

DUNBOYNE LRD

VOLUME II
Main Statement

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DUNBOYNE LRD

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CHAPTER ONE

INTRODUCTION



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CHAPTER ONE

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CHAPTER 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 Marina Quarter Ltd. which is a subsidiary of Glenveagh Homes.

Glenveagh are a leading Irish home builder founded in 2017, whose vision is to build homes and create sustainable communities through exemplary design. Their focus on people, homes, and communities has created successful developments nationally by understanding that well planned, well designed, and well-built homes is the essence of thriving communities.

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 4 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 four Environmental Impact Assessment Reports (EIARs) including the completion of the Introduction, Alternatives, and Population and Human Health chapters.

- Dunboyne Phase 1 Large Scale Residential Development, Dunboyne, Co. Meath
- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Parkside 5B Strategic Housing Development, Belmayne, Dublin.
- Clonattin Strategic Housing Development, Gorey, Co. Wexford.

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 demolition of existing structures, the construction of 356 no. residential units, a creche, 2 no. signalised junctions on the R157 and the provision of a new link road connecting the R157 and the Old Navan Road (including new bridge over the River Tolka), the provision of 1 no. pumping station and all associated ancillary development works including footpaths, cycle lanes, car and bicycle parking, drainage, public lighting, bin storage, boundary treatments and landscaping/amenity areas.



Figure 1.1 Extract from Proposed Site Layout Plan prepared by JFA Architects

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 (Section 10) 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 hectare 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 demolition of existing structures, the construction of 356 no. residential units, creche and ancillary/associated development on a gross site area of 17.22ha. An EIAR is therefore required as the LRD comprises urban development on a site area that exceeds the 10ha threshold for a mandatory EIAR.

The criteria for assessing whether a development would or would not be likely to have significant effects on the environment are 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 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.	Likely Effects The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	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).

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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 on part of the Dunboyne North Masterplan – MP22 Lands. Four applications have been submitted on these masterplan lands which will be taken into consideration in this EIAR. In addition, we note the Part 8 development by Meath County Council for a new link road. The details of these applications are provided in the table below:

Table 1.2 Projects Considered for Cumulative Impacts

Reference	Application
P822022	Dunboyne Link Road – Dunboyne Business Park and the R157. Part 8 Development
23/424	3 no. office buildings, located to north of subject site, on the MP22 masterplan area.
23/60065	Single Storey commercial building east of subject site, located on Phase 1 lands of the MP 22 masterplan area.
23/60290	Large Scale Residential Development for 267 no. residential units, located on the Phase 1 lands of the MP 22 masterplan area.
23/849; 25/60854	Large Scale Residential Development for 705 (reduced from 716) no. residential units located south of the site, c. 1km east of Dunboyne town centre.
24/60805	Large Scale Residential Development for 309 no. residential units located north of the site, c.1km west of Dunboyne town centre.
24/60468	76 no. dwellings and a creche at Station Road, Dunboyne, Co. Meath.
24/60709	Large Scale Residential Development for 853 no. residential units
VA06F.319422	Electricity Development Application to An Bord Pleanála for a 400kV underground cable from East Meath to North Dublin, approximately 37.5km in length.
24/39	8 no. dwellings located to the south-east of the subject site
25/61001	Large Scale Residential Development for re-alignment of a portion of the link road connecting the R157 and the Old Navan Road, 1 no. pumping station and associated access road off the Old Navan Road located on Phase 1 lands of the MP 22 masterplan area.

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

Chapter	Chapter Title	Consultant
1	Introduction	MH Planning
2	Site Location & Project Description	MH Planning
3	Project Need & Alternatives Considered	JFA
4	Population & Human Health	MH Planning
5	Land, Soils & Geology	AWN Consulting
6	Hydrology & Hydrogeology	AWN Consulting
7	Air Quality	AWN Consulting
8	Climate change	AWN Consulting
9	Noise & Vibration	AWN Consulting
10	Waste	AWN Consulting
11	Landscape & Visual Impact	JBA Consulting

Chapter	Chapter Title	Consultant
12	Material Assets – Traffic & Transport	Atkins
13	Material Assets – Service Infrastructure & Utilities	Paul McGrath
14	Biodiversity	DNV
15	Cultural Heritage & Archaeology	John Cronin & Associates
16	Significant Interactions of Impacts	MH Planning
17	Summary of Mitigation Measures & Monitoring	MH Planning
18	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 Square, Barrack House, Ballincollig, Cork.	021 4208710	info@mhplanning.ie
JFA Architects	The Tree House, 17 Richview Office Park, Clonskeagh, Dublin, D14 XR82.	01 6689888	info@jfa.ie
Atkins	Atkins House, 150 Airside Business Park, Swords, Co Dublin, K67K5W4	01 810 8000	info.ie@atkinsglobal.com
DNV	Block 71, The Plaza, Park West Unit 3D, Core C, Dublin 12 F9TN		liam.gaffney@dnv.com
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

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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 Meath County Council and decisions issued on previous applications on the subject site and the adjacent Phase 1 and Phase 2 sites.

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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CHAPTER TWO

SITE LOCATION & PROJECT DESCRIPTION



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CHAPTER TWO

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CHAPTER 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, Alternatives, and Population and Human Health chapters.

- Cooldown Commons Strategic Housing Development, Citywest, Dublin.
- Parkside 5B Strategic Housing Development, Belmayne, Dublin.
- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath.

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
- Quality Housing for Sustainable Communities
- Design Standards for Apartments, Guidelines for Planning Authorities
- Design Manual for Urban Roads and Streets (DMURS)
- Meath County Council Development Plan 2021-2027
- Dunboyne North Masterplan – MP22

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.

2.5 Baseline Environment

2.5.1 Site Location

The subject site is located within the townland of Bennetstown to the north of, and within the defined development boundary, of Dunboyne. The site area of 17.22ha is west of the R157 and the M3 Parkway Station. The centre of the site is located c. 1.4km north of Dunboyne town centre, which is a c. 1.8km driving distance.



Figure 2.1 Approximate Site Location

The lands surrounding the subject site consist primarily of agricultural lands. The M3 Parkway Station to the northeast of the site provides a large surface car park adjacent to the train station.

The boundaries of the site consist of farm buildings to the south west and hedgerows with an existing hedgerow through the centre of the site.

The red line boundary for the application extends from the main site area to include part of the R157, the proposed link road and bridge over the River Tolka to the south-east, and drainage connections to the south-east and north.

2.5.2 Zoning

The majority of the subject site is zoned 'A2 New Residential' in the Meath County Development Plan 2021-2027 and is located within the Dunboyne North Masterplan MP22 area. A portion of the site to the south is located on lands zoned F1 Open Space.

The Dunboyne North Masterplan MP22 was adopted in October 2022 and was prepared to fulfil a requirement of the Meath County Development Plan to prepare a masterplan for the area. The subject site comprises the residential element within Phase 1A, 1B, and 1C. The remainder of the residential element within these phases was subject to a separate planning application.

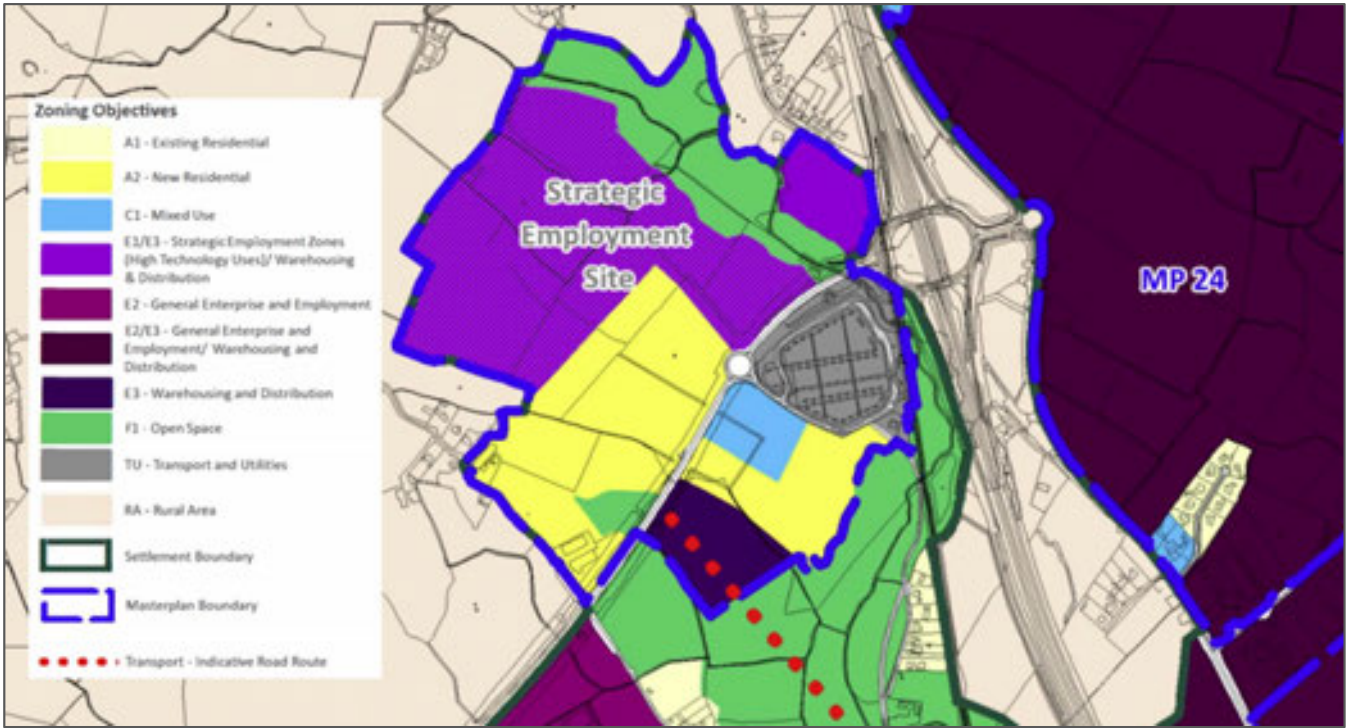


Figure 2.2 Extract from Meath County Development Plan 2021-2027 Land Use Zoning Map (Sheet 13(a) Dunboyne/ Clonee/ Pace)

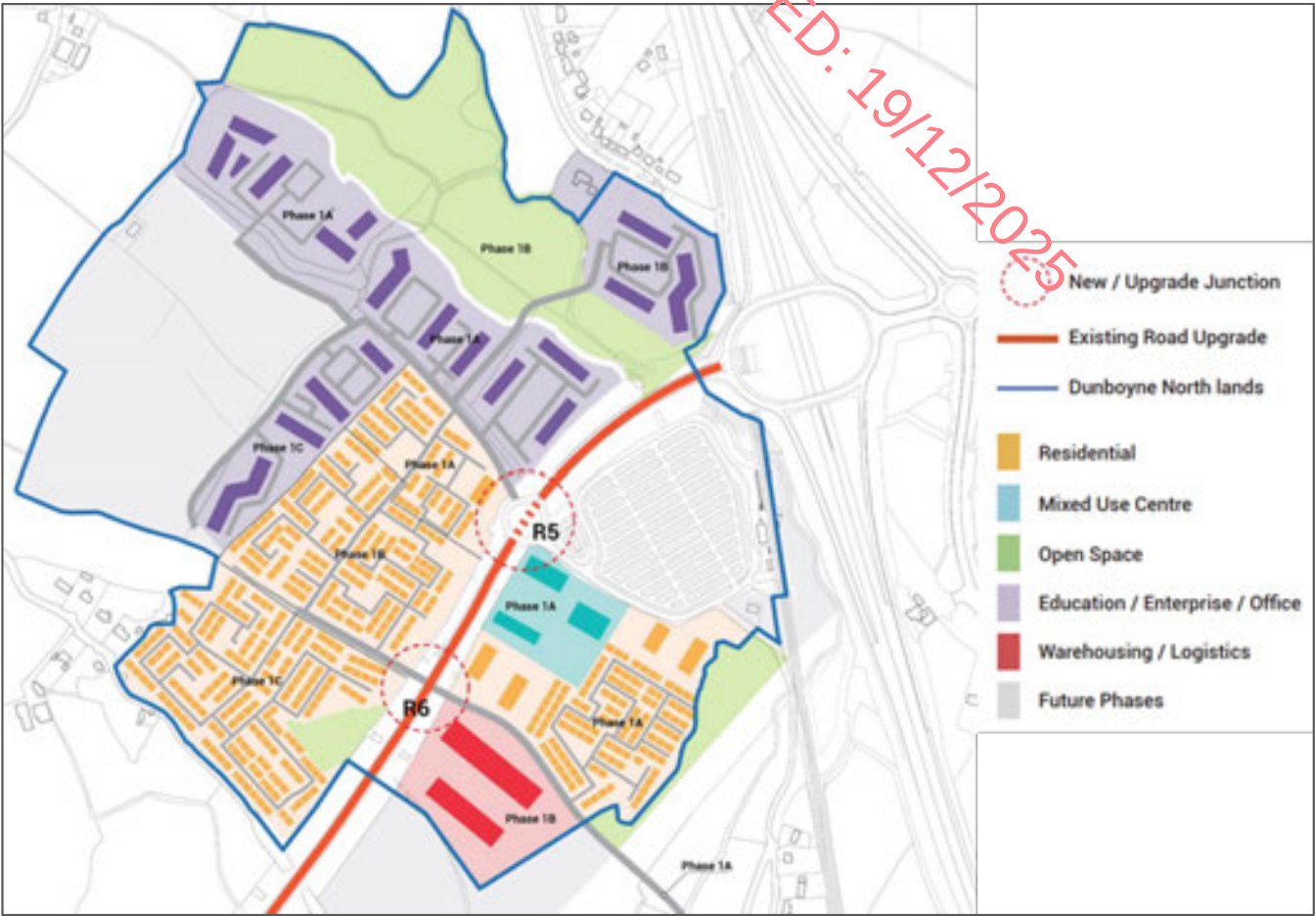


Figure 2.3 Extract from Dunboyne North Masterplan Phasing Plan

2.5.3 Permitted Developments

There have been five applications permitted on the Dunboyne MP22 lands.

A single storey commercial building on the Phase 1A Mixed Use Centre lands was permitted by Meath County Council on the 26th June 2024.

Three office buildings on the Phase 1A Education/Enterprise/Office lands were permitted by Meath County Council on the 7th June 2024. This decision was subject to a first party appeal to An Coimisiún Pleanála (ABP 320091) who permitted the development on the 21st March 2025.

A Large-Scale Residential Development (LRD) for 267 no. residential units on the Phase 1A Residential lands to the south of the R157 was permitted by Meath County Council on the 4th June 2024 (reference: 23/60290). A third-party appeal was lodged to An Coimisiún Pleanála on the 18th June 2024 (reference: ABP 320049-24) who permitted the development on the 20th November 2024.

A Large-Scale Residential Development (LRD) for 309 no. residential units on the Phase 1A and Phase 1B Residential lands to east and west of the R157 was permitted by Meath County Council on the 15th November 2024 (reference: 2460805).

A Large-Scale Residential Development (LRD) comprising modifications to part of the LRD permitted under Meath County Council Ref. 23/60290 (An Coimisiún Pleanála ref. 320049-24) which consisted of the re-alignment of a portion of the link road (including new bridge over the River Tolka) connecting the R157 and the Old Navan Road was permitted by Meath County Council on the 13th of November 2025 (reference: 2561001).

The road infrastructure included within these applications are also included within the red line boundary of the current application.

2.6 Proposed Development

The proposed development consists of

- Demolition of existing structures
- 356 no. residential units. (252 houses and 104 maisonettes/apartment/duplexes)
- A 628sqm creche with 136 no. childcare spaces
- 2 no. signalised junctions on the R157 and the provision of a new link road connecting the R157 and the Old Navan Road (including new bridge over the River Tolka)
- The provision of 1 no. pumping station.
- All associated ancillary development works including footpaths, cycle lanes, car and bicycle parking, drainage, public lighting, bin storage, boundary treatments and landscaping/amenity areas

2.6.1 Layout

The layout consists of 16 no. cells of residential units comprising 104 no. apartments and 252 no. houses.

There are 10no. cells located along the western boundary of the site

- **Cell 01/ Block A** consists of a 3-4 storey apartment block providing 18 no. residential units (Type LM1, LM2, LM3G, LM4G, 1A, 1B, 3A, 3B).
- **Cell 02** consists of 6 no. housing units (Type H201.2, H304.3)
- **Cell 03** consists of 19 no. housing units (Type H303.3, H201.2, H304.3, H403.4)
- **Cell 04** consists of 18 no. housing units (Type H303.3, H201.2, H304.3, H403.4)
- **Cell 05** consists of 10 no. housing units (Type H303.3, H201.2, H304.3)
- **Cell 06** consists of 20 no. housing units (Type H303.3, H201.2, H304.3, H403.4)
- **Cell 07** consists of 22 no. housing units (Type A1, A2, H301.3, H403.4)
- **Cell 08** consists of 14 no. housing units (Type H303.3, H201.2, H304.3, H401.4, H403.4)
- **Cell 09** consists of 27 no. housing units (Type A1, A2, H303.3, H201.2, H401.4, H403.4)
- **Cell 10** consists of 38 no. housing units (Type A1, A2, H303.3, H201.2, H304.3, H403.4)

There are 4 no. cells located along the southeastern boundary

- **Cell 11** consists of 24 no. housing units (Type H303.3, H201.2, H304.3, H403.4)
- **Cell 12** consists of 30 no. housing units (Type H303.3, H201.2, H304.3, H403.4)

- **Cell 13** consists of 16 no. housing units (Type H303.3, H201.2, H304.3, H401.4, H403.4)
- **Cell 14/Block B/Block C/Block D** consists of a 3-4 storey apartment block providing 42 no. residential units (Type LM1, LM2, LM3G, LM4G, 1A, 1B, 3A, 3B).

There are 2 no. cells located in the centre of the site

- **Cell 15** consists of 30 no. housing units (Type H303.3, H201.2, H304.3, H403.4)
- **Cell 16** consists of 22 no. housing units (Type H303.3, H201.2, H304.3, H401.4, H403.4, A1, A2)

The creche is located east of Cell 15 and a large public open space is provided further south, on the F1 zoned lands. An extract from the proposed site layout is shown below.



Figure 2.4 Extract from Site Layout Plan showing proposed housing scheme

2.6.2 Unit Mix and Type

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

Table 2.1 Unit Size and Type Breakdown

Unit Size	Number	%	Unit Type Breakdown
1 bed	76	21%	44 no. maisonettes (12.36%) 32 no. apartments (8.99%)
2 beds	142	40%	142 no. houses (39.89%)
3 beds	117	33%	28 no. duplexes (7.87%) 89 no. houses (25%)
4 beds	21	6%	21 no. houses (5.90%)
Total	356	100.0%	104 no. apartments/duplexes/maisonettes (29.2%) 252 no. houses (70.8%)

2.6.3 Creche

The creche is located to the south-east of the site, adjacent to the F1 zoned lands. The creche measures c. 628sqm and has been designed to cater for 136 no. children. The orientation of the building and the play spaces has been carefully considered to ensure a high level of daylight and the provision of a high-quality environment.

2.6.4 Open Space

The proposed development includes a total of 8 no. public open spaces (POS) consisting of 12,247sqm (16.4%) which is provided in the following spaces:

- 355 sqm – POS 3A
- 2,050 sqm – POS 3B
- 2,139 sqm – POS 3C
- 2,529 sqm – POS 3D
- 3,854 sqm – POS 3E
- 756 sqm – POS 3F
- 388 sqm – POS 3G
- 176 sqm – POS 3H

The F1 zoned lands to the southeast of the site consists of 7,147sqm of open space and is not included in the public open space calculations.

2.6.5 Parking

The proposed development includes a total of 511 no. car parking spaces and 873 no. cycle parking spaces.

Car parking is provided at a ratio of 2 no. spaces for 3/4 bed houses with 1 no. car parking space provided per 1 bed unit. The apartments/duplexes/maisonettes are provided with 1 no. car parking space. 19 no. car parking spaces are provided for the creche, and 26 no. visitor car parking spaces are provided.

A total of 873 no. bicycle parking spaces are provided, with 16 no. spaces for the creche and 62 no. visitor spaces provided.

2.6.6 Access

There will be two vehicular access points into the site. One access is provided to the north off the new arm from the R157 roundabout. The second access is provided southeast directly from the R157.

The internal access routes have been designed to minimise the impact on the existing hedgerows and treelines. Two access routes through the hedgerows have been introduced to provide vehicular access to the centre of the site. Smaller accesses for pedestrians and have cyclists have also been introduced to provide a high level of permeability.

2.6.7 Improvements to the R157 and M3 Parkway Access Road

The proposed development includes changes and improvements to the R157 to the east of the site and the M3 Parkway access road to the northeast of the site.

The existing single carriageway R157 will be altered to provide two lanes of traffic in both directions for approximately 600m. This will be accompanied by a reduction of the existing speed limit from 80 km/h to 50 km/h.

The existing roundabout junction to the north of the site which provides access to the M3 Parkway will be replaced with a signalised crossroads junction. This will require the widening of the existing carriageway by 0.5m to 3m for 50m on both sides on approach to the junction.

An additional new signalised crossroad junction will be provided on the R157 which will provide access to the new link road between the R157 and Old Navan Road and lands for development to the west of the R157.

The existing M3 Parkway Access Road will be modified by providing a new cycle track on footpath on its southern side along with two new zebra crossings.

2.6.8 New Link Road and Bridge

The proposed development also includes the construction of a new link road along the southern boundary of the main site area, connecting the R157 to the west with the Old Navan Road to the east.

The new link road will include footpaths and cycle paths on both sides of the road. A raised toucan crossing will be provided across the link road at the access to the amenity pathway through the F1 Open Space lands within the Phase 1 lands.

Two priority junction access points providing vehicular access to the site are included along the new link road. An additional priority junction access point for the industrial zoned lands to the south of the link road will also be provided with the exact location to be confirmed as part of future planning applications.

A new priority junction will be provided at the new junction with the Old Navan Road.

The construction of this new road will include the partial culverting of the existing open drain along the southern boundary of the site.

Five bridge structures with four bridge openings will be provided along the new road to cross the River Tolka and the flood plain area. One opening will be located on the River Tolka and three located on the western floodplain lands.

2.6.9 Flood Mitigation Measures

The eastern portion of the site, which is zoned F1 Open Space, is located within a flood zone. As a result, a Flood Risk Assessment has been carried out and appropriate mitigation measures have been incorporated into the design of the development including the construction of five flood relief bridge structures along the new link road with four bridge openings.

2.7 Construction Stage

The construction of the proposed development is expected to take approximately three years.

2.7.1 Construction Site Establishment

A temporary site compound will be set up during the construction stage of the works.

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.

2.7.2 Working Hours

The proposed construction working hours will be from 7am to 7pm Monday to Friday, and 7am to 2pm on Saturdays. No construction work will take place on Sundays or public holidays, except works necessary for health and safety reasons or to protect the environment. An Outline Construction Traffic Management Plan has been prepared by Paul McGrail Consulting Engineers and is submitted with the planning application.

2.7.3 Demolition

The proposed development includes the demolition of 2 no. existing agricultural farms sheds and associated structures and the removal of the existing GAA pitch and associated structures.

2.7.4 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.

- Existing topsoil is to be removed over the extent of the proposed Berm area and excavation of subsoil material is to a minimum depth of 500mm below existing ground levels.
- Suitable clay material to be imported to the site (or use of site-won clay material following testing of material to confirm permeability requirements).
- The Clay material is to be placed and compacted in layers greater than 250mm thick by the contractor.
- The Berm is to be shaped to have a slope no greater than 2:1 and to maximum height as indicated on the proposed Berm Detail and associated project Flood Risk Assessment.
- 200mm topsoil to be placed on top of clay material to allow for grass seeding in accordance with landscape requirements.
- The topsoil of the existing Berm is to be removed and stored on site adjacent to the works.
- The existing Berm is to be reduced to 200mm lower than the existing surrounding ground levels. Excavated material is to be removed from the site.
- The topsoil is to be reused and placed over the removed berm location and grass seeding in accordance with landscape requirements.

2.7.5 Construction Sequencing and Phasing

The proposed development comprises the third phase of residential development by Marina Quarter Ltd at Dunboyne North and this third phase will be constructed in two phases – Phase 3A and Phase 3B. Phase 3A comprises Cells 01 to 07 and the creche. Phase 3B comprises Cells 08 to 16.

The subject site is also located within Phases 1A, 1B and 1C of the Dunboyne North Masterplan Area.

2.7.6 Traffic Management

An Outline Construction Traffic Management Plan has been completed by Paul McGrail Consulting Engineers which notes that construction vehicle movements will be minimised by:

- Phasing works and delivery schedules
- Use of precast/prefabricated materials where possible
- Reuse on site of cut material generated by construction works
- Site storage
- Promotion of car sharing and public transport for construction workers.

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2.7.7 Construction Management Plan

A Construction Environmental Management Plan has been completed by Paul McGrail Consulting Engineers. This report outlines the site enabling works, the construction traffic and site access, the site logistics, the indicative construction methods, the health and safety environment, the work force, and the environmental management measures.

2.7.8 Site Services and Waste Management

Refer to accompanying preliminary Construction Environmental Management Plan prepared by Paul McGrail Consulting Engineers. Refer also to the Material Assets Service Infrastructure and Utilities chapter of this EIAR.

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CHAPTER THREE

PROJECT NEED & ALTERNATIVES CONSIDERED



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CHAPTER THREE

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CHAPTER 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 Deirdre Hargaden of John Fleming Architects (JFA). Deirdre Hargaden holds an Architectural Degree and is a Fellow of the Royal Institute of Architects of Ireland and has been trained in conservation methods to Grade 3 standard (BArch dip Arch FRIAI Grade 3 Conservation). JFA has carried out an Architectural assessment and been involved in the preparation of EIARs for the following projects:

- Bective Hotel and Demesne in County Meath.
- Mixed Use Scheme Omni Park Santry
- Bennetstown - Dunboyne residential application Phase 1.
- Bennetstown - Dunboyne residential application Phase 2.

3.3 Proposed Development

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

3.3.1 Aspects Relevant to this Assessment

The subject site is located within the townland of Bennetstown to the north of the defined development boundary of the town of Dunboyne. The site is located c. 2.3 km to the north of the town centre and situated west of the Dunboyne to Clonsilla Rail Line and M3 Parkway rail station, west of the Royal Canal and the Dublin-Maynooth Railway Line and west of the R157 (to Dunboyne). The site is accessible via the R157 which is located at the east of the site.

The area surrounding the site is currently characterised by predominantly agricultural uses. However, the site is located within the MP22 masterplan area where several earlier phases of development have recently been granted planning permission, including Phase 2 which is an integral part of the design of Phase 3.

Phase 2, a residential development comprising 309 no. residential units and a crèche, was permitted by Meath County Council (MCC) to the north of the site (MCC ref. 24/60805) on 15/11/2024. Phase 1 residential development comprising 267 units was granted to the east of the site on 20/11/2024. In addition, a single storey commercial unit was permitted to the east of the site (reference: 23/60065). Three office buildings were permitted to the north of the site (reference: 23/424), and appealed to An Bord Pleanála (reference 320091). There is also a strategic infrastructure development (SID) for an East Meath – North Dublin Grid Upgrade project consisting of approximately 37.5 kilometres of new 400 kilovolt underground cable circuit running along the R157 regional road (ABP Ref. No. VA06F.31942).

3.4 Methodology

3.4.1 Relevant Legislation & Guidance

This EIA Report has been prepared in accordance with the requirements of EIA Directives (2011/92/EU and 2014/52/EU). It is prepared in the Grouped Format Structure following the guideline structure set down in the Environmental Protection Agency (EPA) “Guidelines on the Information to be Contained in Environmental Impact Assessment Reports” (2022).

The “Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment” (August 2018) and the European Commission Guidance on the preparation of the Environmental Impact Assessment Report have been considered in the preparation of the EIA report.

3.4.2 Site Surveys/Investigation

JFA has used the following disciplines to inform their design layout of the scheme:

- Measured Site survey.
- Arborist Survey.
- Aquatic Report.
- Bat Survey.
- Badger survey.
- Bird Survey.
- Proposed New Link Road layout.
- Flood survey.

3.4.3 Consultation

The Applicant and the Proposed Development project team have liaised with the relevant departments of MCC in advance of lodgement of this application. A Section 247 meeting was held online with MCC on the 23th of September 2025. A Section 32B meeting was held on the 16th of October 2025. Officials from MCC and members of the design and developer team attended. Several specific issues, concerns and suggestions were raised during this meeting and further details regarding how they have been implemented into the design are provided in the Architectural Design Statement which is part of the Planning Application documents. The issues and concerns raised informed the progression of the design and layout.

3.5 Difficulties Encountered

There were no significant difficulties encountered while compiling information for this EIAR chapter.

3.6 Project Need

There is a housing crisis in Ireland, and this site is well serviced being beside the M3 Parkway Station and part of the greater Dublin catchment area. The train takes 38 minutes to reach Dublin city centre Connolly station. The site is just off the M3 motorway and the R157 leading to Dunboyne and Maynooth. It is beside Dunboyne town. The Site is zoned **A2 New Residential Land Use** as an objective of Meath County Council which recognises the residential need in the area. The current project is phase 3 of a masterplan promoting a live/work mixed use surrounding the train station. Particularly in light of the housing shortage, it is imperative that this site, which meets all relevant criteria, should be developed.

3.7 Baseline Environment

The site is zoned A2 New Residential Lands which will benefit future residents being directly beside a neighbourhood centre, just north of Dunboyne town centre, the M3 Parkway Station and 1200 park-and-ride carparking spaces.



Figure 3.1 Site Ownership and Zoning Lines. (The blue line on the left-hand map denotes zoning lines and developable area. The red line on the right-hand-side map shows the full red-line boundary of the works.)

The site is a part of a greenfield site situated 2.3 km north of Dunboyne town centre and 0.75 km from the Pace Interchange Junction 5 on the M3. The actual developable area of this site is 7.13 Ha. The site is primarily zoned A2 New Residential and is site 2A of the masterplan MP22 Version 1 in the Meath County Development plan 20 21- 2027.

It is situated south west of the current roundabout entrance to the train station. The topography is mostly flat with a gentle decline south eastward towards the R157. The overall site development area (shown above) includes links to Irish water, foul drainage and road upgrades.

The site is currently in pasture and is bounded to the west by pasture and one private house; to the north by water courses draining the fields which are lined with trees and hedgerows; to the south by Kennedy Road; and to the east by the R157 main road into Dunboyne. A new road layout is planned on the north side of the Phase 2 site entering the office development which has achieved planning (Reg Ref; 23/424). The main entrance will be off the R157. The roundabout is being changed to a signalised junction into the M3 Pace station parkway.

On the east of Phase 2 a retail development was permitted facing the new junction and the R157 (Reg Ref 23/60065).

There are no visible archaeological monuments on the site nor are there any ESB overhead cables. However, the geophysical investigation at Bennetstown and Dunboyne townlands identified a number of sites of archaeological and potential archaeological interest. This is contained in the geophysical report by Ger Dowling dated 17 03 24 (included in appendix 15.4 of this EIAR).

3.8 The ‘Do nothing’ Scenario

In the event that the Proposed Development does not proceed, the specific need for this residential development would still exist for the site, and as such the Proposed Development would need to be built elsewhere. The implementation of the masterplan to create a new residential and commercial community on underutilised lands between the M3 Parkway Station and Dunboyne town centre has already commenced with the issue of the Meath County Council Masterplan MP22 in late 2022. Three commercial office buildings on lands zoned E3 within the Masterplan have been permitted to the north of the site (MCC Ref; 23/424)..

The land is primarily zoned ‘A2- New Residential ’ within which mixed-neighbourhood facilities are permissible. Consideration of an alternative location would equate to a ‘do-nothing’ alternative for the subject site. The lands would remain underutilised farmlands and would not maximise upon the development potential of the site. The status of the environmental receptors described throughout this EIAR would be likely to remain unaffected.

According to the Meath County Council (MCC) Development Plan 2021-2027 and the Masterplan Plan MP22 Version 1, it is an objective for Dunboyne North that proposals for the provision of residential units in a range of densities to support the delivery of a sustainable “live work” community-based model.

As such, it is considered that this development will support the A2 New Residential land use objective of Meath County Council.

3.9 Alternative Project Locations & Alternative Uses

As noted in Section 4.13 of the 2018 Guidelines “some projects may be site specific so the consideration of alternative sites may not be relevant.”

We also refer to the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA. 2022), which states that in some instances alternative locations may not be applicable or available for a specific project which is identified for a specific location.

In the first instance, the Proposed Development is in accordance with the zoning and other relevant policies and objectives of the current MCC Development Plan 2021 – 2027 and the Masterplan MP22. The site is zoned as ‘Zone A2 New Residential – To provide for new residential communities and ancillary community facilities, neighbourhood facilities as considered appropriate.’. The masterplan for Bennetstown provides a variety of Zones to allow for a diverse mix of uses, such as Zones C1 (Mixed Use), E3 (Warehousing and Distribution) and F1 (Open Space), along with A2 (New Residential). This will allow a diverse community to develop. Therefore, the Proposed Development represents alignment with the zoning goals of A2 – and will be the catalyst to initialise the development of the masterplan.

Having regard to the site-specific nature of both the Proposed Development and future developments, further consideration of alternative site locations is not considered essential in respect of the EIAR legislation and guidance.

Given the current zoning of the site, the surrounding proposed land uses, the future proximity to similar associated developments, and the future availability of necessary services and infrastructure, the Proposed Development is the most appropriate use for the site.

3.10 Alternative Designs/Layouts

Both the context and approach to the site of the proposed development, and the emerging design rationale have been subject to consultation with Meath County Council (MCC). The Statement of Consistency prepared by McCutcheon Halley Chartered Planning Consultants, in conjunction John Fleming Architects (JFA), Ilisa Rutgers Landscape Design and Paul McGrail Engineers on behalf of the applicant/developer notes that the proposed development will provide an appropriate form of high-quality residential development, which is consistent with all planning policy framework, for an effective and efficient use of this highly accessible and under-utilised site.

A number of alternative layouts were considered for the proposed development. Ten of these are detailed below, including the three lodged plans (for the S247 meeting, the 32B meeting and the final Planning Application).

3.10.1 Alternatives 1 & 2



Figure 3.2 Alternatives 1 & 2 Design Concept (JFA 2025)

Two sketch schemes were explored before developing the preferred option.

Alternative 1 shows phase 3 as part of the entire site, i.e. including phase 2 as they needed to be master planned together. The ecological hedgerow corridor has been continued by creating green spaces and planting trees that link back to the trees along the R157. Three equally proportioned large open spaces were considered an attractive feature to the design. However, this meant there was no hierarchy of open space, and the design became more grid-like.

The entrance off the main R157 road crosses to lands to the east via a proposed new link road to Dunboyne. The crèche was positioned to the south of the site beside the main 157 road.

Alternative 2 is similar to Alternative 1, continuing the hedgerow corridor within the open space. The public open space is spread throughout the site with a central welcoming area accessible from the main entrance off the R157. The F1 zoned lands of open space is taken advantage of by housing and the crèche facing directly onto it. The two main entrance roads have been planned and included as part of Phase 2.

Alternatives 1 and 2 were further modified to create Alternative 3. A concept sketch is shown below for the preplanning meeting S247.

