. St Joseph's Road north of the site lies on a ridge and forms the local high point. There are limited catchments upstream the development site and as such no overland flows from outside the development would enter the site and cause risk of pluvial flooding.

Groundwater risk

The site is underlain by Dinantian pure unbedded limestone which is a Regionally Important karstified bedrock aquifer (Rkd) dominated by diffuse flow. This type of bedrock is highly productive, and groundwater can travel over large distances through the karstified faults and joints. The nearest Geological Survey Ireland (GSI) mapped karst feature is approx. 500m west of the site near the N72, at an elevation below 50m AOD.

There is no groundwater level monitoring available within the site. Due to the karstified nature of the bedrock the local groundwater flow direction may not reflect the topography, however the regional groundwater flow direction will be towards rivers. Therefore, the groundwater flow direction beneath the site is likely to be south towards the River Blackwater.

The GSI groundwater flooding maps do not indicate risk of flooding at the site.

Taking the above into consideration, the risk of groundwater flooding to the site is considered low.

17.6.3 Seismic Activity

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result.

In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland including IWEX on Carrickbyrne Hill, Co. Wexford, running from 01/01/2011 and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events.

As can be seen in Figure 17.1 below, the principal events have occurred along/ beyond the east, south-east and south of Ireland with seismic movements generally up to 2.9 Magnitude recorded on land with no large seismic events recorded in the immediate vicinity of the subject site.