3.10.2 Alternative 3 – lodged for 247 meeting



Figure 3.3 Alternative 3 (JFA 2025)

This scheme above was presented at a Section 247 meeting with various departments from Meath County Council on the 23rd of September 2025. Following this consultation the scheme underwent a series of positive improvements and refinements and a number of changes were made to the proposal to reflect the suggestions from the Local Authority.

The main issues raised were the following;

- 1. **Density:** The 48 Units /Ha. It was noted that the Compact settlement guidelines look for higher densities on sites like these.
- 2. **Masterplan:** Compliance with the current masterplan to be demonstrated in terms of linkages to other parts of the masterplan. Clarify connectivity to neighbouring uses and make sure the red line is consistent.
- 3. **Urban Edges:** Boundary edges to be visible in relation to the R157 main road, new link road and Kennedy Road to be reinforced with active surveillance. Create future connections to other zoned lands on the west. E1 / E3 Strategic employment zones. Clarify the boundary treatment to the north office development.
- 4. **Open Space and site layout:** Usable open space is required where attenuation and swales are situated.
- 5. **Site layout:** Provide bookends throughout the site along with true activation of corner units (windows are not enough). A mix of house styles, sizes and design required. Character area document required. Place maisonettes back-to-back. Additional heights at edges are welcome.
- 6. **Pedestrian access;** Links through the site and public spaces to be detailed, especially cycle access. Linkages to Dunboyne and the train station
- 7. **Parking;** To be designed according to the development plan guidelines, include EV parking

3.10.3 Alternative 4 – after 247 meeting on 26/09/2025

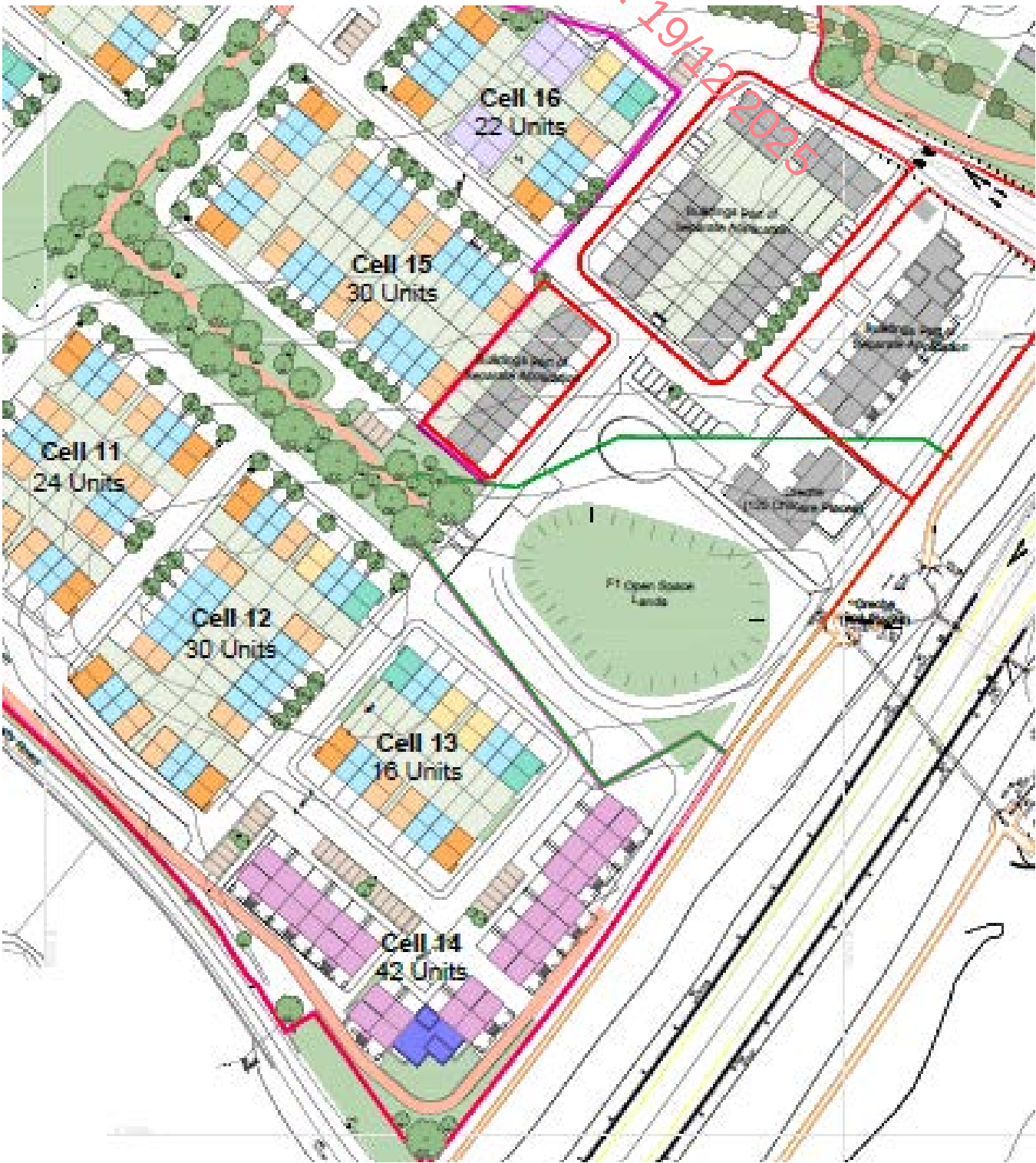


Figure 3.4 Alternative 4

After the S247 consultation with Meath County Council, alternative 4 explored the density formation of an urban edge using 3-storey terraced duplexes facing onto the main R157 road to Dunboyne, on the corner of Kennedy Road at the underpass, and it also addresses the comments from MCC at the S247 meeting. It shows larger blocks lining the edge of the R157 to act as an urban edge and landmarks. Three-storey houses create vistas within the scheme. Back gardens were pulled away from the neighbours' boundary Kennedy Road, and instead a road separates the scheme from the existing dwelling.

Alternative 4 also creates character areas around open spaces with pathways and bike links through new landscape areas, back to the main cycle path and to the train station off the R157.

In both schemes, the main open space remained central and link to other open spaces via footpaths, bike paths and new landscaped routes. Houses address open spaces for passive overlooking, and connectivity permeability was created by cycle paths and footpaths to the train station and retail.

The crèche remained in its original position to take advantage of and provide passive surveillance of the F1 open space lands.

After consultation with the design team, the creation of further maisonettes forming an urban edge to the Kennedy Road emerged as the preferred option. This option was further developed to the final site layout for the 32B presentation.

3.10.4 Alternative 5 – Lodged for S32B Meeting



Figure 3.5 Alternative 5 (JFA 2025)

A Section 32B meeting took place online between Meath County Council and members of the design and developer team, in order to present the above design concept to the Planning, Transportation and Roads departments.

Several specific issues were raised, and constructive criticism was provided by the Meath County Council. Alternative 5 site layout was presented to encourage connectivity and permeability for both pedestrians and cyclists. The layout of the houses creates an articulated community through its series of tree-lined streets and pocket parks and amenity/open space areas. This is further highlighted through the pedestrianisation between neighbourhoods, and the open space and amenity trail which has been provided along the existing and proposed hedgerows and landscaping.

The proposed development provides a connected and sustainable community that brings passive surveillance and accessible amenity areas within the site. The houses are protected by an urban edge of 3 and 4-storey duplex apartments and 3-storey terraced houses which continues around the site facing the mixed-use E1/3 zoned land. A suitably scaled 4-storey duplex apartment block addresses the junction on the R157 main road to Dunboyne and acts as a marker building of the scheme.

There are a series of open spaces interwoven throughout the proposed scheme, retaining as much of the original hedgerow as is viable. Pathways are designed under tree canopies and face the R157 and the new zoned E1/3 link road, which is overlooked by the new development. The recreational requirements were carefully considered during the design and layout of the open spaces associated with the proposed development. The open spaces are defined and overlooked by the built elements to provide passive surveillance, whilst shared surface-access roads and raised tables facilitate safe and convenient access for future residents. The design takes into consideration a road safety audit. Road safety measures were incorporated, including raised junctions and home zones.

This proposal goes into greater detail in terms of street design, including refuse storage & bicycle parking for mid-terrace units, passive surveillance for the public domain, boundary treatments and crèche design & capacity calculations.

The crèche is also perfectly placed to avail of the F1 zoned open space and is within easy access off the R157 into Dunboyne, and on foot via new pathways and bike lanes parallel to the R157 to the railway station and the proposed office development on E1/3 zoned lands.

Alternative 5 provides a mix of housing types with immediate access to amenity areas and walkways/cycleways that connect to the neighbouring communities. In this option, the house type range was reviewed for constructability and the following finalised house types were selected:

- 1 Bed Maisonette
- 1 Bed apartment
- 3 Bed Duplex/ apartment
- 2 Bed Mid Terrace
- 3 Bed end of terrace (Corner)
- 3 Bed End Terrace
- 4 Bed Semi Detached
- 3 Bed Duplex terraced dual frontage



Figure 3.6 Views to F1 Lands Open Space (JFA 2025)

The proposed dwellings are orientated to overlook the open spaces and create passive surveillance for these areas. The duplex units create the urban edge to the site and will complement the overall development.

In response to the S 247 comments, the 32B scheme was refined as follows:

1. Density; The density has been increased from 48 units/Ha to 50 units/Ha.
2. Masterplan; Adherence to the masterplan has been demonstrated by phasing the scheme from the north of the site and through bike and pedestrian connectivity to the neighbouring residential, retail and train station across the main R157 thus creating permeability as requested in the masterplan of the entire area.
3. Urban Edge: Higher properties, at a greater density, now address the corner of the R157 and the Kennedy Road. A new terrace of three-storey duplex apartments faces the R157; the entirety forms a new urban edge leading into Dunboyne.
4. Open Space: The cycle and pedestrian pathway is continued along the F1 lands and the R157 towards Kennedy Road and turns into the site home zones on the corner which creates permeability within the scheme. A new linear park has been formed within the site linking the existing hedgerow on the west of the site back to the hedge- and tree-lined R157 main road thereby completing a walkway and ecology loop. All open spaces are now accessible. The key concept is that the open spaces are interwoven throughout the proposed scheme retaining as much of the original viable hedgerow as possible.
5. Site Layout: A variety of building treatments have been created with the 3 and 4-storey elements framing the two main entrances and large green spaces, thus creating an urban edge and aiding wayfinding within the site. The houses now follow the orientation of the hedgerows and Kennedy Road, creating their own focal points and adding to their distinct character areas. Each housing area is differentiated by the element it overlooks, whether a hedgerow or open space; this will provide good legibility and a sense of place. The creation of a new linear park in phase 3, linking the existing hedgerows to the R157, completes an ecology loop.
6. Pedestrian and cycle access: The design of the pedestrian and bike ways are key to the development of the scheme. They are not only on the site perimeter, but interlaced within the hedgerows they create an instant visual interest and activity throughout the site. It is intended that there will be a loop walk within the site, which in turn will connect to the pedestrian crossroads to the train station, retail and crèche across the R157 Road.

7. Parking: Parking has been provided for the apartments at a ratio of 0.5 to 1. All other parking is in curtilage or to the sides of the maisonettes and duplexes. Some visitors parking has also been allowed for.

3.10.5 Notice of LRD Opinion, Section 32B

On the 16th of October 2025, a Notice of LRD Opinion was issued based on the S32B Design submittal. The main 32B Opinion Architectural requests were the following:

1. Density: A minimum of 50 UPH has to be achieved. Address density throughout Phases 1,2 and 3.
2. Masterplan: The applicant shall demonstrate that the proposal accords with the approved Masterplan MP22. Including Phasing in particular. Provide a strong urban edge and increase densities through the provision of duplexes/ apartments at key focal points along the site boundaries.
3. Design issues: There must be visual interest within the site, key focal points, character areas for placemaking/ providing a sense of place, etc. A variety of building types and heights, hard/ soft landscaping finishes are required, and the massing, scale and form of the proposed development must be appropriate to the site. There must be a flexible mix of housing sizes, types and design. High quality designs with a mix of high-quality finishes are required within the proposal. Stairs on the duplex apartments must be less dominant. Interface with existing residences on the west to be considered.
4. Connectivity / Permeability: The applicant shall demonstrate that the proposal integrates with its surroundings and there is a high level of connectivity and permeability through and around the site to facilitate sustainable travel and movement.
5. Open space: This must be usable and not limited to pocket parks and should be located where the maximum number of residents can benefit from it.
6. Character areas: These should be differentiated. There should be aspects of the design which link the houses, duplexes, apartments and the crèche so that there is an overall coherent development. Care is required to ensure that the proposal is legible for future occupants and visitors to the housing development. The applicant is advised to propose sub-character areas within the development, and to enhance legibility within the scheme surroundings. The applicant must differentiate between those in Phase 2 and 3.
7. The residential units should be designed to ensure there is a good mix of tenure, that there are dual-aspect structures, that dual-frontage design is presented at junctions, that blank walls are avoided at key locations and that there is a strong roadside presence (road/ street frontage). Variety is required.
8. Active frontage: Throughout the scheme, active frontage must be enhanced.
9. Building height: It is advised that the height of the structures at the end of some of the housing blocks could be raised to frame the cell and create greater visual interest in the scheme. The applicant should consider the opportunity to deliver higher structures at key locations within the development (along the outer perimeter; and within the scheme to enhance wayfinding, particularly in the context of the merger of this phase with Phase 2).
10. Bin/bicycle storage: The applicant must provide separate bin storage structures to the rear of the apartments/ units off the R-157 and northern link road, and main entrance to the site where relevant.
11. Separation distances: The applicant is advised to consider the separation distances within the proposed housing cells and seek to minimise the impact on privacy, etc. The applicant is advised to ensure that required separation distances are adhered to as per the Compact Settlement Guidelines 2024
12. Boundary Treatments: Open plan layouts at the front of dwelling houses are not acceptable. The crèche must also have secure play areas. Front boundaries shall be defined by walls or fences at least 0.5 metres high in keeping with the house design and to a uniform scheme design. Boundaries between the rear of proposed dwellings and boundaries within the development shall be a minimum of 1.8 metres high and shall be constructed as capped, rendered concrete block or brick walls, to ensure privacy, security and permanency.
13. A public open space of with kick around activities is absent.
14. Childcare Provisions: The applicant must address childcare requirements in the application with reference to Parking, set-down areas, outdoor amenity space, waste management facilities, pedestrian/ cycling access must be addressed.
15. Housing: Part V- 10%, Universal Design 15%- 30%.

3.10.6 Alternatives 6 and 7 – Development of the Urban Edge along the R157 road to Dunboyne



Figure 3.7 Alternatives 6 and 7 – the Development of the Urban Edge Along the R157, and Marker Building Options Addressing It.

The above 3D figures represent the design and completion of the corner junctions on the R157 and the Kennedy Road junction. Alternative 6 continued the duplexes along the R157, but did not address the corner at Kennedy Road.

Alternative 6 mirrored the duplexes in Phase 2 which frame the main entrance to the scheme off the R157. Option 7 therefore provided a bookend between the corners by housing the four-storey apartment blocks on the corner of Kennedy Road.

The main entrances in Phase 2 were also redesigned with higher apartment duplexes at their entrances, as shown below.



Figure 3.8 Main Entrance to Site off R157

3.10.7 Alternatives 8 and 9 – Following the Section 32B Meeting

Following the 32B meeting, the design team complied with a request from Meath County Council for the provision of a kick-about space. The area in front of cell 05 was suggested but this was being used for SUDS. The open space in front of cell 09 was enlarged to provide a kickabout space.



Figure 3.9 Post S32B Alternatives 8 and 9 (JFA 2025)

3.10.8 Character Area Alternatives Lodged for S247 and S32B Meetings

On the 11th of October 2025 a notice of LRD opinion was issued by MCC, after the meeting. One of the design issues raised was:

There must be visual interest within the site, key focal points, character areas for placemaking/ providing a sense of place, etc. A variety of building types and heights, hard/ soft landscaping finishes are required, and the massing, scale and form of the proposed development must be appropriate to the site.

Several studies took place during the design process looking at different building scales surrounding the open spaces within the scheme, and making sure that prominent buildings address the open spaces so as character areas are created. Having the existing hedgerow rippling through the new scheme added instant maturity to the scheme and naturally created a placemaking marker. The newly created public open spaces and hedgerows link into the existing hedgerows and close the ecological loop to the existing tree-lined R157, the main road to Dunboyne.

The character areas developed through each submission to the county council. Starting with the S247 presentation, a key tool was to incorporate the existing and proposed landscaping into open spaces, and they either ran through them or formed a backdrop, see below. 2-storey houses and side entry houses overlooked all green areas, offering passive surveillance.



Figure 3.10 – Lodged for S247. A 3D showing open space surrounded by houses with hedgerow as a backdrop.



Figure 3.11 - Lodged for S32B. A 3D image showing houses overlooking existing hedgerows, and house mix to create placemaking markers in open spaces.

The presentation for the S32B meeting expanded on the initial concept for character areas and showed taller houses overlooking large open spaces thus creating placemaking markers so as people can navigate through the scheme. Hedgerows enhance open spaces; it was a design criterion to have all houses overlooking the existing hedgerow to establish an instant sense of place.

3.10.9 Development of the Housing Mix Strategy

A further study concentrating on the housing mix was developed in 3D. The objective was to obtain a flexible mix of housing sizes, types and design within the scheme so as to create different sub character areas and create markers to navigate around the site.



Figure 3.12 The 3D Development of the Housing Mix.

Fig 3.12 shows how the higher corner buildings act as markers and the duplex apartment mix stepping down to lower houses with the higher marker building in the distance. The 4-storey duplexes either side of the main entrance heralds the scheme entrance from the R157 main road.



Figure 3.13 Development of Placemaking.

Fig 3.13 shows how the terraces are punctuated with 3-storey marker buildings at block ends stepping down to 2-storey terrace of houses. The overall massing and scale provide a sense of place.

Another character area is surrounding the creche where it addresses a communal open green space at its entrance, and sits within the F1 lands surrounded by open space. The building itself has been redesigned so as to sit more prominently within the site, with a more prominent entrance and private play spaces.



Figure 3.12 Development of Passive Surveillance

The above figures shows the different design methods employed to create passive surveillance by using duals-aspect units at the end of terraces and duplex units, thus ensuring all public paths/throughfares are overlooked.



Fig 3.13 New Creche Elevations

The creche has been expanded in Phase 3 to cater for all children in Phase 2 and 3. This is via a single storey special needs room.

3.10.10 Alternative 10 – Final Layout, Resulting from Section 32B meeting.

This final scheme shown in Fig 3.14 has developed since the Section 32B meeting and has taken cognisance of the opinion issued by Meath Co. Council on the 11th of November 2025, as well as the character area studies shown above in section 3.10.8 and 3.10.9. There are 3 well distributed public open spaces amounting to 23.50% within the gross site area with the overall POS being 18.80% in Phase 2 and 3 , which generate their own character areas and provide passive surveillance. A selection of different types of accommodation surrounds them which create a sense of place which have good legibility and a strong urban edge. Structures addressing the R157 are dual frontage and are in scale with the urban parkway and road they face. High quality finishes and the theme of finishes are constant throughout the project, including a range of houses, apartments and the creche as well. Pedestrian and cycle access has been allowed for along the R157 and into the park and ride for the train station as well as pedestrian links into the C1 retail zoned lands and E1/ E3 Strategic employment zones. Communal, accessible, and bike parking have been catered for and boundary treatments have been clarified by the Landscape design

This final layout ([alternative 10](#)) provides a mixture of housing types addressing the live-work community objective with immediate access to amenity areas, walkways and cycle ways that connect to Dunboyne.



Fig 3.14 Alternative 10 – Final Lodged LRD Planning Application.

In summary the response to the S32B LRD Opinion the scheme was refined to the following:

1. Density: A minimum of 50 UPH has been achieved by Phase 3, Phase 2 (52UPH). Including Phase 1 (51.5 UPH) the average UPH is 51 UPH.
2. Masterplan: The proposal integrates with its surroundings by creating clear road, pedestrian and bike links between the proposed and the railway station and the future retail and office developments and the proposed residential developments via new link roads connections.
3. Design issues: Visual interest is provided by way of the creation of parks and the existing hedgerow weaving through the site. Key focal points, character areas and placemaking are provided by way of using height at corners of entrances to different areas within the scheme. An urban edge is created by using different building massing along the main R157 road to Dunboyne. A flexible mix of high-quality housing design types, sizes, and finishes have been provided within the proposal.
4. Open space has been evenly distributed using the existing hedgerow as the anchor for all new parks to spring from so as all residents can benefit from it.
5. Character areas have been provided using the markers such as the higher apartments, duplexes, the 3-storey houses and creche to create placemaking. There are four character areas naturally formed by the existing hedgerows. The designs of the houses are mixed but use the same materials in different forms and colour giving an overall coherent development
6. The residential units have been designed to ensure there is a good mix of tenure, that there are dual aspect structures, dual frontage design presented at junctions, an avoidance of blank walls at key locations and there is a strong roadside presence (road/ street frontage).
7. Active frontage: Throughout the scheme, active frontage has been enhanced at main entrances to the scheme, along the cycle lane parallel to the R157 and overlooking hedgerows. It was a design decision that many houses overlook the existing hedgerow so as the enjoyment of the maturity of the landscape can be shared with as many units as possible.
8. Building Height: Height of the structures at the end of some of the housing blocks have been raised to frame the cell and create greater visual interest in the scheme. Especially along the R-157 and Kennedy Road where a 4-storey apartment block has been placed stepping down to 3 storey duplex units which address the main corner on the R157 to Dunboyne. A continuous street edge has been created along the R157 entrance to Dunboyne with the use of 3 and 4 storey structures, providing key focal points of visual interest. These units are a continuation and completion of the urban edge treatment on the R157 on Phase 2 and Phase 3..
9. Bin/bike storage: These have been provided throughout, including Bulky storage within the ground floor of the apartments, to the rear and front of the duplexes and within the curtilage of the house units. of the apartments/ units off the R-157 and northern link road.
10. Separation distances: The 16 m separation distances within the proposed housing cells have been adhered to, as per the Compact Settlement Guidelines 2024.
11. Boundary treatments. Bike and bin stores and planting have been used as tools to avoid open plan layouts at the front of dwelling houses. The crèche has a secure play area bounded by a hedge and fence. Boundaries between the rear of proposed dwellings and boundaries within the development are a minimum of 1.8 metres high and shall be constructed as capped concrete block or brick walls, to ensure privacy, security and permanency.

12. A public open space kick about area has been provided by enlarging the open space in front of cell 09.
13. Childcare provision: Childcare requirements such as Parking, set-down areas, outdoor amenity space, waste management facilities, pedestrian/ cycling access are all addressed.
14. Housing: Part V, Universal Design is also addressed.

The following are the unit types provided:

- 1 bed maisonettes
- 1-bed duplex apartment
- 3-bed duplex
- 2-bed mid-terrace house
- 3-bed end-of-terrace house
- 4-bed semi-detached house
- 136 - person crèche

3.11 Alternative Flood Risk Management

The proposed residential development is located adjacent to an area designated as at risk of pluvial flooding. The proposed link road crosses an existing fluvial flood zone and as part of the development and as outlined in the LAP a new road and associated bridge over the river Tolka is to be constructed within the Flood Zone. A Stage 3 Flood Risk Assessment has been carried out to determine the quantitative analysis of potential pluvial and fluvial flood events, the impact the proposed residential development, road and associated bridge would have on the flood events and mitigation measures required to ensure no increase in flood risk.

A large number of assessments were carried out to determine different scenarios in relation to alternative measures required in relation to the road bridge including a review of the span of the proposed bridge over the river Tolka ranging in span from 8 meters to 35 metres. The final and most efficient design is for a 33.75m span bridge. While the 33.75m span bridge is sufficient in size to accomodate the flow within the Tolka without having to undertake works within the river, the out of bank flooding required flood mitigation measures which includes and additional 3 bridge spans to the west of the Tolka River. These spans are 29.45m, 29.70m and a skewed span with minimum length of 24.07m and maximum length of 32.825m

Refer to the IE Consulting Flood Risk Assessment Report for further information

3.12 Alternative Mitigation

For each aspect of the environment, each specialist has considered the existing environment, likely impacts of the proposed development, and reviewed feasible mitigation measures to identify the most suitable measures appropriate to the environmental setting of the proposed development. In deciding on the most suitable mitigation measure the specialist has considered relevant guidance and legislation. In each case, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction, and offsetting (not required in this development). Mitigation measures have also been considered based on the effect on quality, duration of impact, probability, and significance of effects.

The selected mitigation measures are set out in each of the EIA Report Chapters.

3.13 Alternative Processes

Due to the nature of the current proposal (i.e., a residential development greater than 100 dwellings) where the only option is to submit a large-scale Residential Development (LRD) planning application to the planning authority, it is not considered necessary to consider alternative processes for the proposed development.

3.14 Potential Significant Effects

Increased car usage and associated emissions are mitigated by providing alternative, sustainable transport options (i.e. walking, cycle, rail and public bus) and increased connectivity and permeable planned pathways. Increased hardstanding areas and associated flooding risk are mitigated by sustainable urban drainage solutions (SUDS) proposals.

3.14.1 Construction Phase

The environmental effects of the Concept Layouts differ in detail only. Each has a positive effect for human beings for reasons which are set out elsewhere in this EIA Report and are otherwise neutral in relation to human health. Each Concept Layout has generally similar moderate impacts on land and landscape, including removal of a small number of trees and hedgerows and culverting an open drain only where there are road and path connections through the hedgerow, but there will be additional planting. All options have a less significant effect on the setting as they retain the hedgerow. Added to this the addition of new planting and trees will invigorate the existing planting and biodiversity in the area.

3.14.2 Operational Phase

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 Dunboyne.

3.14.3 Cumulative Effects

All options have a slight effect on land and soil, as most of the areas for development formed part of grazing land. The preferred option has a slightly greater negative impact on biodiversity as it involves removing a small number of trees and hedgerow and culverting land drains. These will be replaced by new planting, as set out in the Landscape Design Report.

3.15 The Existence of the Project

The Construction Phase will last approximately three years. During the construction phase of the proposed development, there will be approximately a maximum of 100 construction workers at the peak of the construction works. Hence, 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 Dunboyne. 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

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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 14 Significant Interactions with cumulative impacts and interactions fully addressed in the relevant specialist Chapters of this EIAR.

3.16 Climate Change Preparation

The proposed scheme has been developed in consideration of future climate change impacts. The proposed construction 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 crèche has been conveniently located for the development and the wider area to reduce reliance on car trips. It is also connected to the park and ride by bike and pathways via 2 new junctions over the R157 for convenient drop off.

Existing mature trees and hedgerows have been retained and will enhance the new neighbourhoods and landscaped open spaces. Existing and new trees will facilitate shading in open spaces. The proposed surface water drainage strategy has been designed to reflect future expectations relating to climate.

3.17 Conclusion

Throughout the design evolution of the subject site, the advantages, and disadvantages of each early and alternative option 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 is the most appropriate scheme with the 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, near a built-up urban environment.

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CHAPTER FOUR

POPULATION & HUMAN HEALTH



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CHAPTER FOUR

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CHAPTER 4 | Population & Human Health

4.1 Introduction

This chapter of the EIAR assesses the potential impacts of the proposed development on population and human health that are not 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 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 6 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, Alternatives, and Population and Human Health chapters.

- Dunboyne Phase 1 Large Scale Residential Development, Dunboyne, Co, Meath
- Mullingar Phase 1 and 2 LRD, Mullingar, Co. Westmeath
- Parkside 5B Strategic Housing Development, Belmayne, Dublin.

4.3 Proposed Development

The full description of the proposed development is outlined in Chapter 2 ‘Site Location and project Description’ of this EIAR.

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.

For the purposes of this assessment impacts on tourism have been scoped as the proposed project comprises of a residential development in an area zoned for a mix of residential and employment uses and the site does not have any intrinsic tourism value and is not in proximity to any important tourism or amenity resources.

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 Study Area

The Study Area for the assessment of the potential impact on Population and Human Health comprises the Dunboyne (Meath) electoral division. The assessment of the local facilities is limited to Dunboyne town itself.

4.4.3 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 Censuses. The data included information on population, structure, age profile and household size, number of persons at work, and the unemployment profile. A desktop survey of the following documents and websites also informed this:

- Meath County Development Plan 2021-2027
- Dunboyne North Masterplan – MP22
- Central Statistics Office (CSO) website
- Department of Education website

4.4.4 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.

Meath Childcare Committee were also consulted in relation to the existing childcare capacity in the area. Phone surveys were completed with the primary and post-primary schools in Dunboyne to determine their capacity.

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 assessment of the effects on population and human health refers to those environmental topics under which human health effects may occur (e.g. noise, water quality, air quality, etc). Specific sections of this EIAR provide the baseline scenario relevant to the environmental effect being assessed.

4.6.1 Policy Context

The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region notes that Dunboyne is located on the North-West Strategic Development Corridor and prioritises sequential development of zoned and serviced lands near the railway station and town centre and at Dunboyne North/M3 Parkway Station.

The Meath County Development Plan 2021-2027 Volume 2 includes a written statement and maps for the settlements within the County. A statement is included for Dunboyne, Clonee, and Pace. This statement acknowledges the strategic importance of Dunboyne as the only entire town within Meath that is located with the Metropolitan Area of Dublin. Section 5.1 identifies Dunboyne North adjacent to the M3 Parkway Park and Ride as a primary area for population growth over the lifetime of the development plan. The lands in this area are zoned for employment, commercial, and residential uses and a masterplan has been by Meath County Council for the area (i.e. Master Plan 22 Lands at Dunboyne North).

In line with the Development Plan, the Dunboyne North Masterplan was prepared outlining a 'live-work', transport-based approach to the development of the masterplan lands. The subject site is included in Phase 1A of the masterplan lands. The masterplan identifies that c.500 no. residential units can be accommodated on the Phase 1 residential and commercial zoned lands.

4.6.2 Population

The Development Plan notes that the town of Dunboyne had a population of 7,272 in 2016, which was a 4.5% increase on the 6,959 population of the town in 2011. In contrast, Dunboyne Town recorded a population of 7,155 during the 2022 Census, a change of -1.6% since 2016.

The Development Plan projects that the town will have a population of 10,572 in 2027 and estimates that 2,002 no. housing units will be required for the town.

The population detail referenced in the Development Plan is based on the Dunboyne Settlement Area, as defined in the 2016 census. It is noted that the 2022 Town boundary for Dunboyne is different to the 2016 settlement boundary, as demonstrated in Figure 4.1 below.

The subject site is located outside both the 2016 settlement boundary and the 2022 town boundary, to the north. Therefore, for the purposes of this detailed demographic assessment the Dunboyne (Meath) ED has been used. This ED includes the subject site and the rural area surrounding Dunboyne area, therefore encompassing a larger population than the town and settlement boundary.

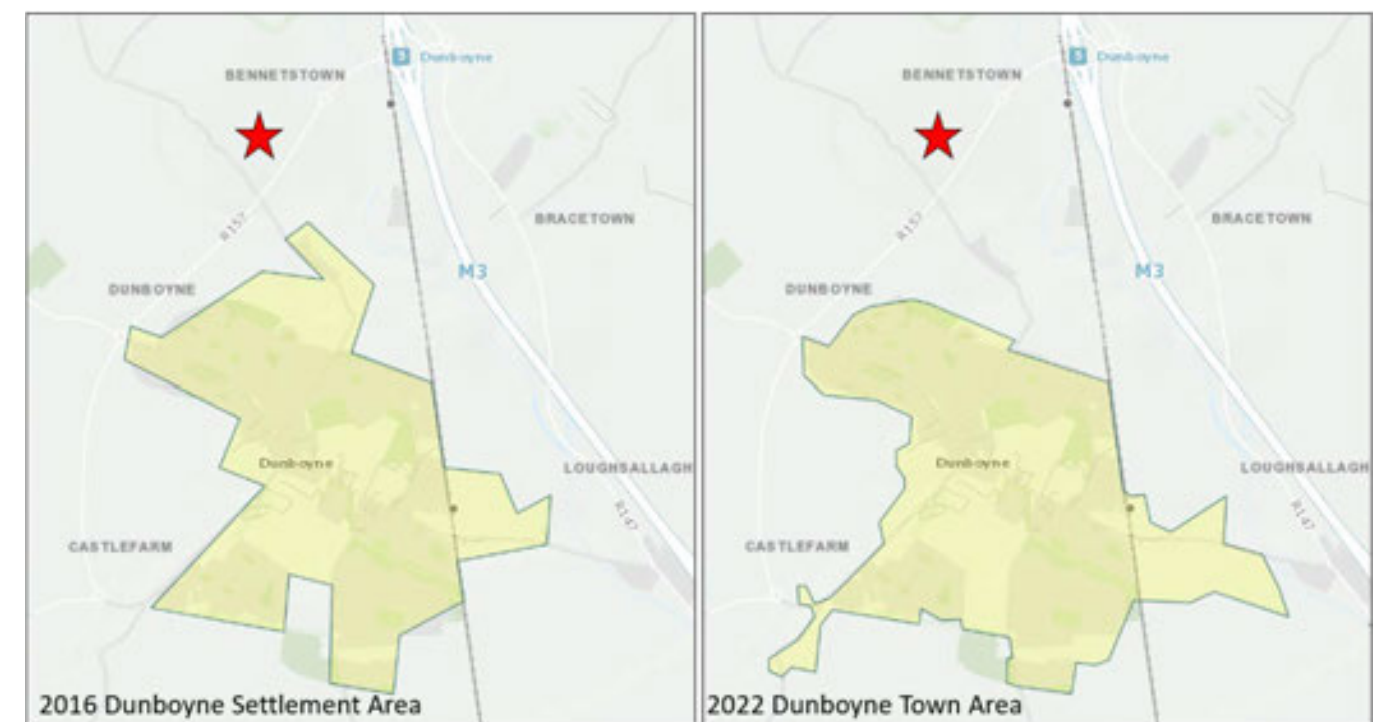


Figure 4.1 2016 Dunboyne Settlement Area, 2022 Dunboyne Town Area. Site location indicated by red star. Image Source: CSO Census Mapping

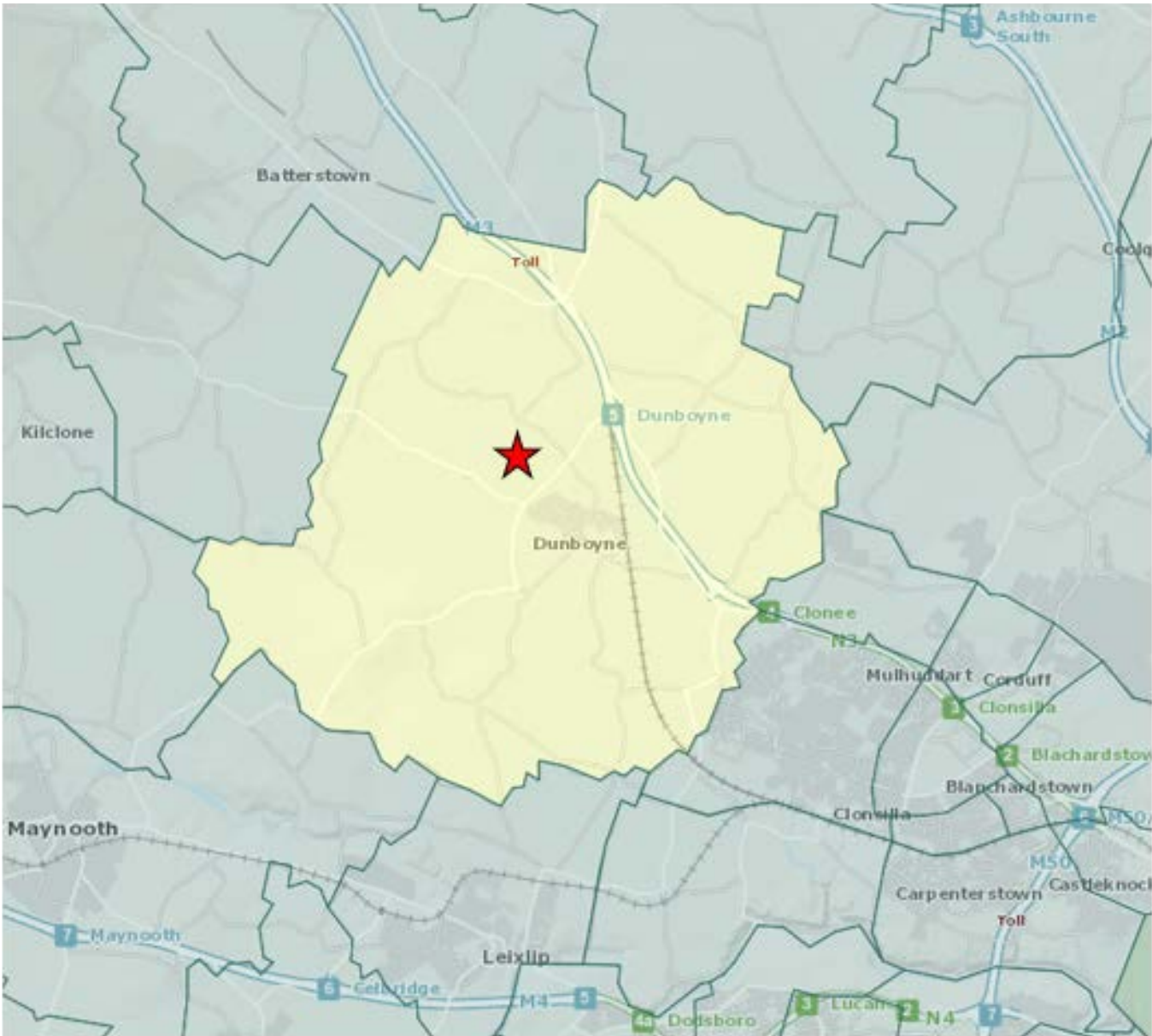


Figure 4.2 Dunboyne (Meath) ED area. Site location indicated by red star. Image Source: CSO Census Mapping

The Dunboyne (Meath) ED had a population of 10,698 in 2022. The population pyramid below demonstrates an even population profile with c. 8% of the population in age groups 5-9, 10-14, 15-19, 35-39, 40-44 and 45-49. There is a noticeable break in this trend with just c. 6% of the population aged 20-24, 25-29 and 30-34. This is seen in towns throughout the country and likely represents these age groups moving to larger cities for further education and employment. The population begins to drop off as the population ages to c. 6%-7% between the age groups 50-54, 55-59 and 60-64; the population continues to decrease after 65, however, c. 12% of the population are aged over 65.



Figure 4.3 Dunboyne (Meath) ED 2016 Population Pyramid. Source: CSO Sap Map 2022.

4.6.3 Households

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

The household type information demonstrates that 82.6% of households in Dunboyne are in houses and 17.3% are in apartments, a 1.5% increase from 2016 Census data. This represents 86% of the population living in houses and 14% of the population living in apartments. These figures demonstrate a growing trend as Census 2022 reflects a 2% increase of population living in apartments since 2016 and a 1% decrease of population living in houses.

In terms of occupancy, 92.3% of dwellings in Dunboyne were occupied on the census night and 1.5% were temporarily absent. The remaining 6.1% were vacant, representing a change of -1.9% since 2016.

In terms of the types of occupancy, 75.1% of households were owned (including those owned outright and those owned with a mortgage or loan) while 19.8% were rented (including those rented from private landlords, the local authority, and housing bodies).

In relation to household size, 25.4% households were 2 person households, 18.6% were 3 person households and 22.5% were 4 person households.

Table 4.1 Household Type. Source: Dunboyne (Meath) ED, CSO 2022

Household Type	Private Households	% Households	Number of Persons in Households	% Persons
House/Bungalow	2838	82.6%	9209	86.0%
Flat/Apartment	593	17.3%	1497	14.0%
Bed-Sit	1	0.0%	2	0.0%
Caravan/Mobile home	2	0.1%	3	0.0%
Total	3,434	100%	10,711	100%

Table 4.2 Occupancy Status. Source: Dunboyne (Meath) ED, CSO 2022

Occupancy	Number	%
Occupied	3,438	92.3%
Temporarily absent	56	1.5%
Unoccupied holiday homes	4	0.1%
Other vacant dwellings	227	6.1%
Total	3,725	100%

Table 4.3 Household Size. Source: Dunboyne (Meath) ED, CSO 2022

Household Size	Number of Families	% Families	Number of Persons	% Persons
1 Persons	528	15.4%	528	4.9%
2 Persons	872	25.4%	1744	16.3%
3 persons	638	18.6%	1914	17.9%
4 persons	773	22.5%	3092	28.9%
5 persons	409	11.9%	2045	19.1%
6 or more persons	214	6.2%	1388	12.9%
Total	3434	100	10711	100

Table 4.4 Type of Occupancy. Source: Dunboyne (Meath) ED, CSO 2022

Occupancy Type	Number of Households	% Households	Number of Persons	% Persons
Owned with mortgage or loan	1,358	39.6%	4,845	45.2%
Owned outright	1,221	35.6%	3,246	30.3%
Rented from private landlord	503	14.7%	1,644	15.4%
Rented from Local Authority	146	4.3%	449	4.2%
Rented from voluntary/co-operative housing body	32	0.9%	81	0.8%
Occupied free of rent	48	1.4%	99	0.9%
Not stated	124	3.6%	344	3.2%
Total	3,432	100.0%	10,708	100.0%

4.6.4 Employment

The Labour Force Survey provides details at a national level relating to employment and unemployment. The survey for Quarter 1 2024 demonstrates that the persons in the labour force has increased by 3.6% since Quarter 1 2023 and the persons unemployed has increased by 3.5% over the same period.

Table 4.5 Labour Force Participation and Unemployment Rates

	Q1 2023	Q1 2024	% Change
Unemployed persons aged 15-74 years	110,700	115,200	+ 3.5%
Unemployment Rate (%) (15-74 years)	4.1%	4.1%	
Persons in Labour Force	2,719,100	2,819,400	+ 3.6%
Labour Force Participation Rate (%) (15 years and over)	64.9%	65.0%	

61% of the Dunboyne (Meath) ED population were at work at the time of the 2022 census. 12.9% were students and 13% were retired with just 2.9% of the population unemployed.

Table 4.6 Economic Status. Source: Dunboyne (Meath) ED, CSO 2022

Economic Status	Male	Female	Total	% Total
At work	2806	2375	5181	61.0%
Looking for first regular job	22	25	47	0.6%
Short term unemployed	78	57	135	1.6%
Long term unemployed	66	45	111	1.3%
Student	545	554	1099	12.9%
Looking after home/family	47	499	546	6.4%
Retired	547	558	1105	13.0%
Unable to work due to permanent sickness or disability	110	107	217	2.6%
Other	18	35	53	0.6%
Total	4239	4255	8494	100.0

Based on the 2022 census, 38% of the Dunboyne (Meath) ED population were at work in Managerial and technical, 17.5% were in Non-manual work, 13% were in skilled manual work, and 11% were in roles as professional workers.

Table 4.7 Socio-Economic Status. Source: Dunboyne (Meath) ED, CSO 2022

Status	Male	Female	Total	% Total
Professional workers	646	533	1179	11.0%
Managerial and technical	1925	2142	4067	38.0%
Non-manual	727	1141	1868	17.5%
Skilled manual	940	446	1386	13.0%
Semi-skilled	416	450	866	8.1%
Unskilled	193	134	327	3.1%
All others gainfully occupied and unknown	506	499	1005	9.4%
Total	5353	5345	10698	100.0

The commute time to work, school or college for the majority of the Dunboyne population was less than 30 minutes in 2022 (c. 53%), with 27% of the population’s commute time under 15 minutes. This suggests that the majority of the location are attending school, college, and work locally. 18% had a commute time of between 30 minutes and 45 minutes and c. 8% had a commute time between 45 minutes and 60 minutes.

Table 4.8 Average Commute Time. Source: Dunboyne (Meath) ED, CSO 2022

Journey Time	Persons	%
Under 15 mins	1894	26.6%
1/4 hour - under 1/2 hour	1909	26.8%
1/2 hour - under 3/4 hour	1255	17.6%
3/4 hour - under 1 hour	540	7.6%
1 hour - under 1 1/2 hours	748	10.5%
1 1/2 hours and over	193	2.7%
Not stated	581	8.2%
Total	7120	100%

4.6.5 Community Facilities and Services

A Social Infrastructure Audit, School Demand Report, and Childcare Assessment were completed by McCutcheon Halley Planning and submitted with the application.

The Social Infrastructure Audit identified the educational facilities, childcare facilities, healthcare facilities, sports and recreational facilities, and social, community and faith groups.

In terms of healthcare, the audit found that Dunboyne is served by two health care facilities, three dentists, and four pharmacies. The majority of these are located within Dunboyne town centre with one pharmacy located in Dunboyne Business Park to the south of the site.

There are two community centres and one library with Dunboyne town centre, which provide a range of spaces for community groups and events.

There are 6 no. childcare facilities, four primary schools, and one post-primary school in Dunboyne. The following tables and figures provide details on the locations and capacities of these schools and childcare facilities.

The capacity of the childcare facilities and primary schools have been determined based on information available through Tusla Reports and the Department of Education. The capacity of the post primary school has been estimated based on observing the past six years of enrolment figures to identify the highest number of enrolment figures in order to gauge the capacity of the school.

Table 4.9 List of Childcare Facilities in Dunboyne.

	Childcare Facility	Distance from Site	Distance from Site by car	Capacity
1	Tiny Tots Montessori	1km	1.5km	11
2.	Small Steps	0.9km	1.8km	9
3.	Little Scholars Creche	1.3km	2.2km	86
4.	Little Scholars Pre-School and After School	1.5km	2.3 km	33
5.	The ABC Club	1.1km	2.5km	44
6.	Kidology Childcare	0.7km	3.1km	100
Total				283



Figure 4.4 Location of Childcare Facilities in relation to subject site (red star).

Table 4.10 Primary Schools in Dunboyne

	Primary School	Distance from Site	Distance from Site by car	2023/24 Enrolment	2024/25 Enrolment	Available Capacity
	St Peters National School	2km	2.5km	102	92	0
	Dunboyne Junior Primary School	1.6km	2km	451	419	0
	Dunboyne Senior Primary School	1.6km	2km	485	453	7
	Gaelscoil Thulach na nÓg	1.9km	2.3km	370	359	9
Total				1,408	1,323	16

Table 4.11 Post Primary Schools in Dunboyne

	Post Primary School	Distance from Site	Distance from site by car	2020/21 Enrolment	2024/25 Enrolment	Available Capacity*
	St. Peters College	1.7km	1.9km	1,235	1,227	8
Total				1,235	1,227	8
* Based on difference between enrolment figures of July 2020/2021 and academic year 2024/2025						

The Enrolment figures for St. Peter’s College for the academic year 2024/25 were not available upon contacting St Peter’s College. Therefore, the figures are based on the difference between enrolment figures of July 2020 and academic year 2024/2025.



Figure 4.5 Locations of Schools in relation to subject site (red star)

4.6.6 Land Use and Local Amenity

An Architectural Conservation Area (ACA) is identified within Dunboyne Town centre, c. 1.7km south of the subject site. There are 35 no. protected structures and several National Monument Services’ Zones of Archaeological Notification within Dunboyne. The nearest Natura 2000 site is the Rye Water Valley SAC which is c. 6km southwest of the site.

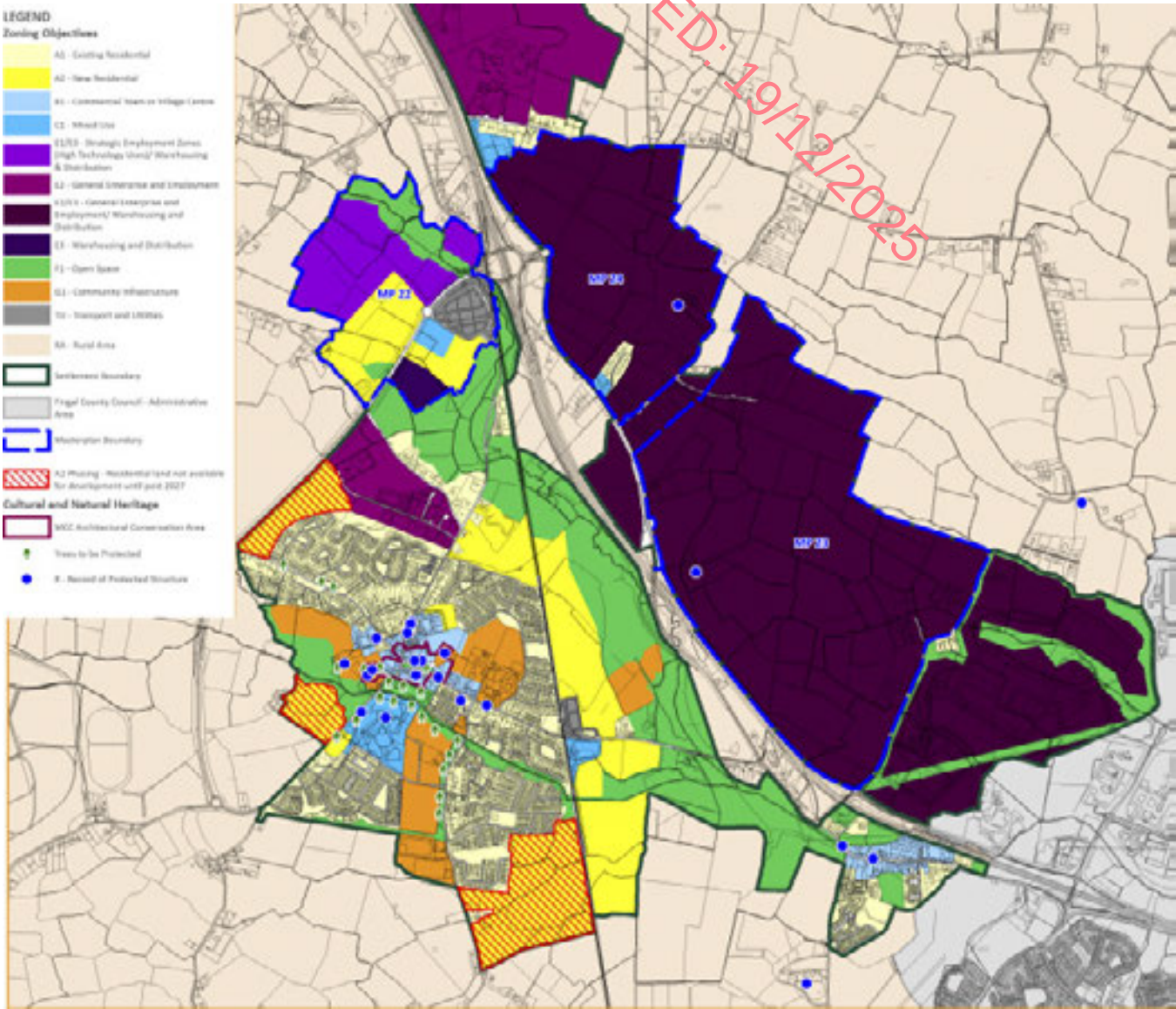


Figure 4.7 Extract from Dunboyne/Clonee/Pace Cultural and Natural Heritage Map – Sheet 13(b) Heritage from the Meath County Development Plan 2021-2027. Site indicated by red star.

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 Meath County Development Plan 2021-2027 and the Dunboyne North Masterplan 2022. If the development does not occur the zoning and objectives of the local planning policy will not be realised in the short term.

4.8 Potential Significant Effects

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 proposals have been 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:

- The houses located to the west and south of the subject site, along Kennedy Road.
- The nine houses located to the southeast of the subject site, accessed off the Navan Road close to the location of the proposed bridge.

The existing facilities and services in Dunboyne have the potential to be impacted by the additional population that will be generated by the proposed development.

Owners and employees of other commercial activities may be impacted by the proposed development i.e. local business owners, industries, and adjacent farms. Consideration is given under economic activity to the potential impact on other neighbouring commercial activities.

It is important to note that an increase of tourism is not expected from the proposed development and is not expected to hinder any existing tourism areas.

4.8.1 Construction Phase

The construction of the proposed development is expected to be completed within 3 years. The expected hours of construction works will commence from 7am to 7pm Monday to Friday and from 7am to 2pm on Saturdays. No works will be undertaken on Sundays or Bank Holiday without the consent of Meath County Council. In total, there is expected to be a maximum 150 construction workers employed on the site.

4.8.1.1 Population and Settlement Pattern

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. No significant impacts are anticipated as a result of the construction phase of the development.

4.8.1.2 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 final phase of the development is completed by 2027. Approximately 150 will be employed on site for up to 3 years, and there will be indirect benefits to other industries as a result of demand for construction materials and services. The loss of the agricultural lands is anticipated to have a neutral effect as the lands are 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 Dunboyne area.

4.8.1.3 Land Use and Local 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 15 'Cultural Heritage and Archaeology' of this EIAR.

4.8.1.4 Community Facilities and Services

The community facilities and services, including the schools and creches, are located to the south of the subject site within the town centre. 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.

4.8.1.5 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.

4.8.1.6 Cumulative

There is potential for the construction phase of the proposed development to overlap with the recently permitted planning applications to the north (references: P822022, 23/424, 23/60065, 23/60290, and 24/60805) which would increase the potential impacts on human health and population. Appropriate mitigation measures have been identified in the relevant EIAR chapters to minimise the potential negative impacts on human health.

4.8.2 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.

4.8.2.1 Population

The proposed development will provide 356 no. residential units (including 76 no. 1 beds). Based on the national average household size of 2.74 people per private household recorded during census 2022, the population of the proposed development is projected to be c. 975 no. people.

Based on the demographic analysis of the Dunboyne (Meath) ED, it can be therefore expected that c. 59 no. of the proposed development’s population will be aged 0-4 (c. 6%), c. 215 will be aged 5-19 (c. 22%), c.185 between 20-34 years (c.19%), c. 410 between 35 and 64 (c. 42%), and c. 117 will be aged over 65 years (c.12%).

The proposed creche has been designed to cater for the additional demand for childcare spaces generated by the proposed development. It is anticipated that there is sufficient capacity in the existing schools in Dunboyne town to cater for the additional primary and post primary school students expected from the proposed development.

4.8.2.2 Schools

The proposed development will result in a demand for school places at both primary and post-primary level which will accrue over the proposed 5-year delivery time.

It is worth noting that the enrolment projections for primary school are currently decreasing with the post primary enrolment figures projected to start decreasing from 2026.

The Department of Education published a report, ‘Projections of Full Time Enrolments Primary and Post Primary Level, 2023-2042’ in March 2024. The report provides regional projections of enrolments at primary and post primary level. The report includes three projection models (M1F2, M2F2, and M3F2) which include different assumptions of fertility and migration. These projections are shown in the graphs below (extracts from the Department’s report). It demonstrates that enrolment for primary schools is currently decreasing and set to decrease until 2036. Enrolment is expected to start increasing again from 2038.

The graphs also demonstrate that enrolment for post primary is currently increasing and will reach a peak in 2025 before gradually decreasing until approximately 2042.

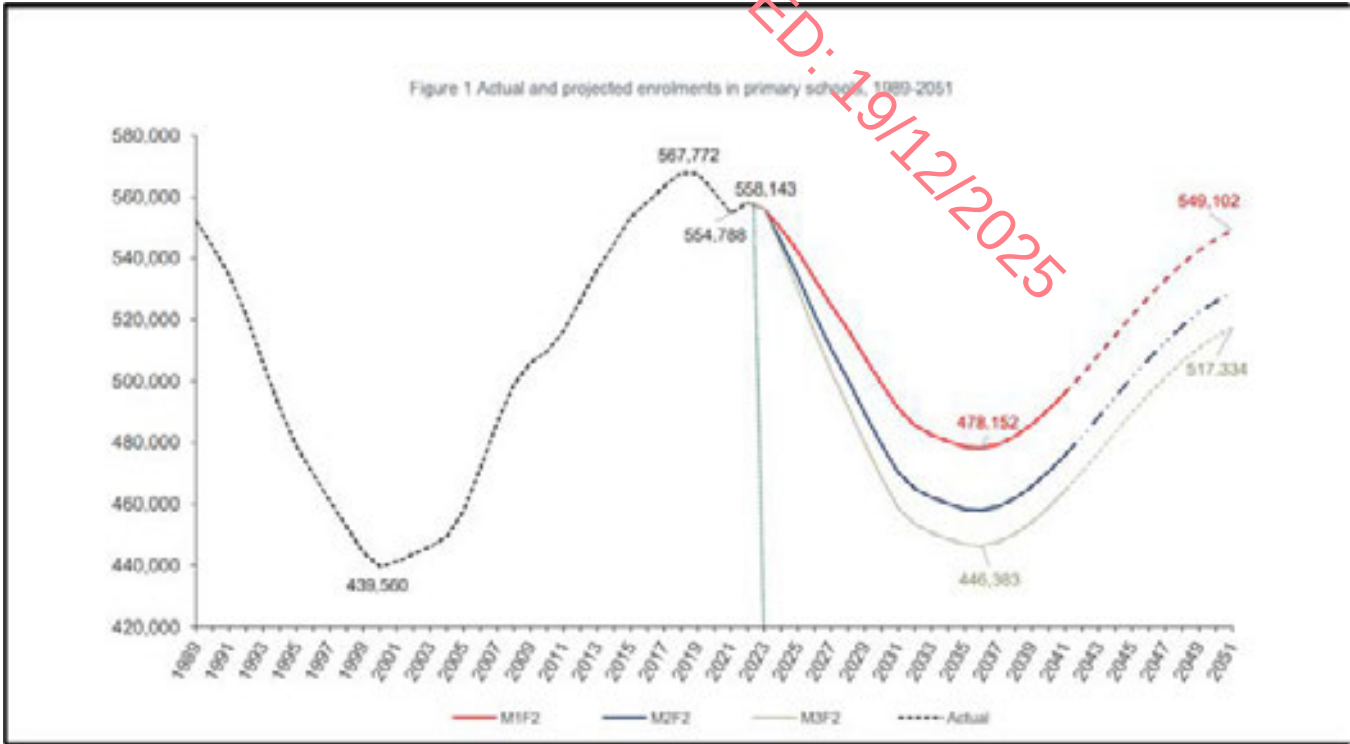


Figure 4.8 Projected Enrolment at Primary Level, 2023-2051. Source: Dept of Education

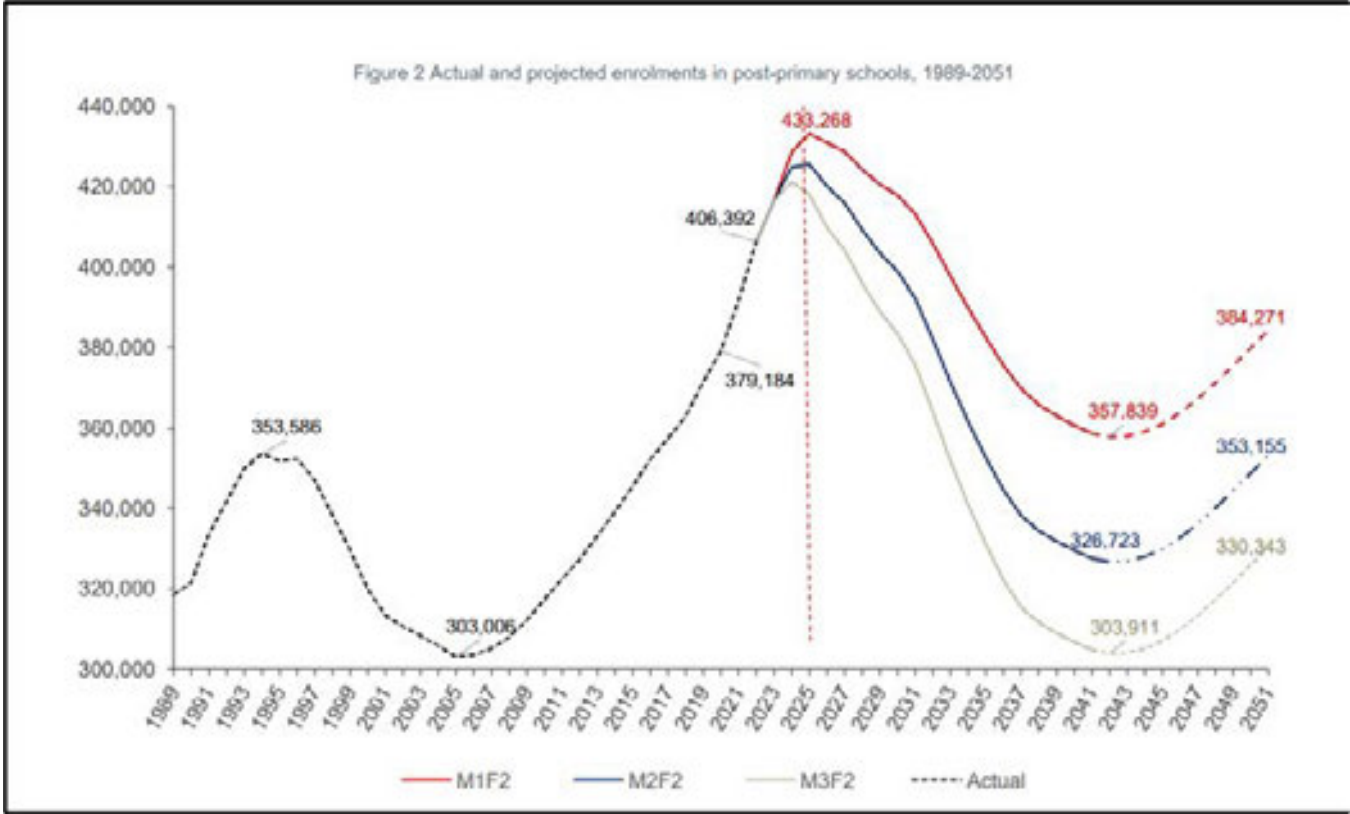


Figure 4.9 Projected Enrolment at Post-Primary Level, 2025-2051. Source: Dept of Education

The Department of Education and the Department of Further and Higher Education, Research, Innovation and Science published a report 'Education Indicators for Ireland' in July 2025 which presents a comprehensive set of educational indicators for the education system in Ireland.

Part 1 of this report notes that primary school enrolments are on a downward trajectory, having peaked in 2018 while post primary enrolments continue to rise sharply, up 45,125 between 2019 and 2023. This is in line with the 2023-2042 projections published in March 2024.

The proposed development is projected to have a population of 975 no. people. Based on the local demographics, it is estimated that c. 12% of the population are of primary school age (aged 5-12) and c. 9% are of post primary school age (aged 13-18). Applying these percentages to the projected population it is estimated that the proposed development will have c. 117 no. primary school aged children and c. 88 no. post primary school.

It is noted that the one bed units are unlikely to include primary and post primary school aged children. If the 76-no. proposed 1 bed units are excluded, the proposal is projected to have 91 no. primary school aged children and 67 no. post primary school aged children.

Based on the information on enrolments provided by the existing schools in the area and the latest school projections provided by the Department of Education, there is sufficient capacity in the existing schools in Dunboyne to cater for this projected population.

4.8.2.3 Childcare Facilities

The 2001 Childcare Guidelines recommend the provision of 20 no. childcare spaces for every 75 no. residential units. Based on this standard, the proposed 356 no. residential units would require 57 no. childcare spaces. However, it is noted that one bed units are unlikely to require childcare spaces. The proposed development includes 76 no. 1 bed units and when these are excluded the 280 no. remaining units would require the 45 no. childcare spaces.

The proposed creche will provide 136 no. childcare spaces and is therefore considered sufficient to cater for the proposed development.

4.8.2.4 Household Type and Settlement Pattern

The proposed development provides a range of 1, 2, 3 and 4 bed houses, maisonettes, apartments, and duplexes which will increase the range of housing options available in the Dunboyne area. The location of the proposed development close to the M3 Parkway station and within the MP22 masterplan area will provide sustainable homes with reduced car dependency. The proposal is therefore expected to have an overall long-term, positive impact on the settlement pattern and housing options in Dunboyne.

4.8.2.5 Economic Activity and Employment

It is expected that the projected population from the proposed development will have a long term, slight, positive impact on the economic activity of Dunboyne. The new residents will support local businesses and services by providing additional customers for the area. There is also potential for new businesses to open up in the area with additional people bringing additional spending power and innovation.

4.8.2.6 Land Use and Local Amenity

The proposed development is in line with the site-specific zoning for residential development and will consist primary of residential units, a creche, open spaces and infrastructure. The proposal will provide a significant, long-term, positive, impact to the existing residents and wider community.

Due to the distance from the protected structures in Dunboyne, the proposed development is expected to have a long-term, neutral, imperceptible, impact on the architectural heritage of Dunboyne.

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

4.8.2.7 Community Facilities and Services

The projected population from the proposed development will support local community facilities and groups. It is anticipated that the proposed development will therefore provide a long-term, slight, positive impact on the local community facilities and services.

4.8.3 Cumulative Effects

As noted above, there is potential for the construction phase of the proposed development to overlap with the recently permitted planning applications to the north and east (references: P822022, 23/424, 23/60065, 23/60290, and 24/60805) which would increase the potential impacts on human health and population.

If these planning applications are constructed, there is a potential for a significant, long-term, positive cumulative impact between the applications as they will mark the beginning of the development of the MP22 masterplans lands.

It is also noted that an LRD application for 716 no. units was permitted by Meath County Council in October 2023 (reference: 23/849), located to the east of Dunboyne town centre. The cumulative impact of this LRD with the current proposal will have a significant, long-term positive impact on settlement patterns and local community facilities and services.

4.9 Mitigation

4.9.1 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.

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

4.9.2 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.

4.9.3 Cumulative Mitigation

No cumulative mitigation measures are required.

4.10 Residual Impact Assessment

4.10.1 Construction Phase

The proposed mitigation measures above and those included in the Construction and Environmental Management Plan 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.

4.10.2 Operational Phase

It is anticipated that the proposed development will result in significant, long-term, positive impacts on the local economy and community. The provision of additional housing will increase the housing supply in the area and provide more options for people to live.

4.10.3 Cumulative Impact

The applications recently granted on the masterplan lands will have a cumulative positive impact on the area if constructed. The applications combined with this proposal will begin the development of the MP22 masterplan lands and will provide a high-quality neighbourhood for people to live and work.

4.11 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). Monitoring is outlined in the interacting Chapters 7 Air Quality and Chapter 9 Noise and Vibration.

4.12 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.

4.13 Significant Interactions

4.13.1 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.

4.13.2 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.

4.13.3 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 imperceptible, therefore, air quality impact from the proposed development are not expected to have a significant impact on population and human health.

4.13.4 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 from the proposed development.

4.13.5 Landscape and Visual

During the Construction Phase there will be visual changes associated with removal of some trees and hedgerows 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 11 'Landscape and Visual Impact' to quantify this impact.

4.13.6 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 insignificant.

4.13.7 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.

4.14 References & Sources

Meath County Development Plan 2021-2027

Central Statistics Office (CSO) Census 2022 Data. Available at: <https://visual.cso.ie/?body=entity/ima/cop/2022&boundary=C04167V04938&guid=2ae19629-1883-13a3-e055-000000000001>

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/>

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CHAPTER FIVE

LAND, SOIL, & GEOLOGY



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CHAPTER FIVE

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CHAPTER 5 | Land, Soil, & Geology

5.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the proposed development will have on Land, Soils and Geology. This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, the predicted scale and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and defines the residual effects of the proposed development (the effect after the implementation of mitigation measures).

This chapter should be read in conjunction with Chapter 6 Hydrology & Hydrogeology. A full description of the proposed development is set out in Chapter 2 of this EIAR.

5.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Rashaqat Ali Siddiqui and Marcelo Allende in the Water section of AWN Consulting Ltd.

Rashaqat Ali Siddiqui (BSc, Msc, MIT). Ali is a hydrogeologist with over 6 years' experience in water resource management and impact assessment. He has a Masters in Hydrogeology and is a former Education Secretary of the Irish chapter for the Association of Hydrogeologists (IAH). Ali's specialist area of expertise is water resource management, Site investigation and monitoring, Contaminated land Assessment, hydrological assessment and environmental impact assessment.

Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) at AWN with over 20 years of experience in Environmental Consulting as well as hydrological and hydrogeological technical studies. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

5.3 Proposed Development

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

The proposed development is phase 3 of a larger masterplan area. Phases 1 and 2 are situated to the east and north of the site.

The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

The subject site is located within the townland of Bennetstown to the north of the defined development boundary of the town of Dunboyne. The site is located c.3.5km to the north of the town centre and situated west of the Dunboyne to Clonsilla Rail Line and M3 Parkway rail station and the Royal Canal and the Dublin-Maynooth Railway Line. The site is accessible via the R157 which is located at the east of the site.

5.3.1 Construction Phase

The key civil engineering works which relate to the land, soil and geological environment during construction of the proposed development are summarised below:

- During the construction phase, excavated topsoil and subsoil and stones (c. 2524 m³) will be generated from the excavations required to facilitate site levelling to the necessary base level and construction of new foundations. It is currently envisaged that all of the material will be able to be retained and reused onsite for landscaping and fill.
- Storage of aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc;
- Temporary storage of fuel required on site for construction traffic. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage;
- There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil will be re-used on site for backfill (levels in some areas need to be raised) and landscaping with some export required. Any surplus topsoil material will be transported off site and disposed of at a fully authorised soil recovery facility / site.
- Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site

5.4 Methodology

5.4.1 Criteria for Rating Effects

This section establishes the criteria, and guidance used to rate the significance of the potential impacts of the proposed development project on the land, soil, geological, and hydrogeological aspects of the site and surrounding area.

Alongside the legislation, policy, and guidance outlined in Chapter 1, this chapter is prepared in line with the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) and due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI 2013).

The document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII) formerly National Roads Authority (NRA) (TII, 2009) is referenced where the methodology for assessment of impact is appropriate. Furthermore, in line with the TII Guidelines, an assessment of the attribute importance has been undertaken in order to provide a basis for the assessment of impact provided. The attribute importance considers the potential as well as the existing use of the surface water features as a water resource i.e., water supply, fisheries and other uses, as well as ecological habitat requirements. The TII criteria for rating the soil and geology related attributes are presented in Appendix 5.1.

The quality, significance, and duration of the potential impacts, residual effects, and cumulative effects are described using standard EIA descriptive terminology, included in Chapter 1 (EPA, 2022).

The principal attributes (and impacts) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site.
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground.
- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves.
- The extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for recovery or disposal.