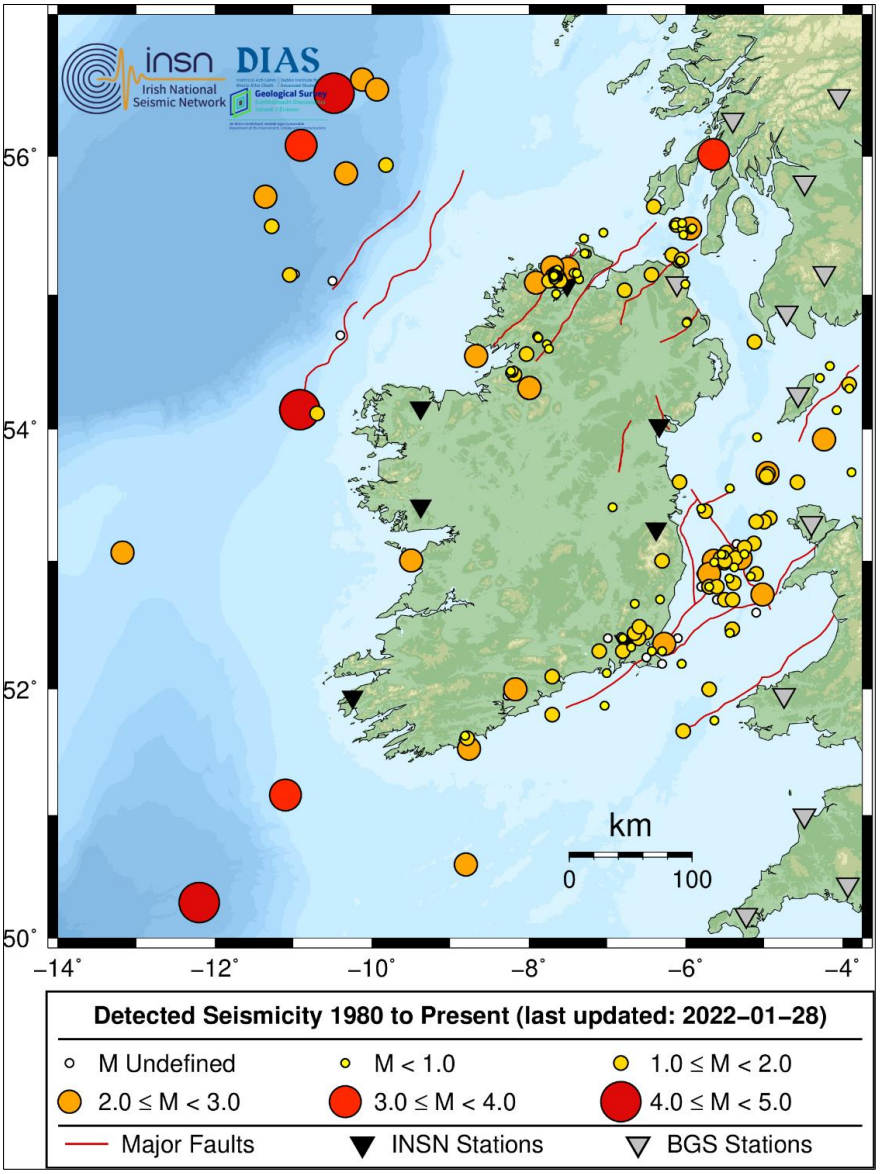

Figure 17.1 Seismic Movements. Source: Irish National Seismic Network

17.6.4 COMAH/SEVESO Sites

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

The purpose of the COMAH Regulations is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

There are two tiers of establishment, which are related to the quantities of dangerous substances present. Depending on quantity, an establishment may be upper-tier or lower-tier. Upper-tier establishments have greater quantities of dangerous substances present and therefore are obliged to comply with additional requirements specified in the Regulations. Lower-tier establishments have lower quantities of dangerous substances present.

There are 29 no. Seveso sites (14 no. lower tier and 15 no. upper tier) located Cork County Council administrative area.

There are no Seveso sites in close proximity to the proposed development. The closest to the subject site is the LPG Cylinder Filling Ltd which is a 'lower tier establishment' and is over 2km from the subject site within the Quartertown Industrial Estate, Mallow, Co. Cork. The activity on site is described in the HSA's 'Public Information on a lower-tier establishment as required by Regulation 25' as 'LPG production, bottling and bulk distribution' and is considered low risk i.e., the advice in the event of a major accident is that "*members of the public are advised to go indoors, stay in and tune to local radio*."

Given the low risk and 'lower tier' nature of LPG Cylinder Filing Ltd premises and the distance to the proposed development, it is not considered a concern for the proposed development at construction or operational phase.

The proposed development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (S.I. 299 of 2007, S.I. 445 of 2012, S.I. 36 of 2016) as amended and associated regulations.

17.7 The 'Do nothing' Scenario

The site will remain as underutilized greenfield area.

17.8 Potential Significant Effects

17.8.1 Construction Phase

No scenarios of concern have been identified during the construction phase. As such the predicted impact is considered to be short term, imperceptible and neutral.

17.8.2 Operational Phase

The proposed development is not located in an area prone to flooding or an area prone to seismic events or within close proximity to a COMAH/Seveso site. As such, these accident scenarios are not of concern.

Therefore, the impact is considered to be long term, imperceptible and neutral.

17.8.3 Cumulative Effects

Cumulative impacts are considered imperceptible and neutral.

17.9 Mitigation

17.9.1 Construction Phase Mitigation

No mitigation measures necessary.

17.9.2 Operational Phase Mitigation

Mitigation measures have been designed into the proposal. No further mitigation measures necessary.

17.9.3 Cumulative Mitigation

No mitigation measures necessary.

17.9.4 Monitoring

No monitoring proposed.

17.10 Residual Impact Assessment

17.10.1 Construction Phase

No scenarios of concern have been identified during the construction phase. As such the predicted impact is considered to be short term, imperceptible and neutral.

17.10.2 Operational Phase

The proposed development is not located in an area prone to flooding or an area prone to seismic events or within close proximity to a COMAH/Seveso site. As such, these accident scenarios are not of concern.

Therefore, the impact is considered to be long term, imperceptible and neutral.

17.10.3 Cumulative Impact

Cumulative impacts are considered imperceptible and neutral.

17.11 References & Sources

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022).

- EPA 'Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2015).
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).
- Office of Public Works (OPW, www.floodinfo.ie).
- Irish National Seismic Network (INSN, www.insn.ie)
- Engineering Reports prepared by DOSA Consulting Engineers.
- Flood Risk Assessment prepared by ARUP.