5.4.2 Sources of Information

Desk-based geological information on the substrata (both quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing national databases and site archives. The collection of baseline regional data was undertaken by reviewing the following sources:

- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.
- Teagasc soil and subsoil database.
- Ordnance Survey Ireland - aerial photographs and historical mapping.
- Environmental Protection Agency (EPA) – website mapping and database information; and
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Site plans and drawings submitted with the planning application pack
- Construction Environmental Management Plan (Paul Mc Grail Consulting Engineers Ltd, 2025)
- Engineering Report (Paul Mc Grail Construction Engineers Limited, 2025)
- Ground Investigations Ireland (GII) Site Investigation Report (July, 2024)

5.4.3 Relevant Legislation & Guidance

- Environmental Protection Agency (EPA) Advice notes on current practice in the preparation of Environmental Impact Statement (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022a).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- Institute of Geologists Ireland (IGI) -Geology in Environmental Impact Statements, a guide (IGI, 2002) and Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- Waste Management Acts 1996 as amended;
- Environment Agency (EA), Land contamination: risk assessment (EA 2020);
- BS 10175:2011 + A2:2017 Investigation of potentially contaminated sites. Code of practice (British Standards Institute 2017);
- CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice (CIRIA 2001);
- Environmental Protection Agency, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013);
- Local Authority planning guidance as applicable,
- Consolidated EIA Directive 2011/92/EU and 2014/52/EU.

5.4.4 Site Surveys/Investigation

An overview of site investigation carried out by GII (June, 2024) at the subject site is summarised below and the location of site investigation points are provided in Figure 5.51 below :

- Topsoil was found up to 0.3m, followed by cohesive sandy gravelly clay deposits up to 2.50m, with firmer layers below 1.20m. Boreholes were finished at 2.5 m.
- Granular deposits of clayey sandy gravel were also identified.
- No groundwater was noted during the investigation however these exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels
- The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a clay of low to intermediate plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 23.7% and 40.9% generally with fines contents of 30 to 40%.
- The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results are low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1
- Soakaway locations SA01 to SA05 confirmed that slow infiltration rates which indicates the clayey nature of the shallow soils.



Figure 5.1 Site location, including locations of boreholes and soakaway test areas.

5.4.5 Consultation

Consultation was undertaken with Mr. Jarlath Flanagan of the Environment, Water & Fire Services in Meath County Council to request information on illegal landfills in the surrounding area of Bennetstown.

5.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the specific information for this EIAR chapter.

5.6 Baseline Environment

This section provides a description of the land, soils and geology in the general region of the proposed development and also takes account of the current and historic uses of the proposed development.

5.6.1 Site Location & Surrounding Land Use

The proposed development site is located within the townland of Bennetstown to the north of Dunboyne town at Dunboyne North, Co. Meath. The total area of the proposed development site is approximately 15.8 hectares.

The site is bounded to the east by a car park, the R157 road and the River Tolka, and to the south, to the north and west by agricultural lands, to the northeast by M3 Parkway and greenfield land in all other directions. The M3 motorway is also located approximately 130m beyond the eastern boundary of the site.

Figure 5.2 below shows the location of the development site.



Figure 5.2 Site location

A review of historic maps (including available 6-inch historic maps (1837-1842) and 25-inch historic maps (1888-1913), and historical aerial imagery / photographs (1995 to 2012) from the Ordnance Survey of Ireland) (OSI, 2025) and current aerial imagery (Google Earth Satellite, 2025) confirms that land use at the site has generally remained greenfield and has been retained in agricultural use.

5.6.2 Topography

The site slopes from 75m at the northern boundary of the proposed development to 71.86m to the south at an average gradient of 1 in 60. Refer to Figure 5.3 for site slope.

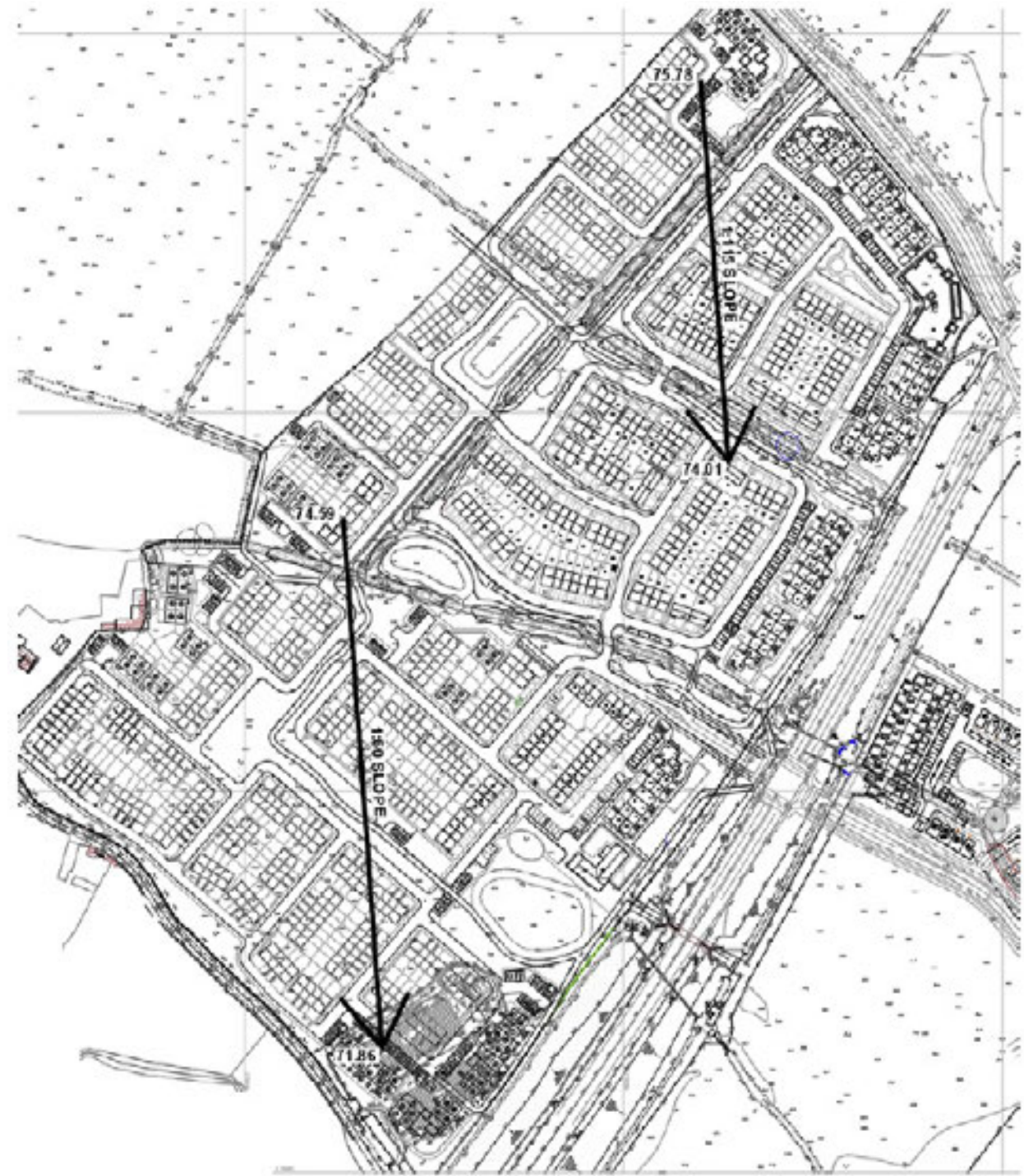


Figure 5.3 Site falls (Paul McGrail, 2025)

5.6.3 Soils and Subsoils (Quaternary)

Based on the Teagasc soils database available on the GSI public data viewer (GSI, 2025), the dominant soil type underlying the site and surrounding area is well drained mineral soils. Refer to Figure 5.4 below.

According to the GSI public data viewer (GSI, 2025), the primary superficial subsoils / quaternary sediments underlying the vicinity of the Site include (Figure 5.5):

- Till derived from limestone comprises the predominant subsoil underlying the development;
- The drainage channel and proposed road and River Tolka bridge crossing (southern portion of the site) is partially underlain by Alluvium. Alluvium is also located in the north and south extents of the site beneath the access road and associated with the River Tolka.
- The proposed road and River Tolka bridge crossing is partially underlain by Gravels derived from the limestone (eastern portion).



Figure 5.4 Teagasc Soils

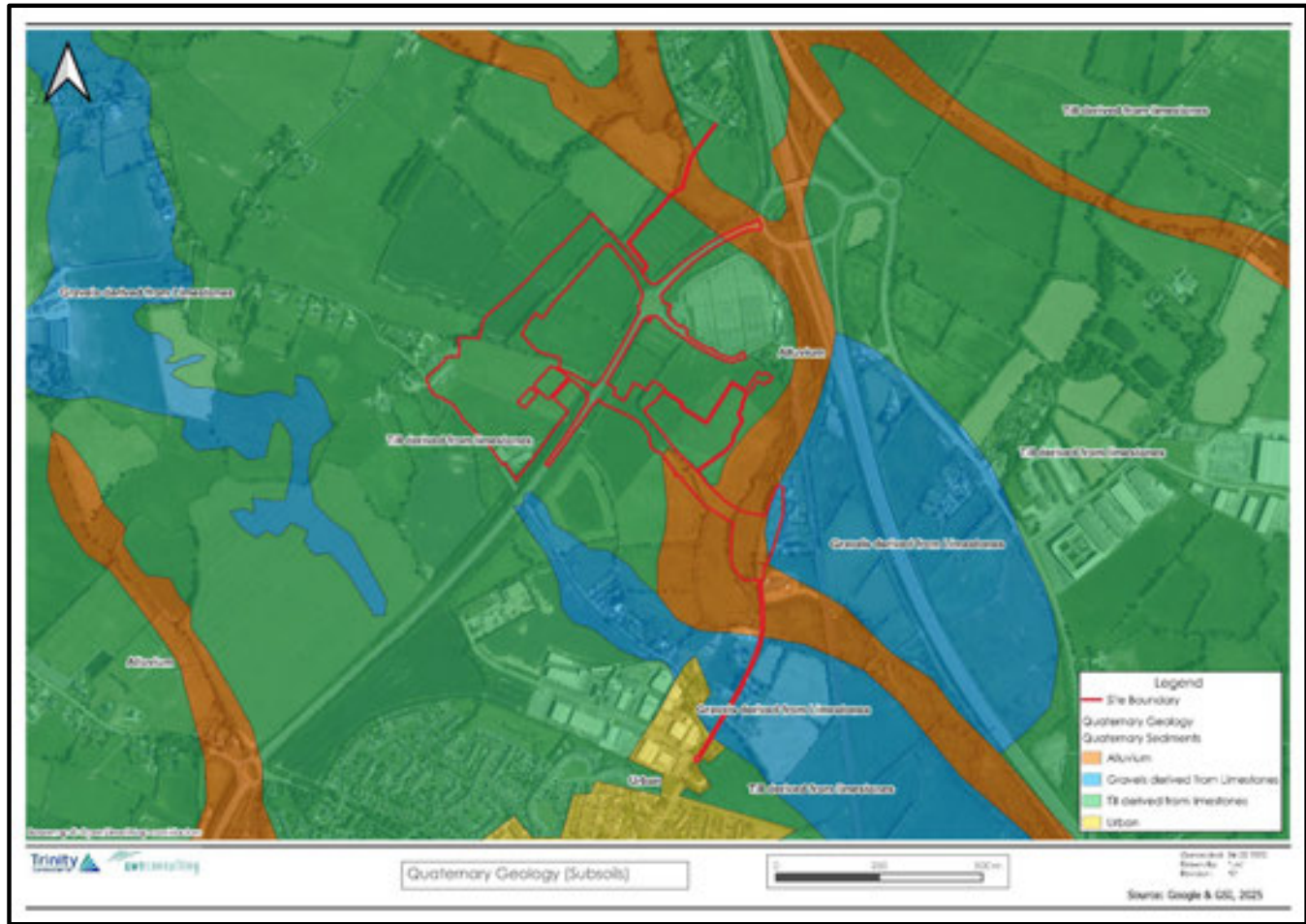


Figure 5.5 Subsoils (Quaternary Geology)

5.6.4 Bedrock Geology

The GSI bedrock geology 100k map identifies the underlying bedrock of the site as Dark Limestone and Shale of the Lucan Formation. The Bedrock Geology Map is included in Figure 5.6 below.



Figure 5.6 Bedrock Geology

5.6.5 Groundwater Vulnerability Rating

Groundwater vulnerability is a term used to represent the natural ground, intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of/ or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater vulnerability is an indication of how easily the aquifer can become contaminated by human activity. It is dependent on the thickness and permeability of the overlying soils and depth to the water table. For example, a bedrock aquifer with minimal thickness of overburden or with a thin layer of permeable overburden will be more vulnerable to contamination than a bedrock aquifer which has a thick layer of low permeability overburden. Extreme groundwater vulnerability is also associated with karst landforms as these are a direct pathway for water and contaminants to enter the aquifer from the surface.

The GSI presently classifies the aquifer underlying the proposed development site with several vulnerability classifications. The majority of the site is classified as 'Low' Vulnerability rating with isolated section of 'High' located to the west of the site as shown in Figure 5-7.

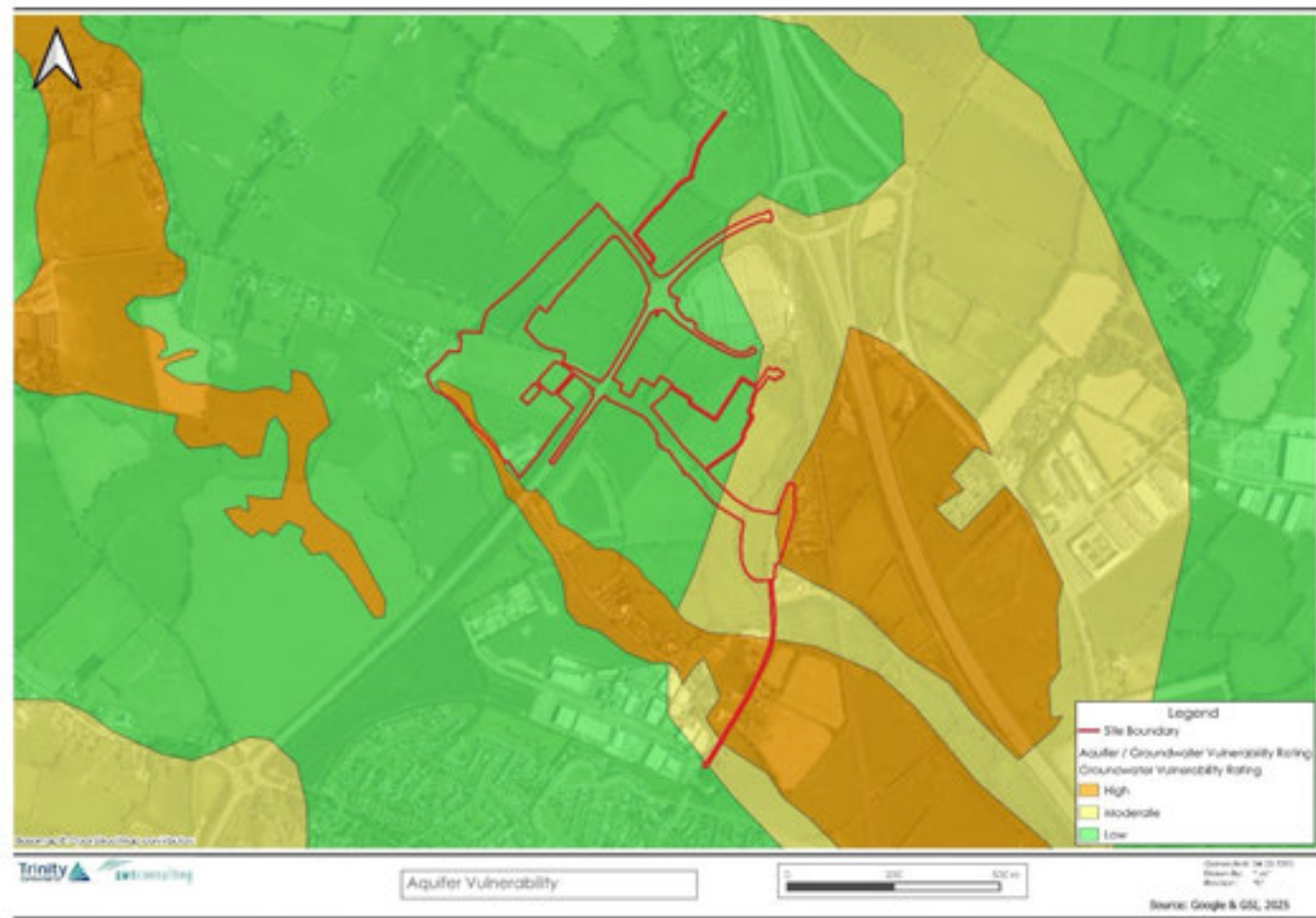


Figure 5.7 Groundwater Vulnerability Rating

Aquifer vulnerability classifications are primarily based on the permeability and thickness of subsoils. Given the subsoils are Made ground underlain by clay along with extreme vulnerability. The expected bedrock depth is between 0-3m. Although, during the site investigation, the trial pits were excavated to a maximum depth of 2.5 m and no bedrock was encountered. Refer to Table 5-1 below.

Table 5.1 Vulnerability Mapping Guidelines (Source (DoELG, EPA, GSI, 1999))

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	> 3.0m	3.0 - 10.0m	3.0 - 5.0m	> 3.0m	N/A
Moderate (M)	N/A	> 10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	> 10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

5.6.6 Radon

Available EPA radon maps indicate that about 1 in 20 homes in this area are likely to have high radon levels of the homes (EPA, 2025). However, in accordance with relevant building regulations, a radon barrier will need to be installed beneath all buildings to be constructed as part of the proposed development. Therefore, radon will not have any effect on the proposed development.

5.6.7 Geo-Hazards

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.

Based on the GSI spatial map viewer (2025), the area of the proposed development and its surrounding have been classified as ‘Low’ to ‘Low Inferred’ landslide susceptibility. The GSI landslide database was consulted and there are no recorded landslides at the immediate site. The closest reported landslide event is located c. 2 km south east of the Site at M3 Junction 4 – Clonee associated with a motorway road cutting.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the 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 and operated by DIAS. The seismic data from the stations come into DIAS in real-time and are studied for local and regional events. According to the Irish National Seismic Network, records show that the nearest seismic activity to the site occurred on the 3rd of July 2024 in Enfield (0.9 MI Magnitude) from a quarry blast, and c. 23 km to the south west of the site. There is a very low risk of seismic activity to the site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

5.6.8 Areas of Geological Interest and Current Land Use

A review of the GSI online database (2025) confirmed that no geological heritage site has been identified in the vicinity of the proposed development site. The majority of the site is currently in use for arable agricultural activities.

There nearest Integrated Pollution Prevention and Control (IPPC) facility (MSD International GmbH, P1073) is located c. 2.9km north-west of the site at Bennetstown, Dunboyne, Co. Meath. The nearest Industrial Emissions Directive (IE) licenced facility (Padraig Thornton Waste Disposal Ltd, W0206) is located c. 1.2km north-east of the site.

Consultation with Meath County Council has confirmed that there are no known illegal / historic landfills within 500 m of the site.

Chapter 8 Biodiversity provides full information on areas of conservation. There are no proposed Special Areas of Conservation (pSAC), Special Protection Areas (SPAs) or Natural Heritage area (NHA) within the immediate surrounds of the study area boundary.

According to the NPWS (2025) on-line database, the following area of conservation are located in closest proximity to the subject site:

- Rye Water Valley/Carton SAC (located c. 5.5km from the site) (Site Code: 001398); and
- South Dublin Bay and River Tolka Estuary SPA (c. 19.3 km) (Site Code: 004024) are the closest audited sites to the proposed development.

5.6.9 Historical Environment

Historical Ordnance Survey (OSi, 2025) maps were examined for the purpose of this study. OS maps were available for the period from 1830 to 1913 and included the historic 6” Cassini maps (c.1845), Historic Map 6-inch Colour (1837-1842), and the historic 25” maps (1888-1913). More recent aerial mapping (1995-to present date) was also used in this assessment.

Historic 6inch first edition map presented in Figure 5.8 along with the 25inch Cassini and Historic 6inch last edition presented in Figure 5.9 and 5.10 respectively illustrates the historic use of the site which is primarily greenfield site.

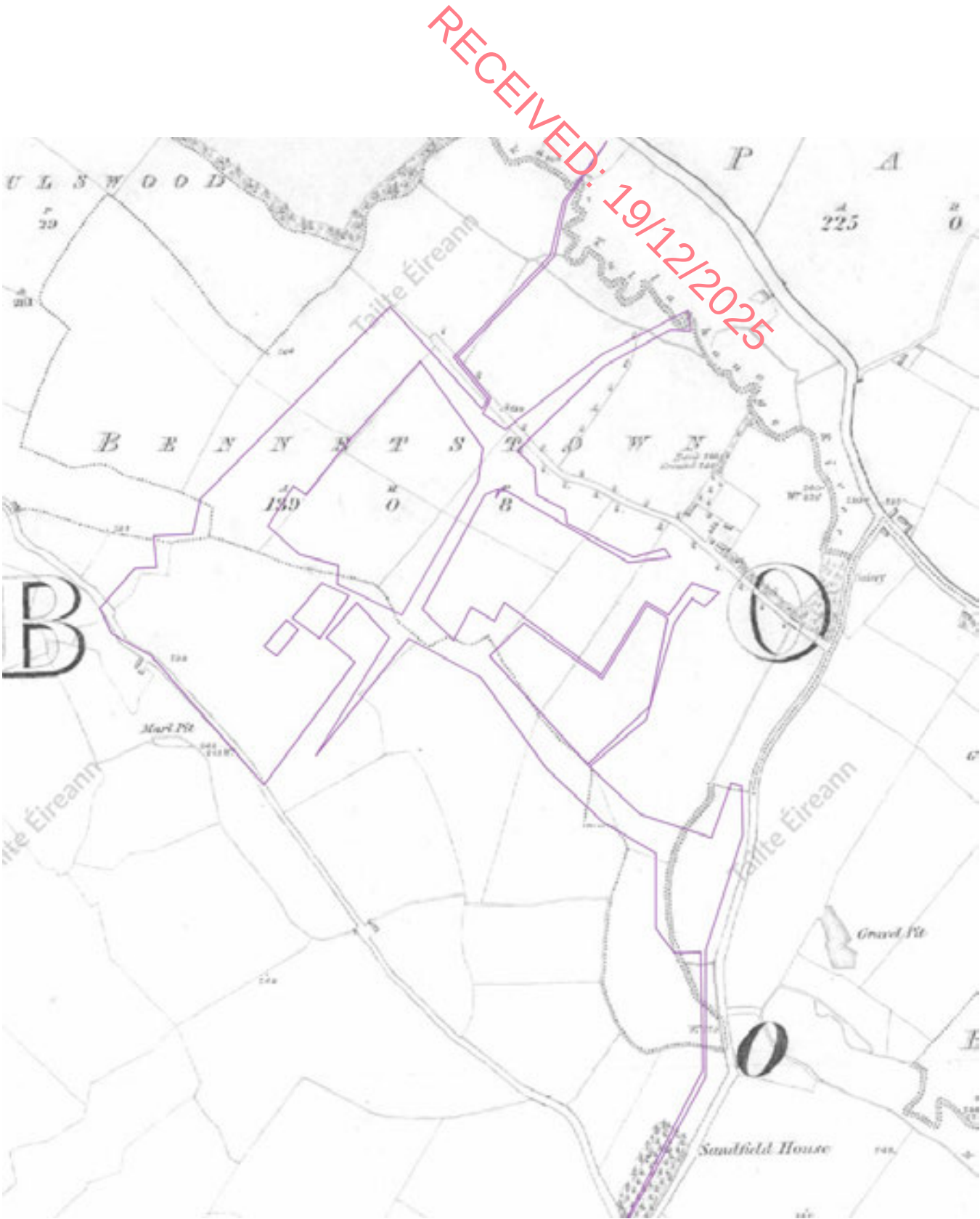


Figure 5.8 Historic 6Inch First Edition (OPW, 2025)

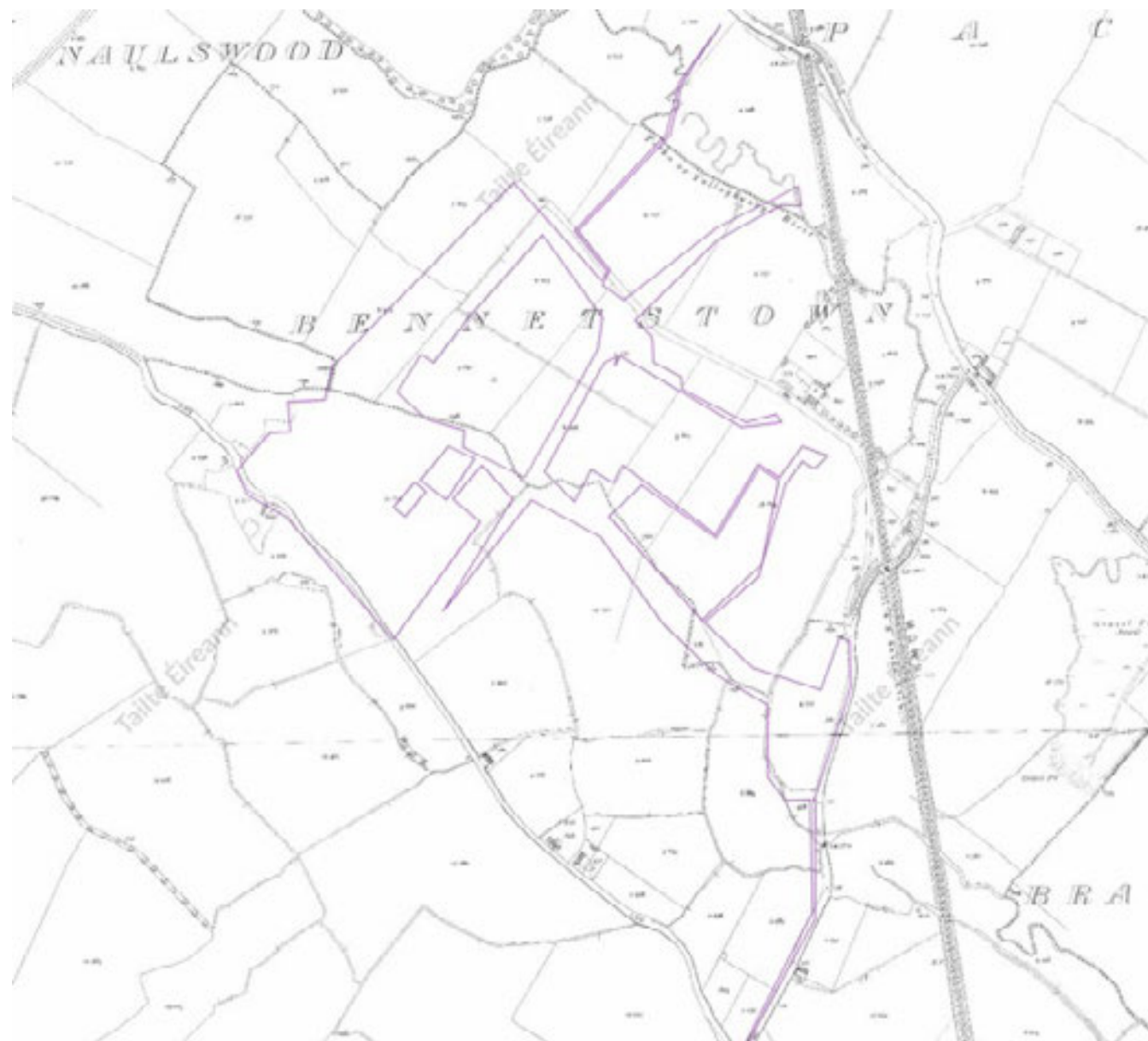


Figure 5.9. Historic 25Inch 'Cassini' (OPW, 2025)

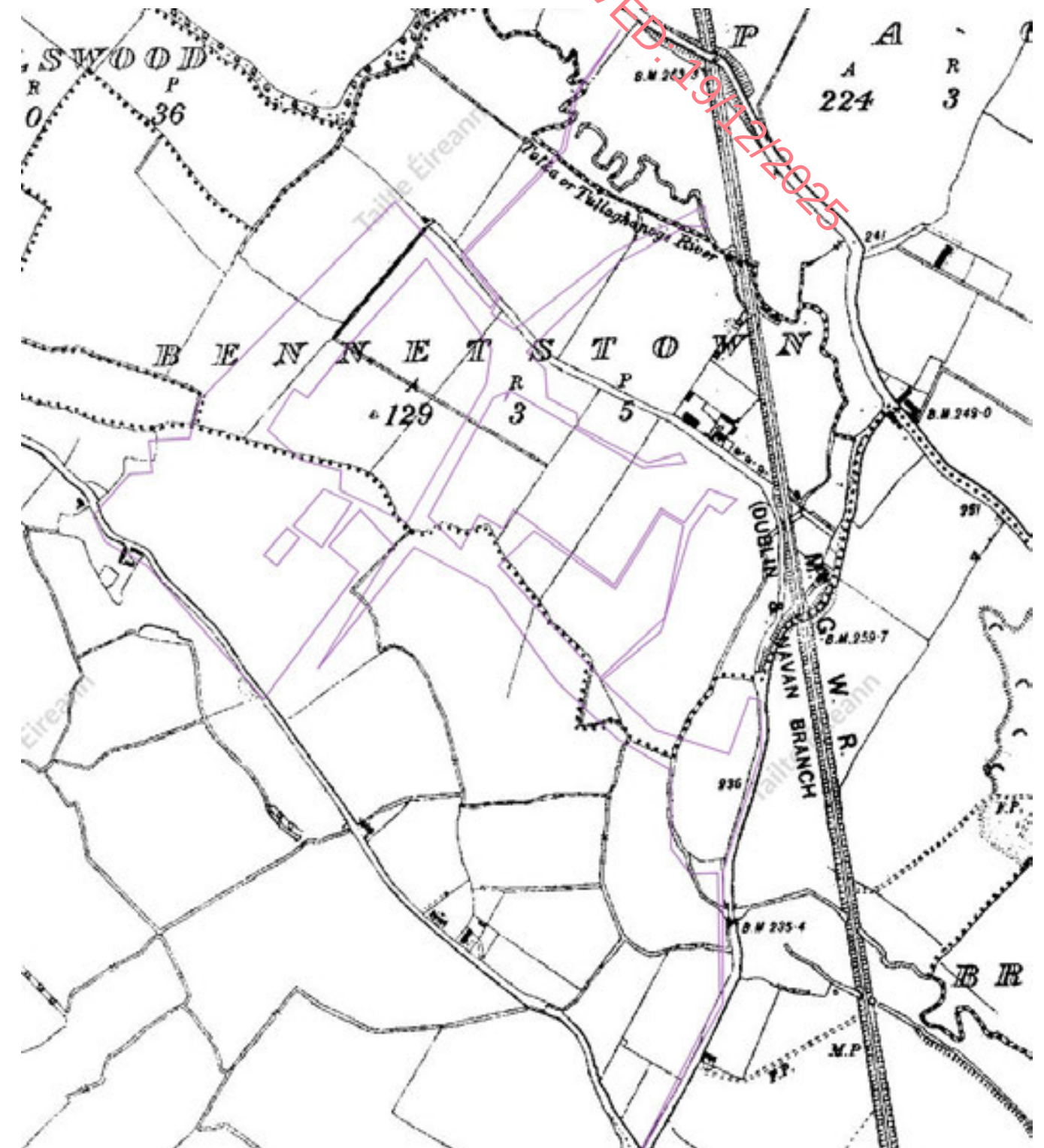


Figure 5.10 Historic 6Inch Last Edition (OPW, 2025)

5.6.10 Rating of Site Importance of the Geological Features

Based on the TII criteria for rating the importance of geological features (2009) (see Appendix 5.1 in Volume 3 of this EIAR), bedrock and soil features at this site are rated as being of 'low importance' with low quality or value on a local scale. This is due to the site's current and historical use as a greenfield site with no other prior uses other than agricultural. There are no pathway linkages to areas of geological heritage etc.

5.7 The 'Do nothing' Scenario

If the proposed development was not to go ahead (i.e. in a Do-Nothing scenario) the baseline environment in terms of land, soils, and geology would remain unchanged as there would be no excavations or construction. Therefore, in a 'Do Nothing' scenario, there would be a *neutral* and *imperceptible* effect on the land, soils and geological environment at the site. The likelihood in a temporary and short-term basis is the existing natural state of the area would persist, without any alterations or disturbances caused by the proposed development. It is noted that the lands are zoned for development and as such would likely be developed in the future.

5.8 Potential Significant Effects

An analysis of the potential effects of the proposed development on the land, soils and geological environment during the demolition, construction and operational phases are outlined below. Due to the inter-relationship between land, soils, geology, hydrogeology and hydrology, the following impacts discussed will be considered applicable to both Chapter 5 and 6 of this EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 5.9.

5.8.1 Demolition Phase

The development contains existing buildings to be demolished. The likelihood of significant effects on the land, soils and geology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the land and soils is minimal and no significant effects on the land's composition, stability, or fertility are anticipated.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology preserving their integrity and minimizing any potential environmental consequences. In the absence of mitigation, the effect on land, soils and geology is likely to be **short-term, imperceptible and negative**.

Refer to Chapter 10– Waste of this EIAR for further information on predicted on and off-site reuse, recycle and disposal rates for demolition waste.

5.8.2 Construction Phase

5.8.2.1 Loss of Land

The current zoning for the Site within the Meath County Council Area is as follows:

A2- New Residential 'To provide for new residential communities with ancillary community facilities, neighbourhood facilities and employment uses as considered appropriate for the status of the centre in the Settlement Hierarchy.'

FI - Open Space 'To provide for and improve open spaces for active and passive recreational amenities'

The effect on land take at the site is likely to have a *slight negative* effect on the environment of the area. This will be a *permanent* effect. However, the proposed development is in a zoned residential area to the north of the village of Dunboyne and immediately adjacent to excellent transport connections of the M3 and the M3 Parkway railway station. The south-eastern portion of the site is zoned as open space. This portion of the site will be retained as open space within the proposed development.

5.8.2.2 Soils & Geology

Activities during construction will primarily comprise stripping of topsoil across the site, excavation of subsoil and pouring of foundations for the residential and commercial units, installation of the storm water (including attenuation tanks) and foul water drainage works, watermains and laying of cable ducts, and piling as required, including for the proposed bridge structure.

Tracked excavators will likely be sufficient to excavate soils for subsequent relocation to facilitate construction works. The extent of the excavation for the housing, is likely to be a maximum depth of c. 1.57mbgl. The extent of excavation for service / utility trenches will vary; however, the general depth will be in the region of 1.0mbgl. All excavations are anticipated to encounter firm to very stiff sandy gravelly clay.

The project engineers (Paul McGrail Consulting Engineers) have estimated that c. 2524m³ of material will need to be excavated to do so. It is currently envisaged that all of the material will be able to be retained and reused onsite for landscaping and fill.

Any unsuitable soils will be removed and disposed of offsite to a suitably permitted / licenced waste recovery / disposal facility in accordance with relevant waste management legislation (including but not limited to the Waste Management Act of 1996, 2001 and 2003 and all subsequent waste management regulations as amended).

During the construction phase of the development, the following potential effects on soils and bedrock could occur and have been assessed accordingly;

- Stripping of topsoil may result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff;
- Soils beneath the proposed development may become unnecessarily compacted by machinery during construction;
- Topsoil and subsoil may become rutted and deterioration of the topsoil layer and any exposed subsoil layers may result in erosion and generation of sediment laden runoff;
- Dust generation can also occur during extended dry weather periods as a result of construction traffic;

- Soils and bedrock may be at risk of becoming contaminated through site construction activity; in particular the risk of spillages and leakage of any fuel oils and paint. Potential human health risks to construction workers could also occur associated with any such spillages and leakage; and,
- Temporary onsite groundwater monitoring wells could provide a conduit for potential contamination of soils and bedrock through site construction activity; in particular the risk of spillages and leakage of any fuel oils and paint.

The above effects (without mitigation) are likely to result in *negative* not significant effect on receiving soils and/or bedrock; however, any effects are considered to be *short-term* and *localised*. Furthermore, mitigation measures will be implemented during the Construction Phase to reduce and/or avoid these potential effects, and to address any potential waste soil management issues.

5.8.2.3 Ground Stability

There is no evidence of significant historic landslides and there are no known karst features within the proposed development boundary. Industry standard health and safety practices will be implemented during the construction phase to address any potential ground stability issues associated with excavation, trenching and piling works. Therefore, a *neutral imperceptible* effect is associated with ground stability.

5.8.3 Operational Phase

The effect on land take is likely to have a *negative slight permanent* effect on the environment of the area; however, this change is consistent with existing and emerging trends.

The development will have a *neutral imperceptible, permanent* effect on recharge to localised portions of soil and bedrock during the operational phase due to the introduction of hard stand. The operational stage of the residential development consists of the typical activities in a residential area and will not involve further disturbance to the topsoil, subsoils and geology of the area.

5.8.4 Cumulative Effects

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

This section has been prepared with reference to the list of the following relevant permitted developments in the vicinity:

- **P822022** – Dunboyne Link Road. Dunboyne Business Park and the R157. Part 8 Development
- **23/424** – 3 no. office buildings, located to north of subject site, on the MP22 masterplan area.
- **23/60065** – Single storey commercial building east of subject site, located on Phase 1 lands of the MP 22 masterplan area.
- **23/60290** – Large scale residential development for 267 no. residential units, located on the Phase 1 lands of the MP 22 masterplan area.

- **23/849** – large scale residential development for 716 no. residential units located south of the site, c. 1km east of Dunboyne town centre.
- **24/60468** – 76 no. dwellings and a creche at Station Road, Dunboyne, Co. Meath.
- **VA06F.319422** – electricity development application to An Bord Pleanála for a 400kV underground cable from East Meath to North Dublin, approximately 37.5km in length.
- **24/39** – 8 no. dwellings located to the south-east of the subject site.

Neither the development proposed nor any other developments will give rise to any significant impacts on water receptors and there are no predicted cumulative impacts in relation to water receptors in terms of water quality and flow, as a result of the proposed development in combination with existing / proposed plans or projects.

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap during the demolition, construction and operational phases. There will be no effects on land soils and geology as each development will adhere to their own CEMP and mitigation plan. There is no pathway and connectivity to land soils and geology to each development.

In the absence of adherence to the CEMP and mitigation plan, the effect on the local and regional environment is likely to be **long-term, significant and negative**

5.9 Mitigation

In order to minimise the potential impacts from the development, the following mitigation measures will be undertaken.

5.9.1 Incorporated Design Mitigation

This section outlines the measures that will be employed in order to ensure the project has minimal adverse effects on the surrounding environment, in this case land, soils and geology. These measures include appropriate design measures such as the proper storage and containment of hazardous substances and proper drainage systems in line with best practice, standard details, policies and guidelines already incorporated into the proposed design.

5.9.2 Demolition Phase Mitigation

To facilitate the development, demolition works are required. The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. As a result, the impact on the land and soils is minimal.

The demolition process focuses on dismantling and removing structures, buildings and infrastructure to accommodate the new development and facilitation works, without disturbing the underlying soil or altering the landscape. This approach ensures that there are no significant effects on the land's composition, stability, or fertility. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate.

Refer to Chapter 10 – Waste of the EIA for further information on predicted on demolition phase mitigation in terms of off-site reuse, recycle and disposal rates for demolition waste.

5.9.3 Construction Phase Mitigation

In order to reduce impacts on the land, soils and geological environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

5.9.3.1 Construction Environmental Management Plan

The project engineer (Paul Mc Grail Consulting Engineers Limited) has prepared a Construction Environmental Management Plan (CEMP) that is included with the application documentation.

The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation and monitoring measures which are described in the EIAR. The CEMP demonstrates the applicant's commitment to implementing the proposed development in such a way as to avoid or minimise the potential environmental effects arising from construction activities. All personnel will be required to understand and implement the requirements of the plan.

Construction works and the proposed mitigation measures outlined in the CEMP are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741);
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005); and
- Guidelines for the crossing of watercourses during the construction of national road schemes (National Roads Authority; 2008).

The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed.

Specific mitigation relating to land soil and geology is described below:

5.9.3.2 Soil Extraction, Removal and Infill

The excavation will require soil excavation and infill. The project engineers (Paul McGrail Consulting Engineers) have estimated that c. 2524m³ of material will need to be excavated to do so. It is currently envisaged that all of the material will be able to be retained and reused onsite for landscaping and fill

If any potentially contaminated material is encountered and is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments. Contractors should prepare and adhere to a method statement indicating the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction.

Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

Any excavation works should be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil will be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with *EC Decision 2003/33/EC*. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

5.9.3.3 Management of Dust

- Soils will be stabilised and protected from erosion whilst planting becomes established.
- During earthworks and excavation works, care will be taken to ensure that exposed soil surfaces are stable to minimise erosion.
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only;
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate;
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust;
- Dust monitoring will be undertaken.

5.9.3.4 Sources of Fill and Aggregates

All fill and aggregate for the proposed development will be sourced from reputable suppliers per the project Contract and Procurement Procedures. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

5.9.3.5 Cement/Concrete Works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 m of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Irish Water / MCC.

Pouring of cement-based materials for works will only be carried out in dry conditions. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings and excess concrete will not be discharged directly into the drainage network. Concrete washout areas will be created to avoid any accidental discharge from the proposed development site.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.

5.9.3.6 Hydrocarbons and other construction chemicals

The following mitigation measures will be implemented during the construction phase to prevent any spillages to ground of fuels and other construction chemicals and prevent any spillages resulting to surface water and groundwater systems:

- Designation of bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowzers are used, the following measures will be taken:

Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;

the pump or valve will be fitted with a lock and will be secured when not in use;

All bowzers to carry a spill kit and operatives must have spill response training;

Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/ container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the Site, they will be secured and on spill pallets;
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site). In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “*Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors*” (CIRIA 532, 2001) will be complied with.

All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at a designated wash out point on site.

5.9.3.7 Environmental Procedures

There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures.

The predicted impact on land and soils during the construction phase is **neutral, imperceptible** and **short-term**, the magnitude of impact is considered **negligible**.

5.9.4 Operational Phase Mitigation

There are no required mitigation measures associated with the operational phase of the proposed development.

5.10 Monitoring Requirements

5.10.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate.

Therefore, no monitoring is required.

5.10.2 Construction Phase

During construction phase the following monitoring measures will be implemented:

- Regular inspection of surface water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off;
- Excavation works to be monitored to record any signs of potentially contaminated soil;
- Regular inspection of construction / mitigation measures outlined in the CEMP should be adhered to during the construction phase. (e.g., concrete pouring, refuelling, etc); and
- Soil sampling of excavated soils and monitoring of surface water run off will be required in case of accidental discharges to underlying geology.

5.10.3 Operational Phase

Maintenance of the surface water drainage system, including hydrobrake, separators / interceptors, and foul sewers is recommended to minimise any accidental discharges to soil or groundwater.

Monitoring of surface water run off will be required in case of accidental discharges to underlying geology

5.11 Residual Effects

The implementation of mitigation measures outlined in Section 5.10 will ensure that the potential impacts on the land, soils and geological environment do not occur during the demolition, construction and operational phases of the proposed development. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 5 (Land, Soils and Geology) & Chapter 6 (Hydrology and Hydrogeology) of the EIAR.

5.11.1 Demolition Phase

A carefully planned approach during the demolition phase in particular waste management, as set out in Section 5.10.2 and full adherence to the RWMP presented in Appendix 10.1 and Chapter 10 –Waste of the EIAR, will ensure that the predicted effect on the land, soils and geological environment will be **short-term, imperceptible** and **neutral**. Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered **negligible**.

5.11.2 Construction Phase

5.11.2.1 Soil Excavation, Removal and Infill

The implementation of mitigation measures outlined in Section 5.9.3.2 will ensure that the potential impacts on the land, soils and geological environment do not occur during the construction phase and that the residual effect will be **short-term-imperceptible-neutral**. Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered **negligible**.

5.11.2.2 Sources of Engineering Fill and Aggregate

The implementation of mitigation measures outlined in Section 5.9.3.3 will ensure that the potential impacts on the land, soils and geological environment do not occur during the construction phase and that the residual effect will be **short-term-imperceptible-neutral**. Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered **negligible**.

5.11.2.3 Fuel and Chemical Handling

The implementation of mitigation measures outlined in Section 5.9.3.4 will ensure that the potential impacts on the land, soils and geological environment do not occur during the construction phase and that the residual effect will be **short-term-imperceptible-neutral**. Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered **negligible**.

5.11.3 Operational Phase

5.11.3.1 Land, Soils and Geology

The implementation of the mitigation measures detailed in Section 5.9.4.1, will ensure that the potential impacts on land, soils and geology, once the proposed development is constructed and operational are adequately mitigated. The residual effect on land, soils and geology during the operational phase is considered to be **neutral-imperceptible-short-term**. Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered **negligible**.

5.11.4 Cumulative Impact

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments (as outlined in Chapter 1) are discussed below.

5.11.4.1 Demolition Phase

The potential residual effects on the land, soils and geological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the land, soils and geological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Any developments proposed in the area will have to adhere to their own CEMP and Mitigation plans. There are no pathway connecting the sites in terms of land, soils and geology.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 5.10.2 will ensure the residual effect on the land, soils and geology environment during the demolition phase is likely to be **short-term-imperceptible-neutral**.

5.11.4.2 Construction Phase

The potential for impact on land soils and geology during construction primarily arises from localised accidental leaks and spills to ground. The proposed development does not require dewatering and with standard mitigation in place for management of accidental discharges. Contractors for the Proposed Development will be contractually required to operate in compliance with a CEMP which will include the mitigation measures outlined in this EIA report. Other developments will also have to incorporate measures to protect soil and water quality in compliance with legislative standards for receiving water quality. As a result, there will be no cumulative potential for change in soil quality or the natural groundwater regime.

The implementation of mitigation measures outlined in Section 5.9.3 will ensure the residual effect on the land, soils and geological environment during the construction phase detailed in Section 5.9.2 will be **short-term-imperceptible-neutral**.

Following the TII criteria for rating the magnitude and significance of impacts on the geological related attributes, the magnitude of impact is considered **negligible**.

5.11.4.3 Operational Phase

Overall, there will be a local change in recharge pattern due to the increase in hardstand from the proposed development. However, based on the overall size of the underlying aquifer and measures to protect soil and water quality there will be no overall change on the groundwater body status. There are no other large projects proposed within this area of the aquifer so no cumulative impact on recharge to the aquifer. There is no requirement for bulk chemical storage at the proposed development therefore the potential risk to soil quality is low.

The implementation of mitigation measures highlighted in Section 5.10.4 will ensure that the potential effects detailed in Section 5.9.3 on the land, soils and geological environment do not occur during the operational phase and that the residual effect will be **short-term-imperceptible-neutral**.

Following the TII criteria (Appendix 5.1) for rating the magnitude and significance of impacts on the geological attributes, the magnitude of impact is considered **negligible**.

5.12 Risk of Major Accidents or Disasters

The EPA Guidelines, 2022, state that:

“To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required.”

In general, risk of landslides in this area of Ireland is considered to be low, as the land is not located in a region with high seismic activity or large mountain ranges. 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 occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (GSI spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water).

Based on the GSI spatial map viewer (2025), the area of the proposed development and its surrounding have been classified as ‘Low’ to ‘Low Inferred’ landslide susceptibility. The GSI landslide database was consulted and there are no recorded landslides at the immediate site. The closest reported landslide event is located c. 2 km south east of the Site at M3 Junction 4 – Clonee associated with a motorway road cutting.

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, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the site.

The most recent earthquake was in Co. Waterford (0.1 Magnitude) on the December 25th 2024 c. 140km south of the proposed development.

There are no active volcanoes in Ireland so there is no risk from volcanic activity at the site.

The proposed development is not in close proximity to any higher or lower tier Seveso sites. All mitigation measures as identified above will be employed during the construction and the operational phase of the development. There will be no risk of major accidents or disasters associated with the construction and operational phase of the proposed development.

5.13 Worst Case Scenario

In a worst-case scenario, if the mitigation measures outlined in Section 5.10 aren't fully followed, there's a chance of contamination and pollution during the demolition, construction, and operational phases of the proposed development to occur. This could happen through accidental spills and leaks, increased run-off, sediment loading, excavation and maintenance works.

The mitigation measures set out in Section 5.9 above are in place to prevent any negative impacts on the land, soil, and geology. This will help minimize the likelihood of these issues occurring and protect the surrounding environment.

5.14 Significant Interactions

5.14.1 Air Quality & Climate

5.14.1.1 Demolition & Construction Phase

Demolition and construction phase activities such as excavations and stockpiling of materials etc. have the potential for interactions between air quality and the land and soils environment in the form of dust emissions. Mitigation measures are proposed to prevent fugitive dust emissions from construction activities including excavation of soils. The interaction is considered to be **neutral, Imperceptible, and short term**.

There are no interactions identified between land and soils and climate during the construction phase.

5.14.1.2 Operational Phase

There are no interactions identified between land and soils and air quality and climate during the operational phase.

5.14.2 Hydrology & Hydrogeology

5.14.2.1 Demolition Phase

The likelihood of significant effects on the hydrogeological and hydrological regime at the proposed development during the demolition phase is minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works.

As a result, no significant effects on the land's composition, stability, or fertility are anticipated. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. Therefore, there is no risk of increased sediment loading and run off entering nearby surface waterbodies during this phase.

As well as the mitigation measures outlined in this section, the development should adhere to the mitigation measures set out in Section 6.10.2 of the EIAR.

5.14.2.2 Construction Phase

The construction phase of the proposed development has the potential to result in increased sediment runoff which has the potential to interact negatively on groundwater and surface water quality. The proposed construction phase mitigation outlined in Section 6.10 - Chapter 6 – Hydrology and Hydrogeology of the EIA, means that the proposed development will not result in significant negative impact on groundwater and surface water quality in the local area. The interaction is considered to be **neutral, Imperceptible, and short term**.

5.14.2.3 Operational Phase

The operational phase of the proposed development has the potential to interact negatively on groundwater and surface water quality via the proposed surface water network. The proposed operation phase mitigation outlined in Section 6.10 - Chapter 6 – Hydrology and Hydrogeology of the EIA, means that the proposed development will not result in significant negative impact on groundwater and surface water quality in the local area. The interaction is considered to be **neutral, Imperceptible, and short term**.

5.14.3 Biodiversity

5.14.3.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities on predominately existing buildings and infrastructure and do not involve any excavation works. As a result, the impact on biodiversity is minimal.

Overall, the surface-level demolition works will benefit the local biodiversity, preserving their integrity and minimizing any potential environmental consequences. The interaction is considered to be **short-term, Imperceptible and neutral**.

5.14.3.2 Construction Phase

In the absence of standard mitigation measures to control the construction phase there is potential for silt laden material or pollution to enter nearby surface waterbodies (and impact on local biodiversity and European sites downstream from the works. Furthermore, dust emissions from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the mitigation measures outlined in this Section 5.10.3, there still remains a residual negative interaction between land and soils with biodiversity during the construction phase. The interaction is considered to be **neutral, Imperceptible, and short term**.

5.14.3.3 Operational Phase

The proposed work is expected to have no significant impact on the local designated areas and their conservation objectives. The interaction is considered to be **long-term, imperceptible and neutral**.

5.14.4 Waste

5.14.4.1 Demolition & Construction Phase

During the construction phase, excavated soil and stone (c. 2524 m³) will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. It is currently envisaged that all clean excavated soil will be reused on-site.

If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 10 (Waste), Chapter 5 (Land and Soils) and the requirements of the RWMP (Appendix 10.1), will ensure the effect is **long-term, imperceptible and neutral**.

5.14.4.2 Operational Phase

There are no potentially significant interactions identified between land and soils and geology during the operational phase.

5.15 References & Sources

- Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency (EPA, 2022).
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority (NRA, 2009)
- Geological Survey Ireland Map Viewer (<https://www.gsi.ie>)
- Environmental Protection Agency (EPA) Map Viewer (<https://gis.epa.ie/EPAMaps/>)
- Teagasc Map Viewer (<http://gis.teagasc.ie/soils/map.php>).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.
- Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (2000).
- Meath County Development Plan (2021-2027).
- Directive 2014/52/EU (16 April 2014) European Parliament.
- TII, (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; June 2009. Transport Infrastructure Ireland, Dublin.
- Construction Environmental Management Plan (Paul Mc Grail Consulting Engineers Ltd, 2025)
- Engineering Report (Paul Mc Grail Construction Engineers Limited, 2025)

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- Ground Investigations Ireland (GII) Site Investigation Report (July, 2024)
- Ordnance Survey of Ireland (2024) GeoHive online mapping

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CHAPTER SIX

HYDROLOGY & HYDROGEOLOGY



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CHAPTER SIX

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CHAPTER 6 | Hydrology & Hydrogeology

6.1 Introduction

This chapter of the EIAR evaluates the likely significant effects, if any, which the proposed development will have on Hydrology (surface water) and Hydrogeology (groundwater). This chapter contains necessary information as defined in the Environmental Protection Agency (EPA) ‘Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, 2022).

The chapter initially provides a description of the receiving environment of the site and the potential impacts of the development. When assessing the potential impacts, this assessment considers the significance of the environmental attributes, and the predicted scale, and duration of the likely effects.

The chapter also outlines the proposed mitigation measures that will reduce or eliminate the identified potential impacts and defines the residual effects of the proposed development (the effect after the implementation of mitigation measures).

This chapter should be read in conjunction with Chapter 5 ‘Land, Soils & Geology’ submitted with the planning application. A full description of the proposed development is set out in Chapter 2 of this EIAR.

6.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Rashaqat Ali Siddiqui and Marcelo Allende in the Water section of AWN Consulting Ltd.

Rashaqat Ali Siddiqui (BSc, Msc, MIT). Ali is a hydrogeologist with over 6 years’ experience in water resource management and impact assessment. He has a Masters in Hydrogeology and is a former Education Secretary of the Irish chapter for the Association of Hydrogeologists (IAH). Ali’s specialist area of expertise is water resource management, Site investigation and monitoring, Contaminated land Assessment, hydrological assessment and environmental impact assessment.

Marcelo Allende (BSc, BEng) is a Principal Environmental Consultant (Hydrologist) at AWN with over 20 years of experience water resources technical studies, conceptual and numerical modelling and environmental consultancy. Marcelo holds a degree in Water Resource Civil Engineering (BEng, Hons) from the University of Chile and a Bachelor of Science in Engineering (BSc, Hons). He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, surface and groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments (Stage 1,2 and 3), Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (IAH, Irish Group) and a member of Engineers Ireland (MIEI).

6.3 Proposed Development

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

The subject site is located within the townland of Bennetstown to the north of the defined development boundary of the town of Dunboyne. The site is located c.3.5km to the north of the town centre and situated west of the Dunboyne to Clonsilla Rail Line and M3 Parkway rail station and the Royal Canal and the Dublin-Maynooth Railway Line. The site is accessible via the R157 which is located at the east of the site as shown in Figure 6.1. The site is phase 3 of a larger masterplan area. Phases 1 and 2 are situated to the east and north of the site.



Figure 6.1 Site location

The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

6.3.1 Construction Phase

The key civil engineering works which relate to the hydrogeological and hydrological environment during construction of the proposed development are summarised below:

- During the construction phase, excavated topsoil and subsoil and stones (c. 2524 m³) will be generated from the excavations required to facilitate site levelling to the necessary base level and construction of new foundations. It is currently envisaged that all of the material will be able to be retained and reused onsite for landscaping and fill.
- Storage of aggregate materials such as sands and gravels will be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Any excavated material temporarily stockpiled onsite for re-use during reinstatement will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc;
- Temporary storage of fuel required for on site for construction traffic. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage;
- There will be a requirement for deliveries of imported engineering fill (sands and gravels), and other construction materials include, steel structure, concrete, cladding, ducting and piping. Construction materials will be brought to site by road. Soil requiring removal offsite will be removed from site regularly to ensure there is minimal need for stockpiling. Some of the topsoil will be re-used on site for backfill (levels in some areas need to be raised) and landscaping with some export required. Any surplus topsoil material will be transported off site and disposed of at a fully authorised soil recovery facility / site.
- Construction activities will necessitate storage of cement and concrete materials, temporary oils, and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site; and
- No groundwater dewatering is required during the construction phase and no discharge to ground. As such no change to the natural groundwater regime.
- There will be no change to the current hydrological flow regime which surrounds the proposed development site.
- Stormwater run-off will result in increase in silty run-off as construction proceeds. As part of the stormwater management plan for the construction site, it is planned to install the downgradient attenuation pond at the first stage of construction to ensure attenuation and settlement prior to discharge to off-site drains which discharge to the Tolka and tributaries as shown in Figure 6.2.

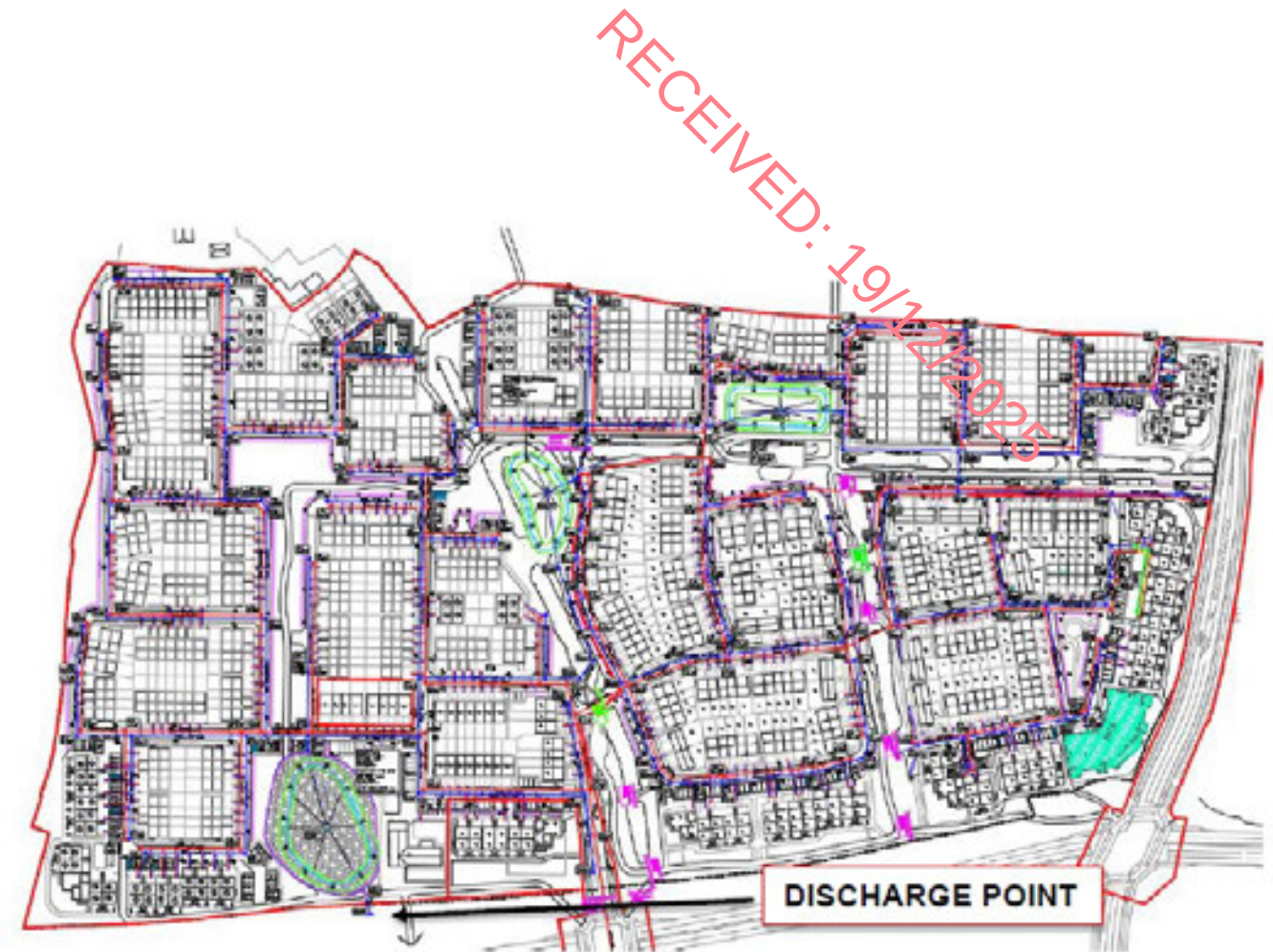


Figure 6.2 showing attenuation ponds and discharge points (Source: Paul Mc Grail Consulting Engineering Services Report, 2025).

6.3.2 Operational Phase

The key elements of the design which relate to the hydrogeological and hydrological environment during construction of the proposed development are summarised below:

- There will be an increase in hardstand and a resultant increase in run-off rate for storm water due to the proposed development.
- The proposed surface water drainage system designed for this development includes a number of Sustainable Urban Drainage Systems (SuDS) measures which will be incorporated to reduce run-off volumes and improve run-off water quality. The SuDS mechanisms will comprise modular permeable paving, swales, bioretention systems, Detention Basins (above ground storage), petrol interceptors, Hydrobrake flow control and attenuation. These features will be provided to cater for up to a 1-in-100-year rainfall event plus 20% allowance for climate change characteristics. Surface water runoff from the development would be attenuated to greenfield runoff (Q_{bar}), in accordance with the recommendations of the GSDS.

For further details, refer to the Engineering Services Report Assessment prepared by Paul Mc Grail Consulting Engineers Ltd (2024) and included as part of this Application.

6.4 Methodology

6.4.1 Criteria for Rating Effects

The section establishes the criteria, and guidance used to rate the significance of the potential impacts on the hydrological aspects of the site and surrounding area.

The document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

Furthermore, in line with this TII Guidelines, an assessment of the attribute importance has been undertaken in order to provide a basis for the assessment of impact provided. The attribute importance considers the potential as well as the existing use of the surface water features as a water resource (i.e., water supply, fisheries and other uses) as well as ecological habitat requirements. The TII criteria for rating the hydrological related attributes are presented in Appendix 6.1 of this EIAR.

The quality, significance, and duration of the potential impacts, residual effects, and cumulative effects are described using standard EIA descriptive terminology set out in Chapter 1 of this EIAR.

The principal attributes (and effects) to be assessed include the following:

- Water Framework Directive (WFD) Status and potential for increased risk of deterioration of this status due to the activities of the site.
- River and aquifer water quality in the vicinity of the site (where available).
- Surface, transitional and coastal watercourses near the site and potential impact on surface water quality arising from Proposed Development related works including any discharge of surface water run-off.
- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any); and
- Surface water features within the area of the site.
- High-yielding water supply springs/ wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the Proposed Development.
- Classification (regionally important, locally important etc) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the Proposed Development e.g. removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality.
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and,
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporarily.

6.4.2 Relevant Legislation & Guidance

This impact assessment was undertaken having regard to the following legislation and guidance:

- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009, previously NRA). The TII criteria for rating the hydrogeological and hydrological related attributes are presented in Appendix 6.1 of this EIAR.
- Water Framework Directive 2000/60/EC.

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, commonly known as the Water Framework Directive (WFD), establishes a framework for community action in the field of water policy.

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. In 2009 the first River Basin Management Plan (RBMP) 2009-2015 was published. The second cycle river basin management plan was carried out between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD). The third cycle (2022-2027) is currently in place and called the Water Action Plan 2024- A River Basin Management Plan for Ireland.

The Water Action Plan 2024 has been reviewed in the context of ensuring mitigation measures comply with current and expected future measures required to be implemented for protection of water body status within the context of the Proposed Development.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation, regulations and guidelines. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003).
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014).
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended SI No. 77 of 2019).
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016).
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010).
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011).
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988.
- Local Government (Water Pollution) Acts 1977-1990.
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.
- Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board).
- Central Fisheries Board Channels and Challenges – The enhancement of Salmonid Rivers.
- CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.
- CIRIA C648 Control of Water Pollution from Constructional Sites; and
- Water Services Guidelines for Planning Authorities Draft (Department of Housing, Planning and Local Government, 2018)
- Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes (NRA/TII, 2006)

6.4.3 Sources of Information

Desk-based hydrological information in the vicinity of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Latest EPA Envision water quality monitoring data for watercourses in the area.
- Geological Survey of Ireland (GSI) - on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of

Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping.

- River Basin Management Plan for Ireland 2018-2021 (Department of Housing, Planning and Local Government, 2018).
- Water Action Plan 2024 - A River Basin Management Plan for Ireland, (Department of Housing Local Government & Heritage, Sept 2024).
- WFD 3rd Cycle: HA 09 Draft Liffey and Dublin Bay Catchment Report (EPA, May 2024).
- WFD 2nd Cycle -Tolka_SC_020 (Code 09_4) Subcatchment Assessment report (Catchments.ie).
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW), 2009).
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie).
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports.
- Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB)).
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (Inland Fisheries Ireland, 2016).
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (CIRIA 532, 2001).
- National Parks and Wildlife Services (NPWS) – Protected Site Register.

Site specific data was derived from the following sources:

- Various design site plans and drawings, as submitted with this planning application .
- Paul Mc Grail Consulting Engineering Services Report (May, 2024)
- Paul Mc Grail Consulting Engineers Construction Environmental Management Plan (June, 2024)
- Updated Ground Investigations Ireland (GII) Site Investigation Report (July, 2024)

6.4.4 Site Surveys/Investigation

A site investigation was carried out by Ground Investigations Ireland Ltd., in May 2024 at the site of the proposed Residential Development in Dunboyne. In addition to the description of the soil profile outlined in Section 5.4.3, the following is noted in relation to hydrogeology:

- Three monitoring wells were installed to a maximum depth of 2.5m,
- No groundwater was noted during the investigation however these exploratory holes did not remain open for sufficiently long periods of time to establish the shallow hydrogeological regime and groundwater samples were not collected;
- No evidence of contamination was noted during trial pitting or drilling;
- Soakaway testing in five locations confirmed poor infiltration rates in the soils.

6.4.5 Consultation

There was consultation with Mr. Jarlath Flanagan of the Environment, Water & Fire Services in Meath County Council to request information on illegal landfills in the surrounding area of Bennetstown. There were no identified illegal landfills in the surrounding area according to Meath County Council.

6.5 Difficulties Encountered

There were no significant difficulties encountered in compiling the specified information for this EIAR chapter.

6.6 Receiving Environment

6.6.1 Site Location & Surrounding Land Use

The subject site is located within the townland of Bennetstown to the north of Dunboyne town in County Meath, approximately 15 km north-west of Dublin city centre. The subject site is devoid of building structures and is predominantly occupied by greenfield land characterised by an agricultural function. The site is bounded to the east by R157 road, to the northeast by M3 Parkway and greenfield land in all other directions.

A review of historic maps (including available 6-inch historic maps (1829-41), 25-inch historic maps (1897-1913), Cassini 6-inch historic maps 1830-1930 and aerial photographs (1995 to 2012) from the Ordnance Survey of Ireland) (OSI 2025) and current aerial photography (Bing Maps, 2025) confirms that the subject lands at the site have been primarily used for agricultural purposes in the past, and this use continues to the present day. Developments in the wider area include the construction of the M3 Motorway and associated link roads and the construction of the M3 Parkway Railway station and associated carpark on the Dublin to Dunboyne railway line to the north of the proposed development.

Historic 6inch first edition map presented in Figure 6.3 along with the 25inch Cassini and Historic 6inch last edition presented in Figure 6.4 and 6.5 respectively illustrates the historic use of the site which is primarily greenfield site.

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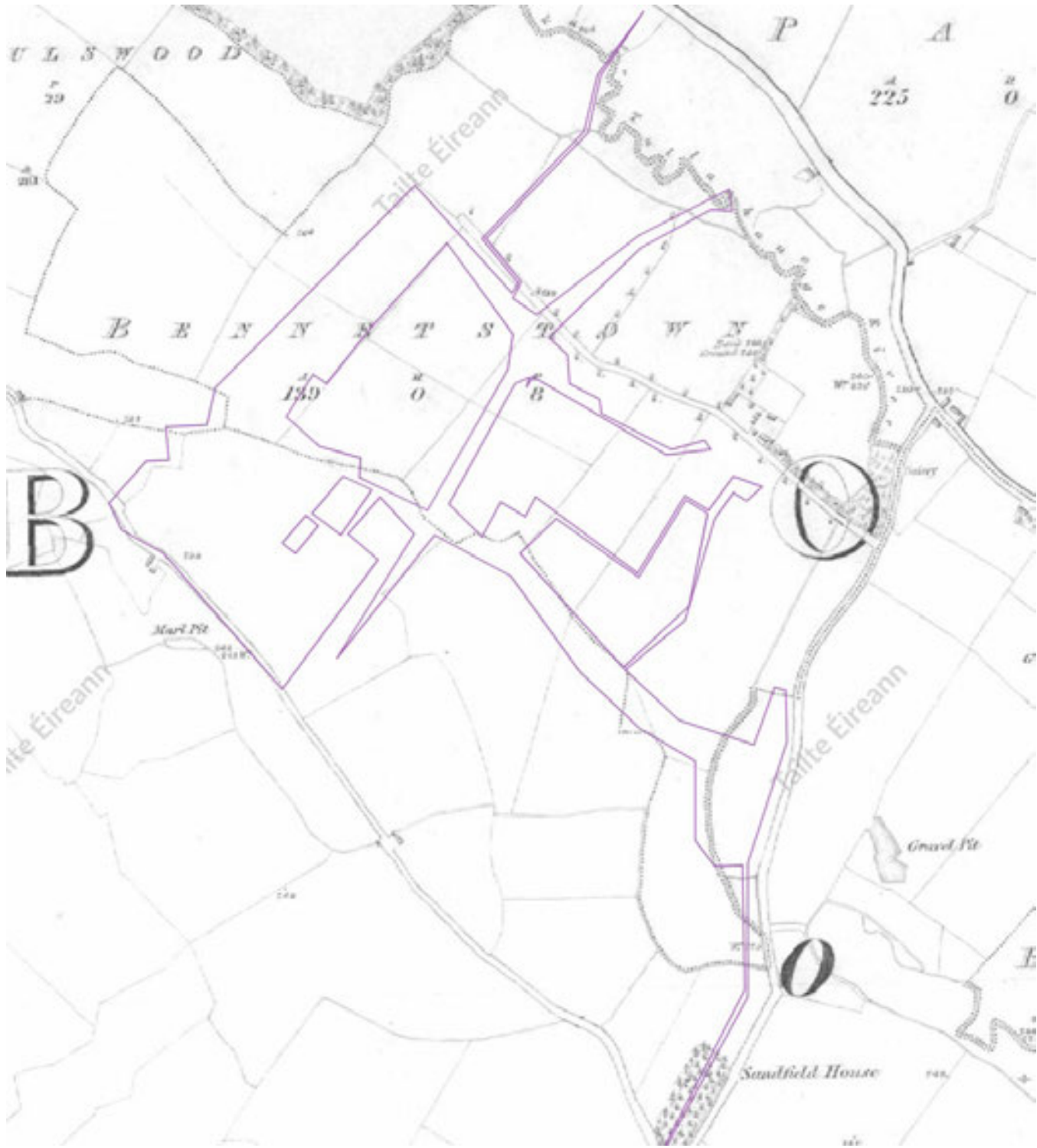


Figure 6.3 Historic 6Inch First Edition (OPW, 2025)

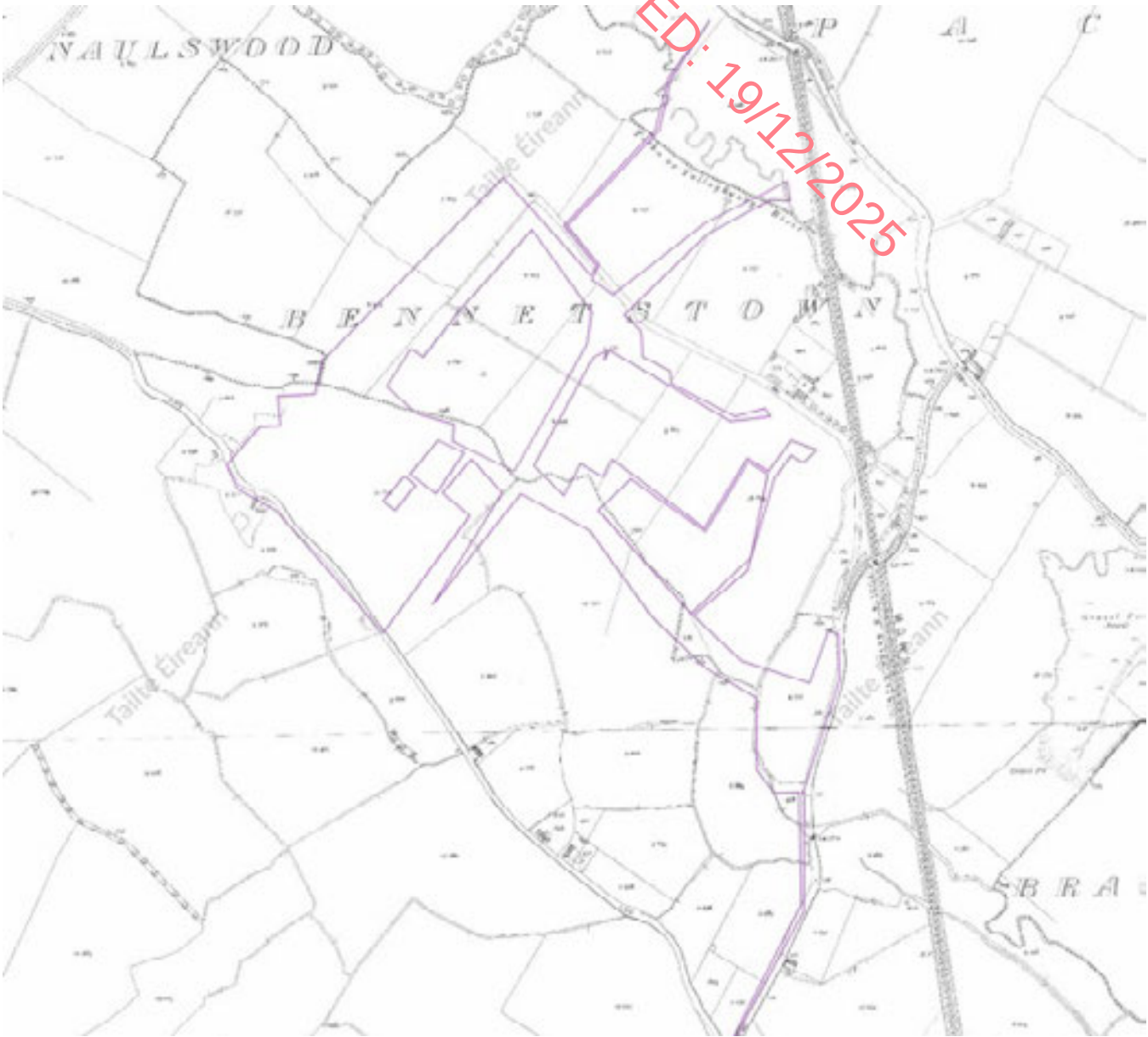


Figure 6.4. Historic 25Inch 'Cassini' (OPW, 2025)

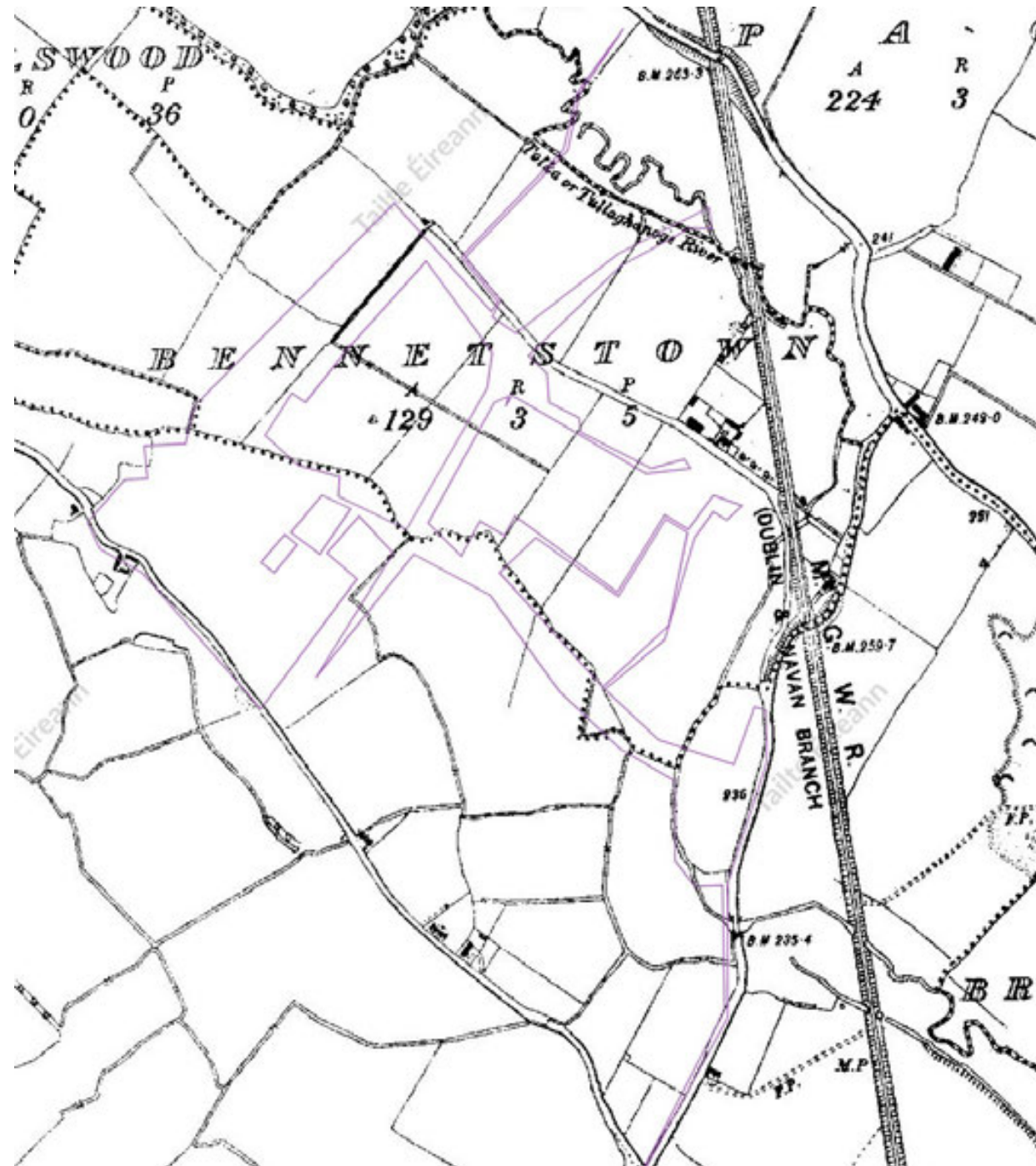


Figure 6.5 Historic 6Inch Last Edition (OPW, 2025)

Dunboyne Phase 1 (Planning Application Reference: 2360290) development located to the south of the site which consists of permission for a Large-Scale Residential Development consisting of: i) 267 no. residential units comprising 145 no. dwelling houses and 122 no. apartments/duplexes providing a mix of 1, 2, 3 and 4-bed units.

6.6.2 Current Site Setting and Topography

The site is bounded to the east by R157 road, to the northeast by M3 Parkway and greenfield land in all other directions. The site slopes from 75m at the northern boundary of the proposed development to 70.63m to the south at an average gradient of 1in60 as shown in Figure 6.6.



Figure 6.6 Site falls (Paul McGrail, 2025)

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6.6.3 Hydrology

6.6.3.1 Regional Hydrological Environment

The proposed development site is located within the former Eastern River Basin District (ERBD) (now the Irish River Basin District), as defined under the WFD.

The proposed development site as defined by the EPA nomenclature (EPA, 2024) is situated in Hydrometric Area No. 09 of the Irish River Network, and lies within the Liffey and Dublin Bay Catchment (Catchment ID: 09), and the Tolka_SC_010 Sub-Catchment (ID: 09_10).

The River Tolka (Tolka_020, IE_EA_09T010800) runs from the north of the site flowing in a south-southeastern direction as shown in Figure 6.7, traversing two (No.2) narrow sections of the northern portion of the site, before flowing south along / through the adjacent lands to the west of the M3 Motorway prior to traversing / aligning the boundary in the southern portion of the site. From here, the River Tolka then flows for approximately 20.5 km (hydrological distance) in an alternating southeast to east direction across North Dublin City, while merging with multiple river waterbodies such as the Pinkeen River, before its outfall to the Tolka Estuary transitional waterbody, which in turn ultimately discharges to Dublin Bay coastal waterbody which includes and is hydrologically connected / linked to multiple Special Protection Areas (SPA), Special Areas of Conservation (SAC), and proposed Natural Heritage Areas (pNHA). The Naulswood Stream (a tributary of the Tolka) flows in a south-easterly direction and joins River Tolka c. 2 km from the proposed development. There is a hydrological connection and linkage between the site and the conservation / protected zones within Dublin Bay via the downgradient Tolka_030 and Tolka Estuary.

The site area contains a number of drainage ditches which appear to fill following period of heavy rainfall and then dry out during dry conditions. Overall drainage is towards the Tolka River in the south east.

According to the NPWS (2024) on-line database there are no special protected areas within, adjacent to or in the vicinity of the subject development site.

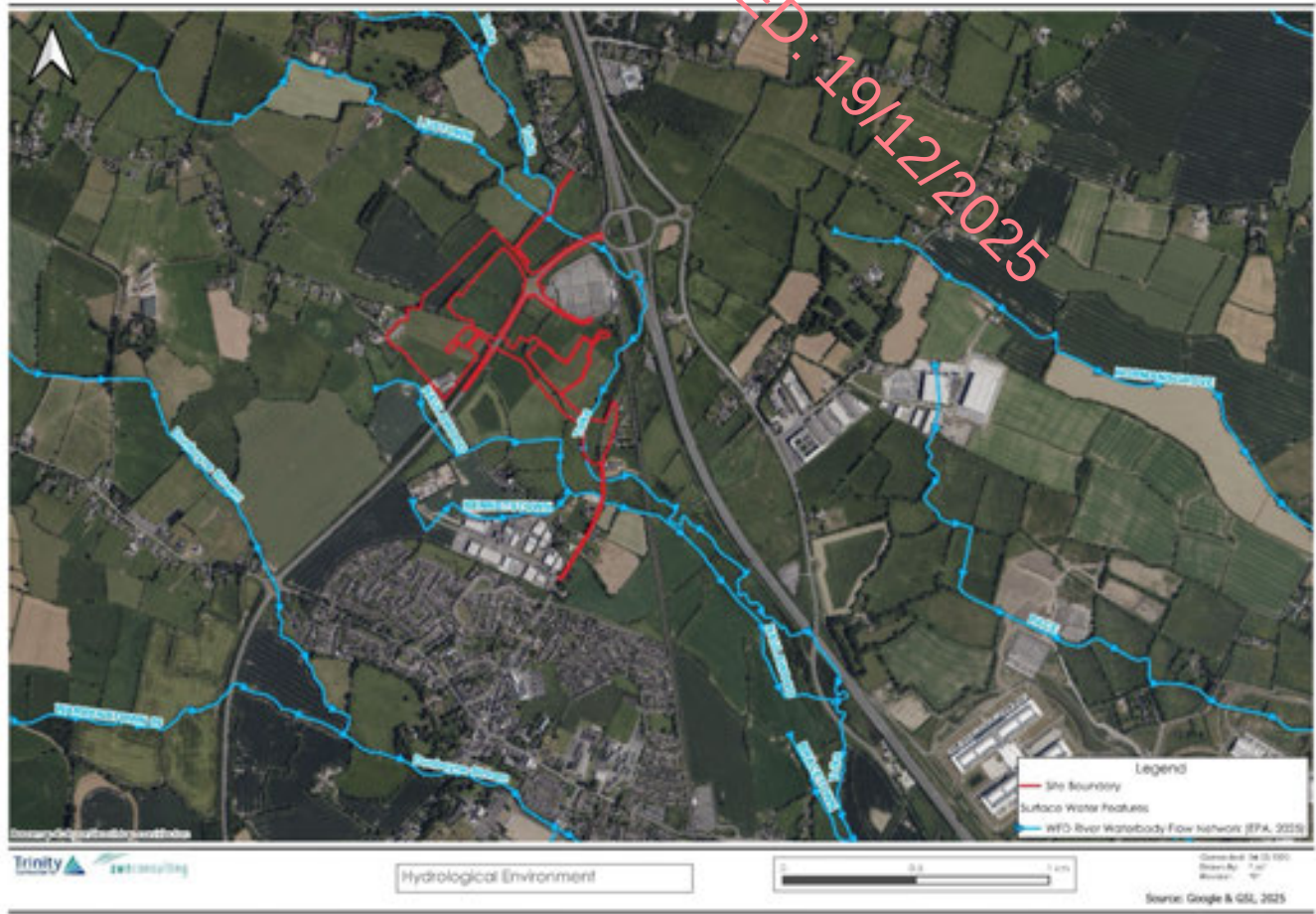


Figure 6.7 Hydrological Environment (EPA, 2025)

6.6.3.2 Surface Water Quality

Surface water quality is monitored periodically by the EPA at various regional locations along with principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

In relation to the proposed development site, the nearest (active) surface waterbody EPA monitoring stations are:

- TOLKA – Br NNE of Dunboyne (EPA Code: RS09T010400), which is located in the Tolka_020 waterbody on the eastern site boundary.
- TOLKA – Railway Br NNE of Dunboyne (EPA Code: RS09T010390), which is located in the Tolka_020 waterbody c. 70 m to the east of the site.

The most recent water quality status recorded by the EPA (2024) at this monitoring station (EPA Code: RS09T010400) is classified as Q3-4 Poor which denotes a moderately polluted waterbody. This value is based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates (the young stages of insects primarily but also snails, worms, shrimps etc.) resident at a river site. Refer to Figure 6.8 below for locations of these EPA quality monitoring points in the context of the site.

Q Value	WFD Status	Pollution Status	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2	Bad	Seriously polluted	Unsatisfactory

In addition to the biological assessment method outlined above the EPA also classified water bodies in accordance with the WFD water quality status. Rivers, lakes, estuaries and coastal waters can be awarded one of five statuses: High, Good, Moderate, Poor, Bad. Groundwater has just two statuses – Good and Poor.

The Environmental Protection Agency (EPA, 2025) on-line mapping presents the available water quality status information for water bodies in Ireland. The most recent WFD Status score (2016-2021) states that the River Tolka has an ‘Moderate’ status while its WFD risk score is ‘At Risk of not achieving good status’ (refer to Figure 6.9).



Figure 6.8 National Water Monitoring Stations (EPA, 2025)



Figure 6.9 WFD Surface Water Quality Status 2016-2021 (EPA, 2025)

6.6.3.3 Bathing Waters and Recreational Waterbodies

A review of Environmental Sensitivity Mapping online maps that includes the Register of Protected Areas (RPA) under the Water Framework Directive (WFD) has shown that there are no Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA located in the vicinity of the site. The nearest bathing waterbody is Sandymount Strand (IEEABWC090_0000_0300) located >c. 20km south-east of the proposed development site and no hydrological/hydrogeological connection/linkages exist.

6.6.3.4 Surface Water Local Drainage

The proposed surface water network has three catchment areas that for Catchment 1 will connect to an existing 900mm diameter pipe which runs under the R157 road and Catchment 3 will connect to Catchment 2 before discharging to the existing ditching running in an easterly direction.

6.6.3.5 Wastewater

The proposed foul sewer network will connect to the proposed foul sewer pumping station located at the northeast boundary which will discharge to the existing Irish Water foul sewer network.

6.6.3.6 Water Supply

There is an existing 350mm diameter watermain located along the R147.

6.6.3.7 Flood Risk

A copy of the Flood Risk Assessment Report prepared by IE Consulting (2024) (Doc. Ref: IE3007_FRA Report_6336) has been submitted as part of this planning application.

In the context of the ‘Planning System and Flood Risk Management Guidelines, DOEHLG, 2009’ the assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment indicates that the proposed link road required to accommodate the development under the Dunboyne North Masterplan partially falls within a predictive 1% AEP (1 in 100 year) fluvial Flood Zone ‘A’ and a 0.1% AEP (1 in 1000 year) fluvial Flood Zone ‘B’. The proposed residential development is not at risk of fluvial flooding and is located within Flood Zone ‘C’.

The proposed link road required to accommodate the development under the Dunboyne North Masterplan partially falls within a predictive 1% AEP (1 in 100 year) fluvial Flood Zone ‘A’ and a 0.1% AEP (1 in 1000 year) fluvial Flood Zone ‘B’. The bridge crossing was redesigned to entail the construction of a continuous structure with longer spans than originally proposed (following a request for further information (RFI) from Meath CoCo as part of the Phase 1 development (ref: 23/60290)). As a result of this redesign, the works now no longer require the excavation of additional flood capacity within the Tolka’s western flood plain, nor does it require the removal of the existing berm located along the eastern bank of the river, except for minor amendments to tie in with the embankments of the proposed link-road and bridge at this location. In addition, a section of existing drainage channel/ditch in the south of the Site that was originally to be culverted beneath the link-road will now be maintained un-culverted once realigned slightly to avoid the western bridge embankments and direct it beneath bridge.

6.6.3.8 Areas of Conservation

The NPWS (2024) on-line database have been reviewed to determine the location of areas of conservation within proximity to the proposed development site, and there are no Special Protected Areas (SPA) established under the EU Birds Directive (79/409/EEC), or Special Areas of Conservation (SAC) established under the Habitats Directive on or within the boundary of the proposed development site. Furthermore, there are no Natural Heritage Areas (NHA), or proposed Natural Heritage Areas (pNHA) established under the Wildlife Acts, 1976 and 2000 (as amended).

The European sites in closest proximity to the proposed development are as follows and presented in Figure 6.10:

- The Rye Water Valley/Carton SAC (001398) – c. 6.9 km to the southwest/downgradient of the site.
- The Royal Canal pNHA SPA – c. 6 km to the southeast/downgradient of the site.
- Liffey Valley pNHA SPA – c. 8 km to the southeast/downgradient of the site.
- Rye Water valley/Carton pNHA – c. 7 km to the south/downgradient of the site.
- Grand Canal pNHA – c. 13 km to the southeast/downgradient of the site.

These European sites are considered to be outside of the Tolka catchment within which the proposed development lies and are also not within the downgradient hydrogeological catchment of the proposed development. The proposed development site only has a direct hydrological pathway or connection to the River Tolka via the Naulswood Stream c. 2 km from the site which subsequently outfalls downstream into the Tolka Estuary before ultimately discharging to Dublin Bay and the Irish Sea (and associated SAC/SPA Natura 2000 site), c. 20.5 km downgradient of the proposed development site.

There is therefore a direct hydrological although extremely lengthy pathway with the designated conservation sites and designated Natura 2000 sites located downstream within the Dublin Bay, namely, South Dublin Bay (SAC & pNHA), South Dublin Bay and River Tolka Estuary SPA, Rockabill to Dalkey Island SAC, and North Bull Island SPA.

There are no groundwater dependent habitats within designated sites downstream of the Proposed Development, located within the Dublin GWB. The Rye Water Valley/Carton pNHA (001398) is located approximately 6km southwest of the Site at its closest point within the Dublin GWB and is designated for groundwater-dependent habitats, namely ‘Petrifying springs with tufa formation (*Cratoneurion*) [7220]’.

Given the limited flow distance within the Dublin GWB of less than a kilometre, the generally eastwards direction of groundwater flow, the presence of numerous intercepting watercourses between the Site and Rye Water Valley/Carton pNHA (001398), and the location of this site ca. 6km to the southwest of the Site in the opposite general direction of groundwater flow, it is deemed that there is no source pathway linkage to this wetland habitat.

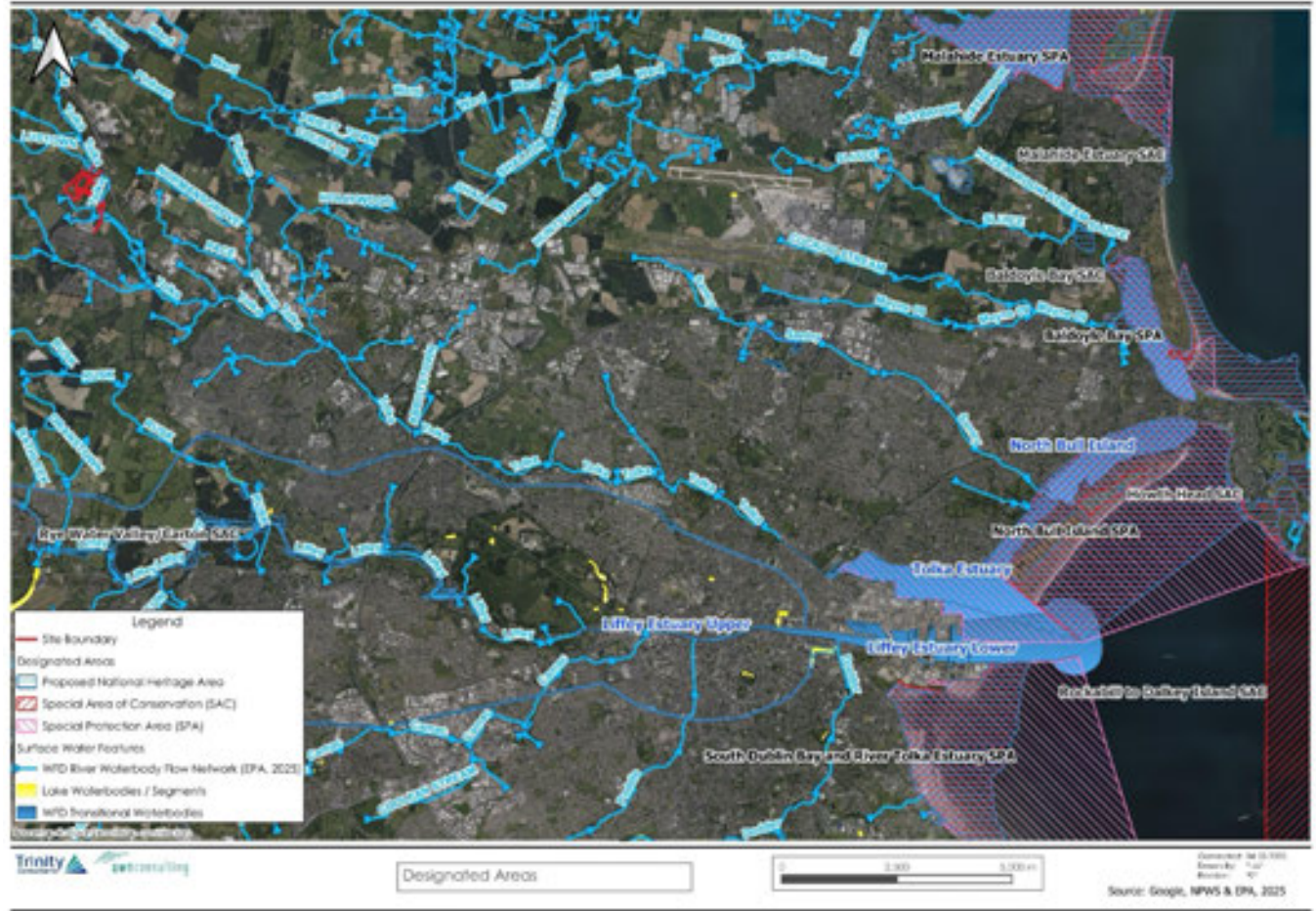


Figure 6.9 Designated Areas (EPA & NPWS, 2025)

6.6.4 Rating of Importance of Hydrological Attributes

The review of the receiving environment undertaken (Section 6.6.1 through Section 6.6.8) and based on the TII methodology (2009) (See Appendix 6.1, Table 7) the importance of the hydrological features at this site can be rated as 'Low- Medium Importance'. This is based on the assessment that the attribute has a medium-quality significance or value on a local scale.

6.6.5 Hydrogeology

6.6.5.1 Aquifer Classification

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km²), well yield (m³/d), specific capacity (m³/d/m) and groundwater transmissivity (mm³/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (PI) or generally unproductive (Pu).

The GSI (2024) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer

- Rkc – Regionally Important Aquifer – Karstified (conduit)
- Rkd – Regionally Important Aquifer – Karstified (diffuse)
- RK – Regionally Important Aquifer – Karstified
- Rf – Regionally Important Aquifer – Fissured bedrock
- Lm – Locally Important Aquifer – Bedrock which is Generally Moderately Productive
- Lk – Locally Important Aquifer – Karstified
- LI – Locally Important Aquifer – Bedrock which Moderately Productive only in Local Zones
- PI – Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones
- PU – Poor Aquifer – Bedrock which is generally Unproductive

Gravel Aquifer

- Lg – Locally Important Aquifer – Sand & Gravel
- Rg – Regionally Important Aquifer – Sand & Gravel

Presently, from the GSI (2025) National Bedrock Aquifer Map, the GSI classifies the bedrock aquifer beneath the subject site as a 'Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones'. The potential for vertical or horizontal migration within this type of aquifer is not significant and on local scale. The GSI map does not identify structural faults underneath the area of the subject site. Refer to Figure 6.11.



Figure 6.11 Aquifer Classification (GSI, 2025)

6.6.5.2 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from potential contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of or of mixtures of peat, sand, gravel, glacial till, clays or silts).

Groundwater vulnerability is an indication of how easily the aquifer can become contaminated by human activity. It is dependent on the thickness and permeability of the overlying soils and depth to the water table. For example, a bedrock aquifer with minimal thickness of overburden or with a thin layer of permeable overburden will be more vulnerable to contamination than a bedrock aquifer which has a thick layer of low permeability overburden. Extreme groundwater vulnerability is also associated with karst landforms as these are a direct pathway for water and contaminants to enter the aquifer from the surface.

As presented in Figure 6.12, the GSI presently classifies the aquifer underlying the Proposed Development site as having ‘Low’ (L) vulnerability underlying the majority of the proposed development site. indicating 10m+ overburden of low permeability subsoils, coupled with a small zone of High (H) vulnerability in the southern and western portion of the site, while parts / portions of the east (NE & SE) of the site are underlain by Moderate (M) vulnerability rating, thereby indicating an overburden (subsoil) thickness of 3-5m and 5-10m, respectively in these localised areas of the site. Infiltration testing confirmed that infiltration to ground was low and site testing (shallow drilling to 2 m bls) confirmed bedrock was not encountered at shallow depths.

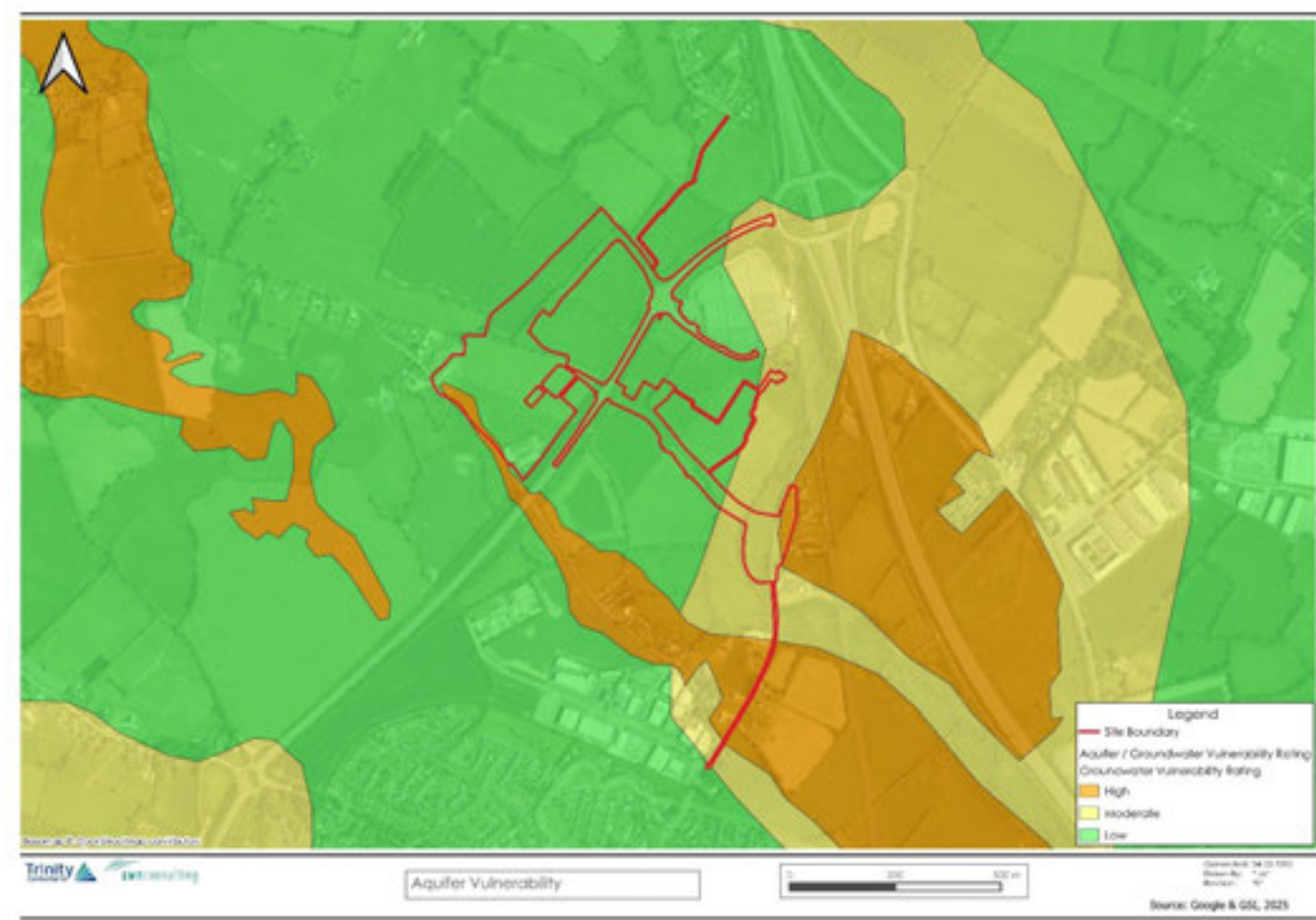


Figure 6.12 Aquifer Vulnerability (GSI, 2025)

Aquifer vulnerability classifications are primarily based on the permeability and thickness of subsoils. Given the subsoils are Made ground underlain by clay along with extreme vulnerability. The expected bedrock depth is 10m+ overburden of low permeability subsoils, coupled with a small zone of High (H) vulnerability in the southern and western portion of the site, while parts / portions of the east (NE & SE) of the site are underlain by Moderate (M) vulnerability rating, thereby indicating an overburden (subsoil) thickness of 3-5m and 5-10m, respectively in these localised areas of the site. Infiltration testing confirmed that infiltration to ground was low and site testing (shallow drilling to 2 m bls) confirmed bedrock was not encountered at shallow depths.

Table 6.1 Vulnerability Mapping Guidelines (Source (DoELG, EPA, GSI, 1999))

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	> 3.0m	3.0 - 10.0m	3.0 - 5.0m	> 3.0m	N/A
Moderate (M)	N/A	> 10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	> 10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

6.6.5.3 Groundwater Wells and Flow Direction

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland.

This current index shows multiple wells in the vicinity of the proposed development site. There is 1 no. well located on the development site.

Figure 6.13 presents the GSI well search for the area surrounding, and Table 6.3 summarises the details of recorded wells present within this search area. It is noted that there is a number of Public Water Supply wells present (PW1, PW2 and PW4), which constitutes the Dunboyne water supply.

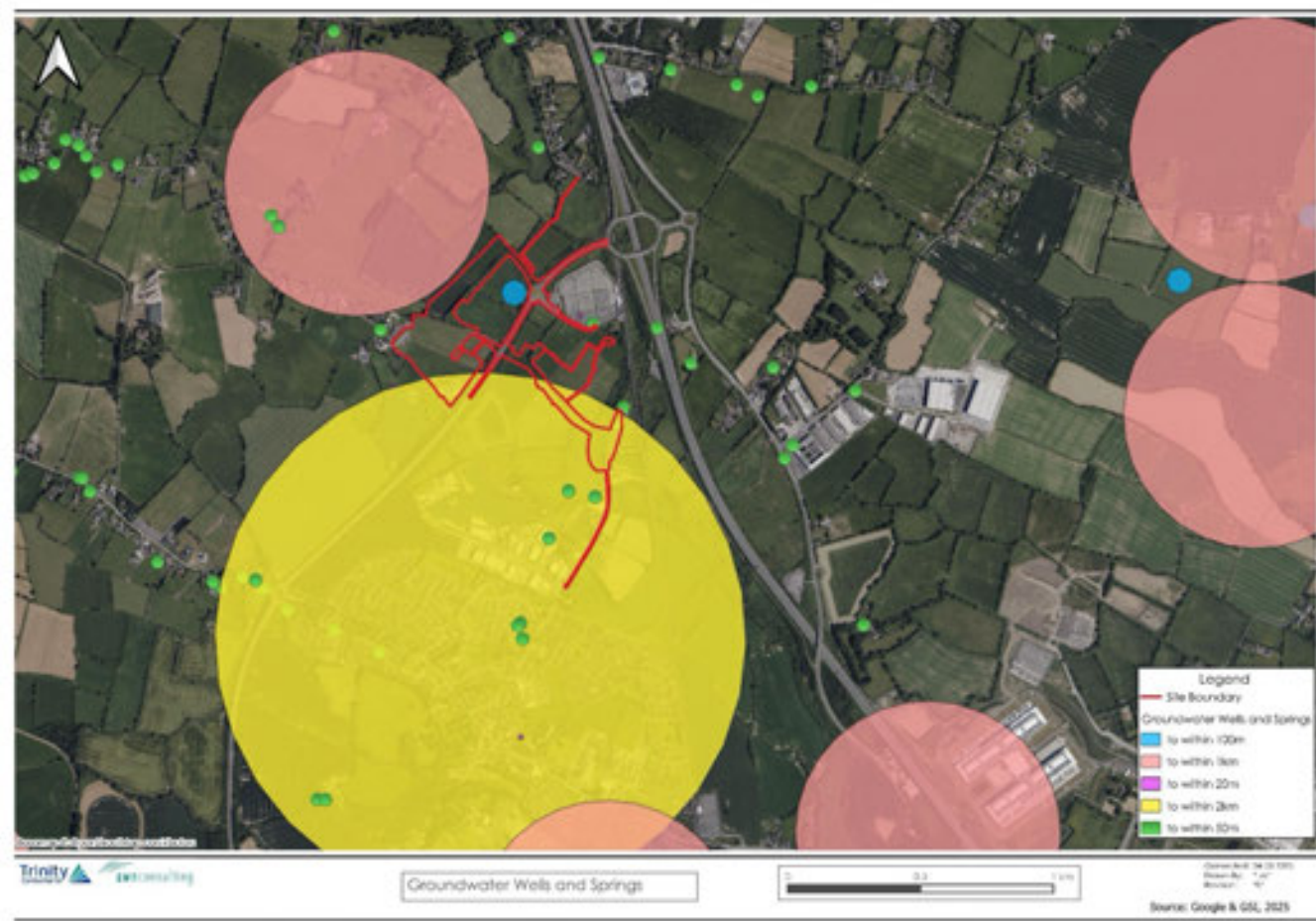


Figure 6.13 GSI Wells and Springs (GSI, 2025)

Table 6.2 GSI Well Card Index (GSI, 2025)

GSI NAME	ORIGNAME	TYPE	EASTING	NORTHING	TOWNLAND	COUNTY
2923NWW463	Unknown	Dug	301400	243800	Bennetstown	Meath
2923NWW411	Unknown	Borehole	301650	243720	Bennetstown	Meath
2923NWW181	Unknown	Dug	301700	243690	Dunboyne	Meath
2923NWW179	Unknown	Dug	301820	243380	Dunboyne	Meath
2923NWW412	Unknown	Dug	301820	243350	Dunboyne	Meath
2923NWW178	Unknown	Unknown	301800	243320	Dunboyne	Meath
2923NWW413	Unknown	Dug	301,780.00	243,170.00	Dunboyne	Meath
2923NWW414	Unknown	Borehole	301,750.00	243,120.00	Dunboyne	Meath
2923NWW405	Unknown	Borehole	301,730.00	243,060.00	Dunboyne	Meath
2923NWW388	PW1	Borehole	301,720.00	243,040.00	Dunboyne	Meath
2923NWW404	Gallery	Infiltration Gallery	301,720.00	243,020.00	Dunboyne	Meath
2923NWW415	Unknown	Borehole	301,680.00	242,950.00	Dunboyne	Meath
2923NWW389	PW2	Borehole	301,620.00	243,060.00	Dunboyne	Meath
2923NWW403	PW4	Borehole	301,610.00	243,040.00	Dunboyne	Meath
2923NWW177	Unknown	Dug	301,550.00	242,880.00	Dunboyne	Meath
2923NWW416	Unknown	Borehole	301,500.00	242,972.00	Dunboyne	Meath
2923NWW417	Unknown	Dug	301,360.00	243,050.00	Dunboyne	Meath
2923NWW418	Unknown	Dug	301,310.00	243,120.00	Dunboyne	Meath
2923NWW419	Unknown	Dug	301,300.00	243,140.00	Dunboyne	Meath

The subject site is located within the Dunboyne Public Water Supply (PWS), Source Protection Zone (SPZ), which is a zone defined by the GSI in order to protect groundwater supplies from potential pollution or contamination. Figure 6.14 presents the Proposed Development Site in relation to the Dunboyne Public Water Supply (PWS) - Source Protection Zone (SPZ). The Public Water Supply at Dunboyne comprises 4 potential abstraction wells (PW1-PW4). Our current understanding is that these wells are not actively in use for a public supply and when they were in use required chlorination treatment. As a conservative measure a technical note has considered the risk of impact (construction and operation) to the PWS as if it were an active supply within the planning application (Appendix 6.3).



Figure 6.14 Source Protection Zone (GSI, 2025)

6.6.6 Groundwater Quality

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater, transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of ‘Good Status’ in water bodies that are of lesser status at present and retaining ‘Good Status’ or better where such status exists at present. ‘Good Status’ was to be achieved in all waters by 2015, as well as maintaining ‘high status’ where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

Presently, the groundwater body in the region of the site (Dublin GWB - IE_EA_G_008) is classified under the WFD Risk Score system (EPA, 2024) as under “Review” meaning the GWB is being reviewed to determine whether or not the GWB has achieved its objectives and has either no significant trends or improving trends. The Dublin GWB was given a classification of “Good” status for the last WFD cycle (2016-2021) as shown in Figure 6.15.



Figure 6.15 WFD Ground Water Quality Status 2016-2021 (EPA, 2025)

6.6.7 Conceptual Site Model

Subsoils across the whole subject site comprise Till derived from limestone, and alluvium located in the north, south and east extents of the access road. The aquifer vulnerability is predominantly Low (L), with a small portion of High (H) vulnerability in the southern portion of the site, and Moderate (M) in the eastern and South eastern portion of the site. The bedrock beneath the general vicinity of the site is classified as a locally important aquifer (LI) – bedrock which is moderately productive only in local zones.

3 no. public ground water supply are located c. 600 m downgradient of the proposed development site, and part of the site is located within the source protection zone for these supply wells. As such any discharge to ground or abstraction from the aquifer could impact the potable supply. It is noted that there is no plan to abstract from or discharge to the aquifer within the proposed development during construction or operation. The low permeability nature of the soil and thickness present (aquifer vulnerability is mostly low to moderate with only small areas of high vulnerability) provides protection to the underlying aquifer. There is no requirement to significantly alter the current soil protection present by excavation during construction and during operation the land will be further protected by hardstand in places. Following development, drainage will be discharging through interceptors to surface water drains rather than to ground.

There is a hydrological connection to the South Dublin Bay and River Tolka Estuary SAC from stormwater discharge to a tributary of the Tolka. However, based on the c. 20.5 km distance between the proposed development site and SAC, there is no likely potential impact during construction or operation on groundwater quality discharging to the estuary.

6.6.8 Rating of Site Importance of the Hydrogeological Features

The review of the receiving environment undertaken (Section 6.6.1 through Section 6.6.8) and based on the TII methodology (2009) (See Appendix 6.1, Table 3) the importance of the hydrogeological features at this site can be rated as ‘*Very High*’ importance as there is a local public water supply present within the receiving aquifer.

6.7 The ‘Do nothing’ Scenario

If the proposed development was not to go ahead (i.e. in a Do-Nothing scenario) the baseline environment in terms of hydrology and hydrogeology would remain unchanged as there would be no excavations or construction. Therefore, in a “Do Nothing” scenario, there would be a neutral effect on the hydrological and hydrogeological environment at the site. The likelihood in a temporary and short-term basis is the existing natural state of the area would persist, without any alterations or disturbances caused by the development.

However, there are a number of existing permitted developments in the vicinity of the proposed development.

It is likely that in the absence of the proposed development, that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal

6.8 Potential Significant Effects

An analysis of the potential effects of the proposed development on the hydrological and hydrogeological environment during the construction and operational phases are outlined below. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water (hydrology) the following effects discussed will be considered applicable to both Chapter 5 and 6 of the EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 6.9.

6.8.1 Demolition Phase

The development contains existing buildings to be demolished. The likelihood of significant effects on the land, soils and geology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the land and soils is minimal and no significant effects on the land's composition, stability, or fertility are anticipated.

Overall, the surface-level demolition works will have a negligible impact on the land, soils and geology preserving their integrity and minimizing any potential environmental consequences. In the absence of mitigation, the effect on land, soils and geology is likely to be **short-term, Imperceptible and negative**.

Refer to Chapter 10– Waste of this EIAR for further information on predicted on and off-site reuse, recycle and disposal rates for demolition waste.

6.8.2 Construction Phase

6.8.2.1 Potential Impacts on Water Quality

There is potential for run-off water to become contaminated with pollutants released during construction activity. If not mitigated, contaminated water can pose a temporary risk to the Tolka river. During construction of the development, the potential of contamination is associated with the following sources:

- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) – arising from construction materials;
- Hydrocarbons and other construction chemicals (ecotoxic) – accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) – arising from accidental discharge from on-site toilets and washrooms. Construction phase sewerage will be taken by tanker off site for disposal at a licensed waste management facility.

In the absence of mitigation, rainfall run-off during the construction phase may contain increased silt levels or otherwise become polluted from construction activities. Suspended solids in runoff water may result in an increase in suspended sediment load, resulting in increased turbidity, which may in turn impact on local infiltration capacity, or downstream infrastructure or watercourses. Concreting operations pose a potential risk of discharging concrete materials into exposed surfaces and percolate to the underlying groundwater. Concrete, especially the cement component, has a high alkalinity level. There is also the potential risk of unintentional discharge of stored materials like fuels, oils, and paints, which could have negative impacts on surface waters on-site and downstream from the site. It is necessary for the mitigation measures outlined in the CEMP to be implemented to reduce and prevent accidental discharges from occurring during construction, including the implementation of effective containment and monitoring procedures.

Accidental discharges can also occur from welfare facilities during construction activities. Wastewater can contain high levels of bacteria, chemicals and organic matter, which could contaminate nearby water sources if discharged incorrectly. The establishment and use of welfare facilities and use of sealed containment, ensures that there are no potential significant impacts; therefore, no additional mitigation is required.

In the absence of mitigation measures the potential impacts during the construction phase on surface water quality and groundwater quality are **negative, imperceptible** and **short term**.

6.8.2.2 Potential Impacts on Water Flow and Quantity

The gradual introduction of impermeable surfaces and the compaction of soils across the construction site as a result of the land clearing and earthworks will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off along with sediment loading, which could potentially impact local drainage if not adequately mitigated. This increase in the rate and volume of direct surface run-off can result in increased sediment loading, scouring impacts on local drainage and watercourse, and downstream impacts. Prior to the installation of attenuation ponds there may be a resultant minor increase in flow to offsite drainage.

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There are no surface water or groundwater abstractions proposed, therefore no potential impacts on the existing surface water and groundwater regime.

There are no proposed permanent diversions of any drainage ditches or waterbodies as part of the proposed development.

In the absence of mitigation measures the potential impacts during the construction phase on water quality and flow are **negative, imperceptible** and **short term**.

6.8.2.3 Potential Impacts on Areas of Conservation

Based on the distance to Natura sites (c. 20.5 km), there is no likelihood of an impact on the surface water flow or water quality in the downgradient Natura sites (South Dublin Bay (SAC & pNHA), South Dublin Bay and River Tolka Estuary SPA, Rockabill to Dalkey Island SAC, and North Bull Island SPA).In the absence of mitigation measures the potential impacts during the construction phase on Areas of Conservation are **neutral and imperceptible**.

6.8.2.4 Potential Impacts on Human Health and Population

A reduction in water quality via unmitigated pollutants entering a surface waterbody or aquifer has the potential to lead to negative impacts on human health and populations. Hydrocarbons and petroleum products for example have the greatest risk for human health when they are in drinking water. However, it is noted that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located downstream.

The subject site is underlain by the Dunboyne PWS, Source Protection Zone, however no discharges to ground or abstractions from the aquifer are required during construction. In addition, the underlying aquifer is well protected by soil cover (aquifer vulnerability mostly Low with a small area of high vulnerability). As such there is no likely impact on the PWS foreseen due to low potential loading (no bulk chemical storage), and natural attenuation within overburden (predominantly >5- 10m). Any accidental leak of hydrocarbons/alkaline water will be attenuated by the existing soils even without mitigation measures.

In the absence of mitigation measures, the potential impacts during the construction phase on human health and populations due to changes to the hydrological and hydrogeological environment are **negative, imperceptible** and **short term**.

6.8.2.5 Potential Impacts on Water Framework Directive Status

There is a potential of localised accidental discharges during the construction phase (as set out in Section 6.8.1), however these are temporary short-lived events that will not impact on the water body status long-term and as such will not impact on trends in water quality and overall WFD status assessment.

As such the proposed development will not cause any significant deterioration or change in water quality status or prevent attainment, or potential to achieve the WFD objectives or to meet the requirements and/or objectives in the third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

Therefore, there is no potential for impacts on water framework directive status based on the current understanding of the proposed development during construction.

6.8.3 Operational Phase

There are no discharges to any open water courses without adequate attenuation included in the design. The surface water network has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100 year event to the attenuation basins without any overland flooding including an additional allowance of 20% in rainfall intensities due to climate change. Discharge flow will be restricted to the greenfield equivalent runoff for the catchment area.

The development will be fully serviced with separate foul and stormwater public sewers which will have adequate capacity for the facility and discharge limits as required by Irish Water licencing requirements. Discharge from the site to the public foul sewer will be sewage and grey water only due to the nature of the proposed development. The foul discharge from the site will join the public sewer and will be treated at the Ringsend Water Wastewater Treatment Plant (WWTP) prior to subsequent discharge to the Irish Sea. This WWTP is required to operate under an EPA licence and meet environmental legislative requirements as set out in its licence.

There is no bulk chemical (including fuel) planned for the development. The proposed development site includes car parking area at the site. Leakage of petrol/ diesel fuel may occur from these areas; run-off may contain a worst-case scenario of 70 litres/car for example. However, in the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed and any releases to drainage will be mitigated through petrol interceptors.

The subject site is underlain by the Dunboyne PWS, Public Supply Source Protection Area, however no discharges to groundwater or abstractions from the aquifer are included in the proposed design. As such there is no likely impact on the PWS foreseen due to low potential loading (no bulk chemical storage), natural attenuation within overburden (predominantly >5- 10m). Any accidental discharge of hydrocarbons from a car etc. will more likely impact stormwater drainage due to the hardstand and drainage infrastructure proposed and any releases to drainage will be mitigated through petrol interceptors.

In the absence of mitigation measures, the potential impact of operation phase of the proposed development to the hydrological and hydrogeological environment are **negative, imperceptible** and **short term**.

6.8.3.1 Potential Impacts on Water Framework Directive Status

There are no proposed direct discharges of surface water to River Tolka during the operational phase. There is a potential of localised minor accidental discharges during the operation phase, however these are temporary short-lived events that will not impact on the water body status long-term and as such will not impact on trends in water quality and overall WFD status assessment.

According to Uisce Éireann’s (Irish Water) Wastewater Treatment Capacity Register (June 2023), there is capacity available at Ringsend WWTP.

There is no potential impact on Water Framework Directive status or Programme of Measures to achieve Good status. Therefore, there is no potential for impacts on water framework directive status based on the current understanding of the proposed development during operation.

6.8.4 Cumulative Effects

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. Multiple developments in the area could potentially be developed concurrently or overlap during the demolition, construction and operational phases. There will be no effects on hydrology and hydrogeology as each development will adhere to their own CEMP and mitigation plan. There is no pathway and connectivity to hydrology and hydrogeology to each development.

In the absence of adherence to the CEMP and mitigation plan, the effect on the local and regional environment is likely to be **long-term, significant and negative**

6.9 Mitigation

6.9.1 Incorporated Design Mitigation

This section outlines the measures that will be employed in order to ensure the project has minimal adverse effects on the surrounding environment, in this case hydrogeology and hydrology. These measures include appropriate design measures such as the proper storage and containment of hazardous substances and proper drainage systems in line with best practice, standard details, policies and guidelines. For further information on design refer to Engineering Planning Report - Paul Mc Grail Construction Engineers Limited, 2024.

6.9.1.1 Surface Water Quality and Drainage

The proposed development design includes hardstand cover across the site and the proposed surface water drainage system for this development has been designed as a sustainable urban drainage system (SuDS). It is proposed to use a sustainable urban drainage system (SuDS) approach to stormwater management throughout the site where possible. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in stormwater.

The SUDs features proposed are as follows:

- Modular Permeable Paving
- Swales
- Detention Basins
- Petrol interceptor
- Hydrobrake flow control.

6.9.1.2 Foul Water Drainage

A new network of foul sewers will be installed to serve the proposed development, discharging to existing connections to the existing foul sewer system along the R147. There will be no direct or indirect foul water discharge into any surface water courses.

6.9.1.3 Potential Impacts on Water Framework Directive Status

The following design mitigation measures have been incorporated in the design to mitigate potential impacts have taken account of the potential impacts of the development.

- Provision of SuDS measures such as Modular Permeable Paving, Swales, Detention Basins, Petrol interceptor, Hydrobrake flow control included. Therefore, the risk of accidental discharge has been adequately addressed through design.
- All surface water will be discharged to the existing storm water network and foul water will be discharged to the existing foul sewer system located along the R147.

6.9.2 Demolition Phase Mitigation

The development contains existing buildings to be demolished. The likelihood of significant effects on the hydrology and hydrogeology during the demolition phase is minimal due to the demolition works of the proposed development being limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction. As a result, the impact on the land and soils is minimal and no significant effects on the land's composition, stability, or fertility are anticipated.

Refer to Chapter 10— Waste of this EIAR for further information on predicted on and off-site reuse, recycle and disposal rates for demolition waste.

Overall, no mitigation measures are required during the demolition phase in relation to hydrogeology and hydrology due to the surface level nature of the works. The surface-level demolition works will have a negligible impact on hydrogeology and hydrology, preserving their integrity and minimizing any potential environmental consequences.

6.9.3 Construction Phase Mitigation

6.9.3.1 Construction Environmental Management Plan

Paul Mc Grail Consulting Engineers Limited have prepared a Construction Environmental Management Plan (CEMP) (2025) in respect of the subject development that is included with the application documentation. It contains best practice measures and protocols to be implemented during the construction phase of the proposed development to avoid / minimise environmental impacts. This outline and explains the construction techniques and methodologies which will be implemented during construction of the proposed development.

Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to:

- Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741); and
- Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005).

The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager, and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures.

The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The mitigation and control measures outlined in the CEMP will be employed on site during the construction phase. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed.

6.9.3.2 Surface Water Management Plan

The CEMP will include preparation of a surface water management plan to ensure all run-off water is discharged through an attenuation pond. This allows for attenuation and collection of contaminated water in the event of an accidental discharge of alkaline water/hydrocarbons.

During construction a site drainage and protection system will be built to collect run-off from the site, prevent soil erosion, and protect water quality in the River Tolka. Temporary excavated channels, bunds, silt fences, or ridges or a combination of the three, may be constructed to manage sediment-laden water.

Temporary surface water management systems, and a treatment train (if required) with attenuation will throttle runoff and allow suspended solids to be settled out and removed.

The surface water management plan should include daily monitoring of the discharge to the attenuation pond including at minimum visual monitoring of colour (suspended solids), iridescence presence or absence, pH and conductivity.

6.9.3.3 Management of Soil & Silty Runoff

In addition to provision of the attenuation pond prior to discharge the following silt control measures are planned:

- During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.
- Silt deposited during construction will be removed.
- Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.
- A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate.
- A stabilised entranceway consisting of an aggregate on a filter cloth base that is located at any entry or exit point of the construction site.
- Aggregate will be established at the site entrance points from the construction site boundary extending for at least 10 m.
- The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection.
- Construction materials, including aggregates etc. will be stored a minimum of 20-meter buffer distance from any surface water bodies and surface water drainage points.
- Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination.
- Movement of material will be minimised to reduce the degradation of soil structure and generation of dust.

- Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.
- Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site.
- Any surface water run-off collecting in excavations will likely contain a high sediment load. This will be diverted to settlement ponds and will not be allowed to directly discharge to existing onsite concrete storm water sewer drains within the site boundary or the River Tolka.

In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

6.9.3.4 Cement/Concrete Works

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil.

No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Irish Water / Meath Co. Co.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.

Riparian buffers will be implemented in compliance with INF OBJ 30 (Meath County Development Plan 2021-2027;

“To establish riparian corridors free from new development along all significant watercourses and streams in the County as follows: A 10 metre wide riparian buffer strip measured from the top of the bank either side of all watercourses in urban areas; A 30m wide riparian buffer strip from top of bank to either side of all watercourses is required as a minimum outside of urban areas”.

6.9.3.5 Material Storage and Handling

The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground, of fuels and other construction chemicals, and prevent any discharges to surface water and groundwater systems:

- Designation of bunded refuelling areas on the site.
- Provision of spill kit facilities across the site.
- Where mobile fuel bowsers are used, the following measures will be taken:
 - » Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.
 - » The pump or valve will be fitted with a lock and will be secured when not in use.
 - » All bowsers to carry a spill kit and operatives must have spill response training.
 - » Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal.
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage.
- All drums to be quality approved and manufactured to a recognised standard.
- If drums are to be moved around the site, they will be secured and on spill pallets; and
- Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from surface water gullies or drains minimum 20 m buffer zone. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with.

The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.

6.9.3.6 Wastewater Management

Foul wastewater discharge from the site will be managed and controlled for the duration of the construction works.

Site welfare facilities will be established to provide sanitary facilities for construction workers on site. The main contractor will ensure that sufficient facilities are available at all times to accommodate the number of employees on site. Foul drainage from site offices and compound, where not directed to the existing wastewater network, will be contained and disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations to prevent the pollution of watercourses.

The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures.

6.9.3.7 Human Health and Populations

It has been established that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located in the vicinity of the site. However, there is a Groundwater Water PWS source protection zone (SPZ). As outlined in the risk assessment presented in Appendix 6.3, on a precautionary basis, the mitigation measures will include implementation of a surface water management plan during construction and measures described above to manage any accidental spills to ground.

6.9.3.8 Potential Impacts on Water Framework Directive Status

Even in the absence of the mitigation measures detailed in Section 6.6, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

6.9.4 Operational Phase Mitigation

6.9.4.1 Surface Water Quality

The proposed development stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality. SuDS measures such as Detention Bains will be used to provide attenuation of stormwater runoff and also facilitate some settling of particulate pollutants. Other SuDS measures include Modular Permeable Paving, Swales, Petrol Interceptors and Hydro brake Flow Control. The quality of discharged water to the foul and storm network is expected to be compliant with respective licence conditions following treatment and management. In case of any exceedances of parameters stipulated by discharge permit conditions, water will be retreated on site, or disposed of to a licenced facility. The discharges to storm water and foul water network shall comply with the requirements established in the discharge licence to Meath County Council (for storm water network) and/or Irish Water (for foul water network).

6.9.4.2 Foul Water Drainage

A review of the Ringsend Annual Environmental report (2022) confirmed that there is adequate capacity for foul water. The average effluent discharge (Design Flow as constructed), for the Proposed Development is 1.59 l/s which would only equate to 0.014% of the licensed discharge at Ringsend WWTP [peak hydraulic capacity]).

Riparian buffers will be implemented in compliance with INF OBJ 30 (Meath County Development Plan 2021-2027).

6.9.4.3 Human Health and Populations

On a precautionary basis, the operational mitigation measures for Hydrology and Hydrogeology set out in Section 6.9.4 of the EIAR will be implemented during the operational phase for the protection of human health and populations.

There are no proposed discharges to ground as part of the surface water drainage strategy and all surface water is discharged to the existing storm water network via SuDS implementation and foul water discharge is sent to existing the foul sewer network.

Therefore, as there are no effects on the hydrogeological and hydrological environment at the proposed development, no mitigation is required.

6.9.4.4 Potential Impacts on Water Framework Directive Status

The water framework directive (WFD) assessment is included in Appendix 6.2. Even in the absence of the mitigation measures detailed above, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

There are appropriately designed mitigation measures which will be implemented during the operational phase to protect the hydrological environment. There is a potential of accidental discharges during the operational phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

There are no untreated discharges of wastewater during the operational phase to any open waterbody / watercourse. The discharge to surface water sewer will be adequately treated via SuDS measures, hydro-brake (or equivalent) and oil/water interceptor / separator to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term / on-going integrity of same.

6.10 Residual Impact Assessment

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented. The implementation of mitigation measures outlined in Section 10.9 will ensure that the potential impacts on the hydrogeological and hydrological environment do not occur during the demolition, construction and operational phases of the proposed development. Due to the inter-relationship between land, soils, geology, hydrogeology and surface water the following impacts discussed will be considered applicable to both Chapter 6 (Hydrology and Hydrogeology) and Chapter 5 (Land, Soils and Geology) of the EIAR.

6.10.1 Demolition Phase

As stated in Section 6.9.1, the potential impacts on the hydrogeological and hydrological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the hydrogeological and hydrological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Overall, the surface-level demolition works will have a negligible impact on the hydrogeological and hydrological environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 6.9.2 will ensure the residual effect on the hydrogeological and hydrological environment during the demolition phase is likely to be **neutral, imperceptible** and **short-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.2 Construction Phase

6.10.2.1 Surface Water Quality

The implementation of the mitigation and monitoring measures detailed in Section 6.9.3 will ensure that the potential impacts on the hydrogeological and hydrological environment during the construction phase are adequately mitigated. The residual effect on surface water quality during the construction phase is considered to be **neutral, imperceptible** and **short-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.2.2 Human Health and Populations

The implementation of the mitigation and monitoring measures detailed in Section 6.9.3, will ensure that the potential impacts on human health and populations (and material assets) during the construction phase are adequately mitigated. The residual effect on human health and populations during the construction phase is considered to be **neutral, imperceptible** and **short-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.2.3 Water Framework Directive Status

Even in the absence of the mitigation and monitoring measures detailed in Section 6.10.3, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland.

There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

The residual effect on Water Framework Directive Status during the construction phase is considered to be **neutral, imperceptible** and **short-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.3 Operational Phase

6.10.3.1 Surface Water Quality

The implementation of the mitigation measures detailed in Section 6.9.4.1, will ensure that the potential impacts on surface water quality once the proposed development is constructed and operational are adequately mitigated. The residual effect on surface water quality during the operational phase is considered to be **neutral, imperceptible** and **short-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.4 Cumulative Impact Assessment

The cumulative impact of the proposed development with any/all relevant other planned or permitted developments are discussed below.

Existing developments that are already built and in operation contribute to the characterisation of the baseline environment. As such any further environmental impacts that the proposed development may have in addition to these already constructed and operational developments has been assessed in the preceding sections of this chapter.

This section has been prepared with reference to the list of the following relevant permitted developments in the vicinity:

- **P822022** – Dunboyne Link Road. Dunboyne Business Park and the R157. Part 8 Development
- **23/424** – 3 no. office buildings, located to north of subject site, on the MP22 masterplan area.
- **23/60065** – Single storey commercial building east of subject site, located on Phase 1 lands of the MP 22 masterplan area.
- **23/60290** – Large scale residential development for 267 no. residential units, located on the Phase 1 lands of the MP 22 masterplan area.
- **23/849; 25/60854** – large scale residential development for 705 no. residential units located south of the site, c. 1km east of Dunboyne town centre.
- **24/60805** – Large Scale Residential Development for 309 no. residential units, , c.1km west of Dunboyne town centre.
- **24/60468** – 76 no. dwellings and a creche at Station Road, Dunboyne, Co. Meath.
- **24/60709** – Large Scale Residential Development for 853 no. residential units
- **VA06F.319422** – electricity development application to An Bord Pleanála for a 400kV underground cable from East Meath to North Dublin, approximately 37.5km in length.
- **24/39** – 8 no. dwellings located to the south-east of the subject site.

Neither the development proposed, nor any other developments will give rise to any significant impacts on water receptors and there are no predicted cumulative impacts in relation to water receptors in terms of water quality and flow, as a result of the proposed development in combination with existing / proposed plans or projects.

6.10.4.1 Demolition Phase

The potential residual effects on the hydrogeological and hydrological environment surrounding the development are expected to be minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works. As a result, there will be minimal impact on the hydrogeological and hydrological environment, and no significant effects on the composition, stability, or fertility of the land are anticipated. The absence of excavation works also means that there will be no disturbance to the natural soil structure, thus preventing potential soil erosion or compaction and increased run-off rates.

Overall, the surface-level demolition works will have a negligible impact on the hydrogeological and hydrological environment, preserving their integrity and minimizing any potential environmental consequences.

The implementation of mitigation measures outlined in Section 6.10.2 will ensure the residual effect on the hydrogeological and hydrological environment during the demolition phase is likely to be **short term, Imperceptible and neutral**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.4.2 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place in the area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap during the construction phase.

In relation to the potential cumulative impact on the water environment during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Sediment compaction may result in increased run-off from the construction site if not adequately mitigated,
- Contamination of receiving waters (groundwater and surface water drainage) from accidental spillage and leakage from oil storage on site, construction traffic, alkaline runoff from cementing work is possible unless project-specific measures are put in place for each development and complied with.

Contractors for the proposed development will be contractually required to operate in compliance with a Construction Environmental Management Plan (CEMP). The works contractors for other planned or permitted developments will be obliged to ensure that similar measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality including European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

The implementation of mitigation and monitoring measures detailed here as well as the compliance of the above permitted and planned development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the water environment during the construction phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible, and short-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.10.5 Operational Phase

In relation to the potential cumulative impact on the water environment during the operational phases, the operational activities which would have potential cumulative impacts are as follows:

- Increased hard standing areas will reduce local recharge to ground and increase surface water run-off potential if not limited to the green field run-off rate. Each permitted development is required by the Local Authority to incorporate SuDs measures including providing suitable attenuation on-site and ensure that there is no increase in off-site flooding as a result of the development,

- Each development will require approval from Uisce Éireann (UÉ) confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure for the proposed development and other developments are required to be designed to accommodate the proposed development and a confirmation of feasibility received.

During operation, all developments are required to manage groundwater and surface water discharges in accordance with legislative requirements including the European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016) and (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019). As such, there will be no significant cumulative impact to water quality

The implementation of design and mitigation measures detailed in Section 6.9 as well as the compliance of the proposed development and permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change in the water regime during the operational phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be **neutral, imperceptible** and **long-term**.

Following the TII criteria for rating the magnitude and significance of impacts on the hydrological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.11 Risk of Major Accidents or Disasters

The EPA Guidelines, 2022, state that:

“To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required.”

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. 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 occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The landslide susceptibility map (GSI spatial map viewer) identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water). The nearest landslide was c. 2km to the south-east of the proposed development, referred to as the M3 J4 Clonee 2014 (Event ID: GSI_LS16-0042) which occurred on March 2nd 2014. There have been no recorded landslide events in the vicinity of the site.

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, has been recording seismic events in Ireland since 1978 (www.dias.ie). This

network consists of several seismometers that are located throughout Ireland. Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact. There is a very low risk of seismic activity to the proposed development site.

According to the Irish National Seismic Network, records show that the nearest seismic activity to the site occurred on the 3rd of July 2024 in Enfield (0.9 MI Magnitude) from a quarry blast, and c. 23 km to the south west of the site. There is a very low risk of seismic activity to the site.

6.12 Significant Interactions

This section discusses interactions between this chapter and other specialist environmental topics considered in this EIAR.

6.12.1 Land and Soils

6.12.1.1 Demolition Phase

The likelihood of significant effects on hydrogeology and hydrology at the proposed development during the demolition phase is minimal due to the demolition works being limited to surface-level activities and do not involve any excavation works.

As a result, no significant effects on the land's composition, stability, or fertility are anticipated. The absence of excavation works means that there is no disturbance to the natural soil structure, preventing potential soil erosion or compaction.

As well as the mitigation measures outlined in this section, the development should adhere to the mitigation measures set out in Section 5.10.2 of the EIAR.

Full adherence to the RWMP presented in Appendix 10.1 and Chapter 10 –Waste of the EIAR.

6.12.1.2 Construction Phase

The construction phase of the proposed development has the potential to result in increased sediment runoff which has the potential to interact on surface water quality. The proposed construction phase mitigation outlined in Section 6.9.3, means that the proposed development will not result in significant negative impact on surface water quality in the local area.

Taking into account the design and mitigation measures set out in Chapter 6 (Hydrology and Hydrogeology) & Chapter 5 (Land, Soils and Geology) of this EIA Report, means that the proposed development will not result in significant negative impact on the Land, Soils and Geology in the local area. The interaction is considered to be **neutral, imperceptible**, and **short term**.

6.12.1.3 Operational Phase

Taking into account the design and mitigation measures set out in Chapter 6 (Hydrology and Hydrogeology) & Chapter 5 (Land, Soils and Geology) of this EIA Report. There are no potentially significant interactions identified between Land, Soils and, Hydrogeology and Hydrology during the operational phase.

6.12.2 Biodiversity

6.12.2.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities on predominately existing buildings and infrastructure and do not involve any excavation works. As a result, the impact on biodiversity is minimal.

Overall, the surface-level demolition works will benefit the local biodiversity, preserving their integrity and minimizing any potential environmental consequences. The interaction is considered to be **short-term, imperceptible and neutral**.

6.12.2.2 Construction Phase

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised.

Taking into consideration the implementation SuDS, discharge of surface and foul water to the combined sewer network and the mitigation measures outlined in Section 6.9.3. the impact on biodiversity should be minimal.

Taking into account the design and mitigation measures set out in (Hydrology and Hydrogeology) and (Biodiversity) of this EIA Report, the interaction between Water and Hydrology, and Biodiversity is considered to be **short-term, imperceptible and neutral**.

6.12.2.3 Operational Phase

The proposed development design includes hardstand cover across the site and the proposed surface water drainage system for this development has been designed as a sustainable urban drainage system (SuDS). It is proposed to use a sustainable urban drainage system (SuDS) approach to stormwater management throughout the site where possible. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in stormwater. The design of the attenuation storage system has been carried out for the 1 in 100-year event with a 20% allowance for climate change.

There is no discharge to ground proposed as part of the surface water drainage strategy. Surface water will be discharged to the existing storm water network located along the R147 and foul water will be discharged to the existing foul sewer system which is connected to the Ringsend WWTP.

Taking into account the design and mitigation measures set out in Section 6.9.3 of this EIA Report, the interaction between Hydrogeology and Hydrology, and Biodiversity during the operational phase is considered to be **short-term, imperceptible and neutral**.

6.12.3 Waste

6.12.3.1 Demolition & Construction Phase

During the construction phase, excavated soil and stone (c. 2524 m³) will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. It is currently envisaged that all clean excavated soil will be reused on-site.

If material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 10 (Waste), Chapter 6 (Hydrogeology and Hydrology) and the requirements of the RWMP (Appendix 10.1), will ensure the effect is **long-term, imperceptible and neutral**.

6.12.3.2 Operational Phase

There are no potentially significant interactions identified between Waste and Hydrogeology and Hydrology during the operational phase.

6.12.4 Air Quality

6.12.4.1 Demolition Phase

Demolition phase activities such as demolition of existing infrastructure and stockpiling of materials etc. have the potential for interactions between air quality and hydrology and hydrogeology in the form of dust emissions that may deposit in surface waters.

Mitigation measures implemented during the demolition phase outlined in Section 6.9.2 will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and, hydrology and hydrogeology. The interaction is considered to be **short-term, imperceptible and neutral**.

6.12.4.2 Construction Phase

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and hydrology and hydrogeology in the form of dust emissions that may deposit in surface waters.

Mitigation measures implemented during the construction phase outlines in section 6.10.3 will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and, hydrology and hydrogeology. The interaction is considered to be **short-term, imperceptible and neutral**.

6.12.4.3 Operational Phase

There are no potentially significant interactions identified between Hydrology and Hydrogeology, and Air Quality during the construction phase.

6.13 Monitoring

6.13.1 Demolition Phase

The demolition works of the proposed development are limited to surface-level activities and do not involve any excavation works. The absence of excavation works means that there is no potential for increasing the groundwater vulnerability to contamination in case of accidental spills or discharges.

In addition, all waste materials will be dealt with in accordance with regional and national legislation, time and resources will be dedicated to ensuring efficient waste management practices and waste arisings will be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. Hence, eliminating the risk of contaminated runoff to surface or groundwater.

6.13.2 Construction Phase

During construction phase the following monitoring measures will be considered:

- Weekly checks will be carried out to ensure surface water drains are not blocked by silt, or other items, and that all storage is located at least 20 m from surface water receptors.
- Regular inspection of surface water run-off and sediments controls will be implemented throughout the construction phase and full adherence to the Outline Construction Environmental Plan will be maintained..
- Runoff diversion channels/bunds need regular maintenance to keep functioning throughout their life.
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).
- Monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the stormwater network.

6.13.3 Operational Phase

Oil separators will be maintained and cleaned out in accordance with the manufacturer’s instructions.

Maintenance of the surface water drainage system and foul sewers is recommended to minimise any accidental discharges to surface water.

6.14 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development on the Hydrogeological and hydrological environment (Hydrology and Hydrogeology). These effects have been considered for the demolition, construction and operational phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures set out in this chapter are adhered to in full throughout all phases, the overall predicted impact of the proposed development is *long-term, imperceptible and neutral*

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CHAPTER SEVEN

AIR QUALITY



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CHAPTER SEVEN

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CHAPTER 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 Bennetstown, Dunboyne, Co. Meath.

It should be read in conjunction with Chapter 12 ‘Material Assets: Traffic and Transport’.

7.2 Expertise & Qualifications

This chapter was completed by Ciara Nolan. Ciara is a Principal Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institute of Environmental Science (MIEnvSc). She has over 9 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 Bennetstown to the north of Dunboyne town. The proposed development will consist of a mix of residential units and all associated site works. The site is phase 3 of a larger masterplan area. 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 nitrogen dioxide (NO₂), and particulate matter (PM₁₀ and PM_{2.5}). Operational phase impacts will be long-term in duration. Methodology

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);
- Advice Note on Preparing Environmental Impact Statements – Draft (EPA, 2015);
- 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 on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast). This directive supersedes EU Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (CAFE Directive). Directive (EU) 2024/2881 sets out air quality standards for pollutants to be reached by 2026 and by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, which are more closely aligned with the WHO air quality guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.

The pre-2030 and post-2030 ambient air quality standards applicable for nitrogen dioxide (NO₂) and particulate matter (as PM₁₀ and PM_{2.5}) are outlined in Table 7.1. These pollutants are of relevance to the proposed development.

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Table 7.1 Ambient Air Quality Limit Values

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	Limit Value (to be attained by 2026 and applicable until 2030)	Limit Type	Limit Value (to be attained by 2030)
Nitrogen Dioxide (NO ₂)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m ³	Hourly limit for protection of human health - not to be exceeded more than 3 times/year	200 µg/m ³
	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	50 µg/m ³
	Annual limit for protection of human health	40 µg/m ³	Annual limit for protection of human health	20 µg/m ³
Particulate Matter (as PM ₁₀)	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m ³	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m ³
	Annual limit for protection of human health	40 µg/m ³	Annual limit for protection of human health	20 µg/m ³
Particulate Matter (as PM _{2.5})	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m ³
	Annual limit for protection of human health	25 µg/m ³	Annual limit for protection of human health	10 µg/m ³

7.4.1.2 WHO Air Quality Guidelines & Clean Air Strategy

In April 2023, the Government of Ireland published the *Clean Air Strategy for Ireland* (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (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 µg/m³. The strategy also acknowledges that “meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both PM_{2.5} and NO₂”.

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that “Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution

objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II.”

These assessment thresholds relate to monitoring of ambient air quality by Member States, where “exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years.”

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

The applicable air quality limit values for the purposes of this assessment are those set out in Table 7.1. The pre-2030 limit values in Table 2 of Annex I of Directive (EU) 2024/2881 are applicable for the construction phase and the Opening Year 2025 of the proposed development. The limit values stipulated in Table 1 of Annex I of Directive (EU) 2024/2881 are applicable for the Design Year 2040 for the proposed development.

7.4.1.3 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 PM₁₀ 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/m²/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/m²/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.

7.4.1.4 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 NO₂, PM₁₀ and PM_{2.5} emissions as a result of the proposed development.

Table 7.3 Air Quality & Traffic Significance Criteria

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Standard 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*

As per Table 7.3 a neutral effect is one where a change in concentration at a receptor is:

- 5% or less where the Opening Year, without the proposed development, annual mean concentration is 75% or less of the standard; or
- 1% or less where the Opening Year, without the proposed development, annual mean concentration is 94% or less of the standard.

Where an effect does not meet the criteria for neutral, as described above, the effect can either be positive or negative. The TII guidance (TII, 2022) states that “the evaluation of significance of effects for the operational phase should be undertaken for the Opening Year only as the Design Year is likely to show lower total pollutant concentrations and changes in concentration” (TII, 2022).

Non-significant effects (i.e. of local importance only) are ‘neutral’ or ‘slight’ changes in concentrations while significant effects can be changes in pollutant concentrations that are either ‘moderate’ or ‘substantial’. However, the TII guidance (TII, 2022) states that these must be considered in the context of the project and ‘moderate’ or ‘substantial’ increases are not necessarily always significant effects.

The impact descriptors in Table 7.3 are used to describe the impact at each modelled receptor location, and the significance of the impacts is then determined, aligning with the terminology in the EPA guidelines (EPA, 2022). Whilst it may be determined that there are ‘slight’, ‘moderate’ or ‘substantial’ impacts at one or more receptors, an overall judgement should be made of whether the proposed development is ‘significant’ or ‘not significant’ in terms of air quality. Factors to consider when determining the overall significance of a proposed development are provided in Table 4.10 of the TII guidance (TII, 2022).

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 Section S32B meeting with Meath County Council was held in January 2025. Additional consultation with specific relevant bodies was not required as part of the air quality assessment.

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 (IAQM, 2024). The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Table 7.4 IAQM Criteria to Determine Dust Emissions Magnitude

Dust Emission Magnitude		
Small	Medium	Large
Demolition		
- Total building volume <12,000 m³ - 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 m³ - Potentially dusty construction material - Demolition activities 6 – 12 m above ground level	- Total building volume >75,000 m³ - 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 m² - Soil type with large grain size (e.g. sand) <5 heavy earth moving vehicles active at any one time - Formation of bunds <3 m in height - Earthworks during wetter months	- Total site area 18,000 m² - 110,000 m² - 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 m² - Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) >10 heavy earth moving vehicles active at any one time - Formation of bunds >6 m in height
Construction		
- Total building volume <12,000 m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)	- Total building volume 12,000 - 75,000 m³ - Potentially dusty construction material (e.g. concrete) - On-site concrete batching	- Total building volume >75,000 m³ - 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 (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling, human health and ecological effects. The level of risk associated with each activity is determined using the criteria in Table 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

7.4.42 Construction Phase Traffic Assessment

Construction phase traffic also has the potential to impact air quality. The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 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, a detailed 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 certain proposed new development in the wider Dunboyne east area, the full masterplan development for the Applicant’s wider lands in Dunboyne east, as well as proposed road upgrades (see Traffic and Transport Assessment and Chapter 12: 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 (2022) states that modelling should be conducted for NO₂, PM₁₀ 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 NO₂, PM₁₀ and PM_{2.5} concentrations has been conducted for the Do Nothing and Do Something scenarios using the TII Road Emissions Model (REM) online calculator tool (TII, 2025).

The following inputs are required for the REM tool: receptor locations, light duty vehicle (LDV) annual average daily traffic movements (AADT), 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 PM₁₀ 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 (2022) 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 site or impacted road links and therefore no assessment was required as there is no potential for significant impacts to the designated sites due to changes in air quality.

7.4.5.2 Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from Atkins Consulting Engineers for the purposes of this assessment. Data was provided for the Base Year 2021, Opening Year 2025 and Design Year 2040 (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 Dunboyne area.
- The Proposed scenario – this scenario includes traffic from the Do Minimum scenario and traffic associated with the full build-out of the masterplan lands in the ownership of the Applicant (Marina Quarter Ltd.) as well as traffic associated with cumulative developments in the wider Dunboyne area.

Further detail on the modelling scenarios can be found in the Traffic and Transport Assessment prepared by Atkins 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

Road Link	Location	Speed (kph)	Base Year 2021	Opening Year 2025		Design Year 2040	
				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)
2	M3 motorway (south of J5)	102.5	35127 (3117)	36124 (3247)	38872 (3247)	40734 (3649)	45965 (3646)
2A	M3 off ramp	82	8548 (475)	9193 (451)	10649 (451)	9812 (497)	12742 (497)
3	R147, north of R147/R157 junction	78	18878 (1025)	19926 (941)	20626 (941)	21296 (1037)	22318 (1027)
8	R157, between proposed Dunboyne Business Park Distributor Road junction with R157 and Summerhill Roundabout	66.5	14262 (694)	13280 (542)	14547 (542)	15767 (604)	17503 (603)
9	L2228 Summerhill Road, between Summerhill Roundabout and Main Street signalised junction	47	4711 (235)	3277 (113)	3478 (113)	2861 (126)	4449 (139)

Road Link	Location	Speed (kph)	Base Year 2021	Opening Year 2025		Design Year 2040	
				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)
10	L2228 Station Road, east of Main Street signalised junction	46.5	6175 (161)	7346 (345)	8514 (345)	5952 (362)	7042 (361)
12	Old Navan Road, north of Main Street signalised junction	46	4369 (170)	4033 (159)	4997 (159)	3484 (148)	5135 (149)
17	M3-Junction 5 Interchange	50.5	9706 (397)	16161 (649)	18643 (649)	17909 (699)	22106 (693)

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 Dublin Airport meteorological station, which is located less than 15 km east of the proposed development. Dublin 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 (2020 – 2024), the predominant wind direction is westerly to south-westerly with a mean wind speed of 5.4 m/s over the 30-year period 1991 – 2020 (Met Eireann, 2025).



Figure 7.1 Wind Roses for Dublin Airport Meteorological Station

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 2024” (EPA, 2025). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments.

As part of the implementation of the 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). However, it is also in close proximity to Zone A, which has been taken into account when estimating the current background pollutant concentrations for the area of the proposed development. 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 NO₂

Long-term NO₂ monitoring was carried out at the representative Zone D suburban background locations of Castlebar, Co. Mayo and Edenderry, Co. Offaly, as well as the rural background locations of Emo Court, Co. Laois and Killkitt, Co. Monaghan over the period 2020 – 2024 (EPA, 2025). Swords Co. Dublin, a representative Zone A suburban background location, was also used as a representative air quality station as the proposed development is in close proximity to the Zone A boundary.

Long term average NO₂ concentrations are significantly below the annual average limit of 40 µg/m³ (see Table 7.7). Average results range from 2 – 10 µg/m³ over the period 2020 – 2024 for the Zone D sites. Annual average concentrations for the Zone A location in Swords are somewhat higher than in Zone D with results ranging from 10 – 12 µg/m³ over the period 2020 – 2024. The 5-year average NO₂ concentration for all representative sites suggests an average concentration of no more than 12 µg/m³ as a background concentration. Long-term average concentrations are significantly below the annual average limit of 40 µg/m³. Based on the above information, a conservative estimate of the current background NO₂ concentration for the region of the proposed development is 12 µg/m³.

Table 7.7 Trends in Air Quality – Nitrogen Dioxide (NO₂)

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Emo Court (Zone D Rural Background)	Annual Mean NO ₂ (µg/m ³)	3	4	3	2	3
	1-hr Mean NO ₂ values >200 µg/m ³	0	0	0	0	0
Kilkitt, (Zone D Rural Background)	Annual Mean NO ₂ (µg/m ³)	2	2	2	2	2
	1-hr Mean NO ₂ values >200 µg/m ³	0	0	0	0	0
Castlebar (Zone D Suburban Background)	Annual Mean NO ₂ (µg/m ³)	6	6	8	7	7
	1-hr Mean NO ₂ values >200 µg/m ³	0	0	0	0	0
Edenderry (Zone D Suburban Background)	Annual Mean NO ₂ (µg/m ³)	-	9	7	9	10
	1-hr Mean NO ₂ values >200 µg/m ³	-	0	0	0	0
Swords (Zone A Suburban Background)	Annual Mean NO ₂ (µg/m ³)	11	11	12	10	10
	1-hr Mean NO ₂ values >200 µg/m ³	0	0	0	0	0

7.6.2.2 PM₁₀

Continuous PM₁₀ 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 period 2020 – 2024 (EPA, 2025). Phoenix Park Co. Dublin, a representative Zone A location, was also used as an indicative air quality station as the proposed development is in close proximity to the Zone A boundary.

Long-term PM₁₀ concentrations are in compliance with the annual average limit value of 40 µg/m³. Levels range from 7 - 14 µg/m³ over the five-year period at the Zone D sites, with at most 2 exceedances (in Castlebar) of the 24-hour limit value of 50 µg/m³ (35 exceedances are permitted per year) (EPA, 2025). The Zone A suburban background station in the Phoenix Park

measured PM₁₀ concentrations that ranged from 9 – 11 µg/m³ over the period 2020 – 2024 (see Table 7.8). The 5-year average PM₁₀ concentration at the sites suggests an average concentration of no more than 11 µg/m³ (Table 7.8). Based on the EPA data, a conservative estimate of the current background PM₁₀ concentration in the region of the proposed development is 11 µg/m³.

Table 7.8 Trends in Air Quality – Particulate Matter, PM₁₀

Station	Averaging Period ^{Note 1}	Year				
		2020	2021	2022	2023	2024
Castlebar (Zone D Suburban Background)	Annual Mean PM ₁₀ (µg/m ³)	14	10	11	10	10
	24-hr Mean > 50 µg/m ³ (days)	2	1	0	-	0
Claremorris (Zone D Rural Background)	Annual Mean PM ₁₀ (µg/m ³)	10	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)	8	8	9	7	7
	24-hr Mean > 50 µg/m ³ (days)	0	-	0	0	0
Phoenix Park (Zone A Suburban Background)	Annual Mean PM ₁₀ (µg/m ³)	10	10	11	9	10
	24-hr Mean > 50 µg/m ³ (days)	0	0	0	0	0

7.6.2.3 PM_{2.5}

Average PM_{2.5} levels in Claremorris Co. Mayo over the period 2020 - 2024 ranged from 5 - 8 µg/m³ (see Table 7.9), (EPA, 2025). The overall annual average concentration for this 5-year period is 6 µg/m³. Based on this information, a background PM_{2.5} concentration in the region of the proposed development of 6 µg/m³ has been used in the assessment.

Table 7.9 Trends in Air Quality – Particulate Matter, PM_{2.5}

Station	Averaging Period ^{Note 1}	Year				
		2020	2021	2022	2023	2024
Castlebar (Zone D Suburban Background)	Annual Mean PM ₁₀ (µg/m ³)	5	8	6	5	5

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 current relevant limit values set out in Table 2 of Annex I of Directive (EU) 2024/2881. The current pollutant concentrations at these monitoring sites are also in compliance with the 2030 limit values set out in Directive (EU) 2024/2881 and the clean air strategy, however, concentrations are approaching the limit values. Further measures will be needed at a national scale to reduce air pollution in future years. The EPA have indicated that road transport emissions are contributing to increased levels of NO₂ with the potential for breaches in the annual NO₂ 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 (PM₁₀ 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, 2025).

The current background concentrations have been used in the operational phase air quality assessment for the Opening Year 2025 and Design Year of 2040 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.

Table 7.10 outlines the criteria for determining the sensitivity of the area to dust soiling and dust-related human health effects as per the IAQM guidance (IAQM, 2024).

Table 7.10 Criteria for Determining the Sensitivity of the Area

Sensitivity of the Area to Dust Soiling Effects on People and Property						
Receptor Sensitivity	Number of Receptors	Distance from Source (m)				
		<20	<50	<100	<250	
High	>100	High	High	Medium	Low	
	10 - 100	High	Medium	Low	Low	
	1 - 10	Medium	Low	Low	Low	
Medium	>1	Medium	Low	Low	Low	
Low	>1	Low	Low	Low	Low	
Sensitivity of the Area to Human Health Impacts						
Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from Source (m)			
			<20	<50	<100	<250
High	< 24 µg/m³	>100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	< 24 µg/m³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	< 24 µg/m³	>1	Low	Low	Low	Low

In terms of receptor sensitivity to dust soiling, there is 1 no. high sensitivity residential property within 20 m of the site and there are a further 2 no. properties within 21 – 50 m of the site (see Figure 7.2). Based on these receptor numbers and using the IAQM criteria in Table 7.10, the overall sensitivity of the area to dust soiling impacts is considered medium.

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM₁₀ 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 PM₁₀ concentration in the vicinity of the proposed development is 11 µg/m³ and there is 1 no. high sensitivity residential property within 20 m of the site and there are a further 2 no properties within 21 – 50 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 considered low.

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to dust-related ecological impacts. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability of the plant as well as other effects. The guidance states that dust impacts to vegetation can occur up to 50 m from the site, and 50 m from site access roads, up to 250 m for the site entrance. The sensitivity of the area is determined based on the distance to the source, the designation of the site, (European, National or local designation) and the potential dust sensitivity of the ecologically important species present. There are no designated ecological sites within 250 m of the proposed development therefore, there is no potential for significant impacts to vegetation from construction dust emissions.

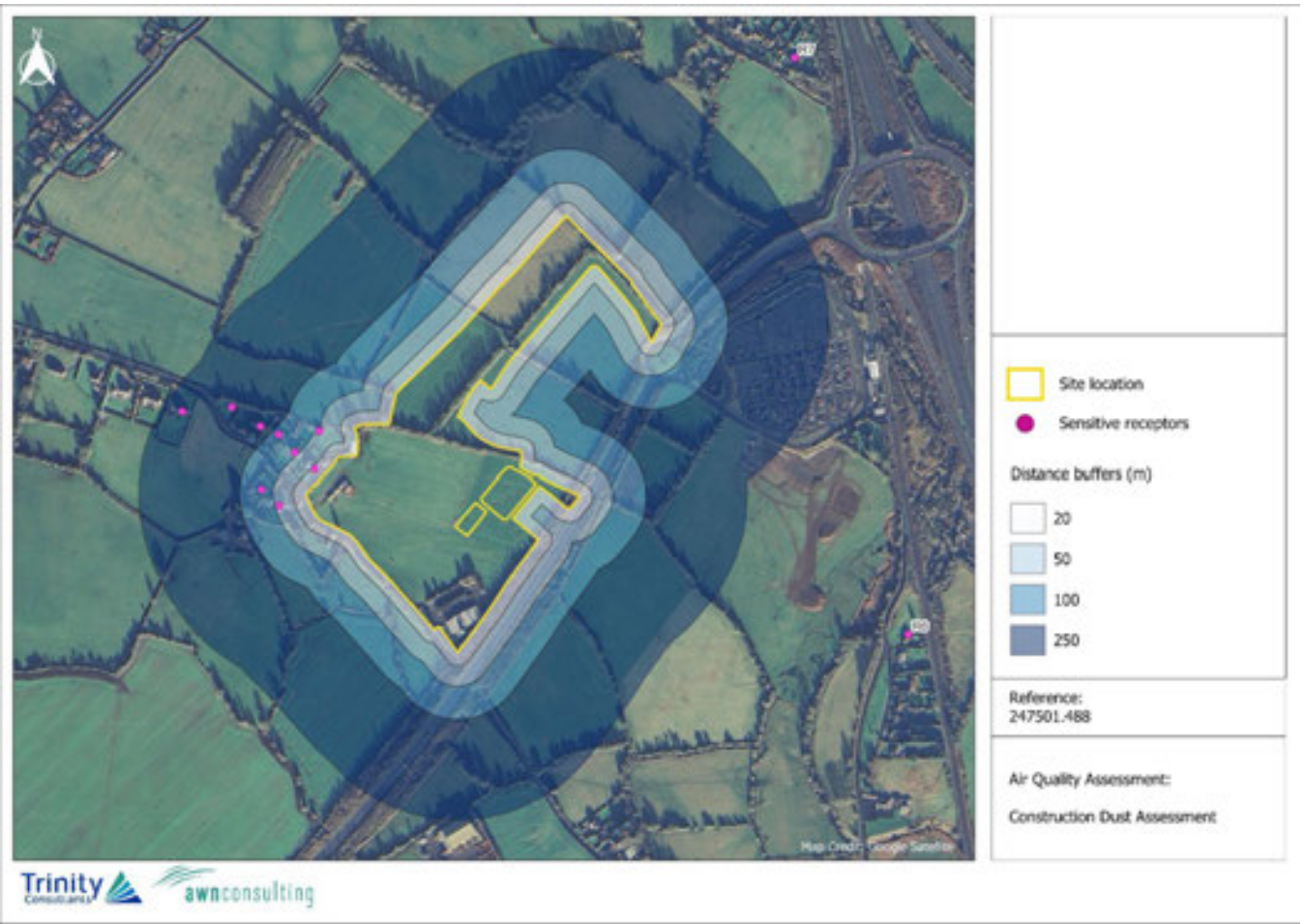


Figure 7.2 Sensitive Receptors within 20m, 50m, 100m and 250m of Site Boundary

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 6 no. high sensitivity residential receptors (R1, R2, R3, R5, R6, and R7) and 1 no. school (R4) were included in the modelling assessment (see Figure 7.3)

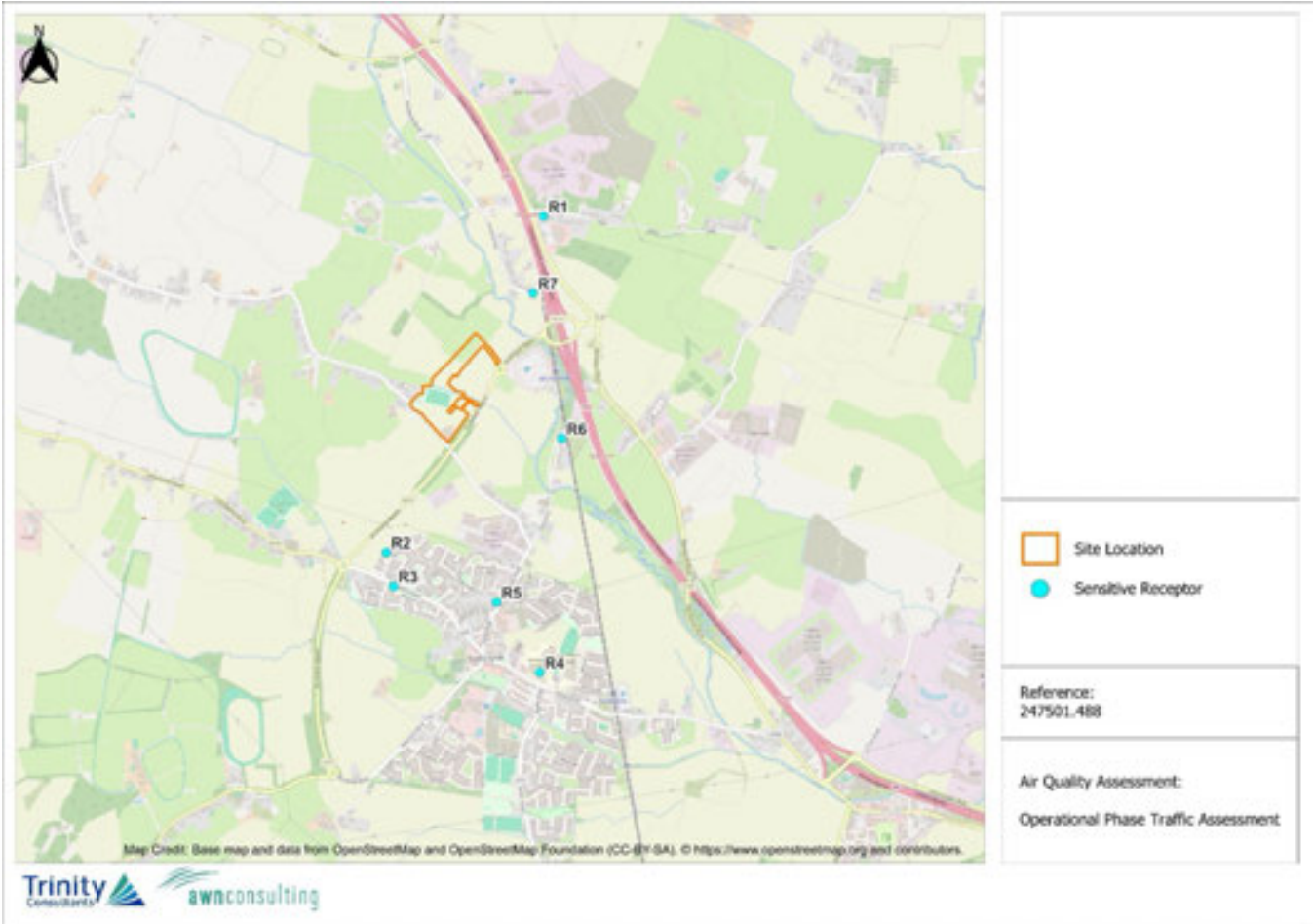


Figure 7.3 Location of Sensitive Receptors used in Operational Phase Air Quality Assessment

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. However, as the site is part of a wider masterplan site construction phase dust emissions will still occur as a result of the Phase 1 and Phase 2 developments, albeit to a lesser extent due

to the smaller area. However dust mitigation measures will be in place for the Phase 1 and Phase 2 developments and therefore dust emissions from the Phase 1 and Phase 2 developments will not cause a significant impact.

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, imperceptible and 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 Dublin Airport meteorological data indicates that the prevailing wind direction is westerly to 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 Dublin Airport meteorological station indicates that on average 200 days per year have rainfall over 0.2 mm (Met Eireann, 2025) and therefore it can be determined that 55% of the time dust generation will be reduced.

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.

To determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area (Section 7.6.3.1). The major dust generating activities are divided into four types within the IAQM guidance (IAQM, 2024) to reflect their different potential impacts. These are: demolition, earthworks, construction and trackout (movement of heavy vehicles).

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 a small amount of demolition proposed as part of the development. The dust emission magnitude for the demolition activities can be categorised as small due to the volume of buildings involved, with significantly less than 12,000 m³ of buildings to be demolished.
- **Earthworks:** The dust emission magnitude for the proposed earthwork activities can be classified as medium as the total site area is between 18,000 – 110,000 m².

- **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 m³.
- **Trackout:** The dust emission magnitude for the proposed trackout activities can be classified as medium, as at worst-case peak periods there will be between 20 – 50 outward HGV movements per day.

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 (IAQM, 2024), is to establish the level of risk by combining the magnitude with the overall sensitivity of the area to dust soiling and dust-related human health effects (Section 7.6.3.1). The level of risk associated with each activity is determined using the criteria in Table 7.5. The overall risk of dust impacts from the construction works is shown in Table 7.11 for each category.

- **Demolition:** As the overall sensitivity of the area to dust soiling is medium, when combined with a small dust emission magnitude, this produces an overall low risk of dust soiling 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).
- **Earthworks:** As the overall sensitivity of the area to dust soiling is medium, when combined with a medium dust emission magnitude, this produces an overall medium risk of dust soiling 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).
- **Construction:** Combining the large dust emissions magnitude for the construction activities with the medium sensitivity to dust soiling results in a medium risk of dust soiling 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.
- **Trackout:** Combining the medium dust emission magnitude for the trackout activities with the medium sensitivity to dust soiling results in a medium risk of dust soiling 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 trackout activities.
- There is at most a medium risk of dust soiling 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 medium-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 7.11 Risk of Dust Impacts used to Define Site-Specific Mitigation

Receptor	Receptor Sensitivity	Dust Emission Magnitude	Risk of Dust-Related Impacts
Demolition			
Dust Soiling	Medium	Small	Low Risk
Human Health	Low		Negligible
Earthworks			
Dust Soiling	Medium	Medium	Medium Risk
Human Health	Low		Low Risk
Construction			
Dust Soiling	Medium	Large	Medium Risk
Human Health	Low		Low Risk
Trackout			
Dust Soiling	Medium	Medium	Medium Risk
Human Health	Low		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 PM₁₀ 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 slight 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 12: Material Assets (Traffic & Transport) for further details).

The traffic data includes the Do Nothing or Do Minimum (DM) scenario and Do Something (DS) scenario. The impact of NO₂, PM₁₀ 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.

Traffic related air emissions have the potential to impact air quality which can affect human health. The following details the results of the air dispersion modelling assessment of traffic emissions to determine the impact to human health. The predicted pollutant concentrations have been compared against the ambient air quality limit values set out in Table 7.1. The limit values set out in Table 2 of Annex 1 of Directive (EU) 2024/2881 are applicable to the Opening Year 2025. The limit values set out under Table 1 of Annex I of Directive (EU) 2024/2881 are applicable to the Design Year 2040.

NO₂

The results of the NO₂ modelling are shown in Table 7.12. In the Opening Year 2025, predicted annual mean concentrations of NO₂ are in compliance with the annual mean limit value of 40 µg/m³ set out under Directive 2008/50/EC, reaching at most 38% of the limit. In addition, the TII guidance (2022) states that the hourly limit value for NO₂ of 200 µg/m³ is unlikely to be exceeded at roadside locations unless the annual mean is above 60 µg/m³. As predicted NO₂ concentrations are significantly below 60 µg/m³ (Table 7.12), it can be concluded that the short-term NO₂ limit value will be complied with at all receptor locations. Some increases in NO₂ concentrations are predicted at the worst-case receptors assessed in the Opening Year when compared with the Do Nothing scenario (see Table 7.12). Concentrations are predicted to increase by at most 0.41 µg/m³ at receptor R4. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 1.03% at receptor R4. All other receptors in the area will experience similar or lesser impacts and all increases are considered ‘neutral’ as per the TII criteria in Table 7.3.

In the Design Year 2040, predicted annual mean NO₂ concentrations are in compliance of the limit value of 20 µg/m³, at the worst-case receptors assessed, reaching at most 65% of the limit. The proposed development will result in a ‘neutral’ increase in NO₂ concentrations according to the TII significance criteria in Table 7.3, with concentrations increasing by at most 0.21 µg/m³ as a result of the proposed development (at receptor R3, see Table 7.12), which is an increase of 1.05% when compared with the applicable annual mean limit value for NO₂. Therefore, the impact of the proposed development on NO₂ concentrations is neutral.

Table 7.12 Predicted Annual Mean NO₂ Concentrations (µg/m³)

Receptor	Impact Opening Year						
	DM	% of AQLV	DS	% of AQLV	DS- DM	% Change of AQLV	Description
R1	14.1	35%	14.1	35%	0.02	0.05%	Neutral
R2	12.4	31%	12.4	31%	0.03	0.07%	Neutral
R3	13.4	34%	13.5	34%	0.08	0.20%	Neutral
R4	14.9	37%	15.3	38%	0.41	1.03%	Neutral
R5	13.4	33%	13.7	34%	0.30	0.75%	Neutral
R6	12.1	30%	12.1	30%	0.01	0.02%	Neutral
R7	12.1	30%	12.1	30%	0.01	0.02%	Neutral
Receptor	Impact Design Year						
	DM	% of AQLV	DS	% of AQLV	DS- DM	% Change of AQLV	Description
R1	12.7	64%	12.7	64%	0.01	0.05%	Neutral
R2	12.2	61%	12.2	61%	0.00	0.00%	Neutral
R3	12.4	62%	12.6	63%	0.21	1.05%	Neutral
R4	12.8	64%	12.9	65%	0.13	0.65%	Neutral
R5	12.4	62%	12.6	63%	0.17	0.85%	Neutral
R6	12.0	60%	12.0	60%	0.01	0.05%	Neutral
R7	12.0	60%	12.0	60%	0.01	0.05%	Neutral

PM₁₀

The results of the PM₁₀ modelling can be seen in Table 7.13 for the Opening Year 2025 and Design Year 2040.

In the Opening Year 2025, annual mean PM₁₀ concentrations are in compliance with the annual mean limit value of 40 µg/m³ set out under Directive 2008/50/EC reaching at most 32% of the limit. In the Design Year 2040 annual mean PM₁₀ concentrations are also in compliance with the annual mean limit value of 20 µg/m³ set out under Directive (EU) 2024/2881 reaching at most 62% of the limit. In addition, the proposed development will not result in any days of exceedance of the daily PM₁₀ limit value (Table 7.1) in both the opening and design years.

The changes in PM₁₀ concentrations as a result of the proposed development can be assessed relative to the ‘Do Nothing’ (DN) levels. In the Opening Year 2025 annual PM₁₀ concentrations will increase by at most 0.19 µg/m³ at receptor R4, this is a 0.47% increase when compared with the annual mean limit value of 40 µg/m³. All other receptors in the area will experience similar or lesser impacts and all increases are considered ‘neutral’ as per the TII criteria in Table 7.3.

In the Design Year 2040 the proposed development will result in a maximum increase of 0.28 µg/m³ at receptor R3, which is a 1.4% increase when compared with the annual mean limit of 20 µg/m³. The changes in concentrations in the Design Year are considered ‘neutral’ based on the TII criteria in Table 7.3.

Table 7.13 Predicted Annual Mean PM₁₀ Concentrations (µg/m³)

Receptor	Impact Opening Year						
	DM	% of AQLV	DS	% of AQLV	DS- DM	% Change of AQLV	Description
R1	12.1	30%	12.2	30%	0.01	0.02%	Neutral
R2	11.2	28%	11.2	28%	0.01	0.02%	Neutral
R3	11.7	29%	11.7	29%	0.03	0.07%	Neutral
R4	12.4	31%	12.6	32%	0.19	0.47%	Neutral
R5	11.7	29%	11.8	29%	0.13	0.32%	Neutral
R6	11.0	28%	11.1	28%	0.01	0.03%	Neutral
R7	11.1	28%	11.1	28%	0.00	0.00%	Neutral
Receptor	Impact Design Year						
	DM	% of AQLV	DS	% of AQLV	DS- DM	% Change of AQLV	Description
R1	12.1	61%	12.1	61%	0.01	0.05%	Neutral
R2	11.2	56%	11.2	56%	0.01	0.05%	Neutral
R3	11.6	58%	11.9	59%	0.28	1.40%	Neutral
R4	12.1	61%	12.3	62%	0.16	0.80%	Neutral
R5	11.5	58%	11.8	59%	0.22	1.10%	Neutral
R6	11.0	55%	11.1	55%	0.01	0.05%	Neutral
R7	11.1	55%	11.1	55%	0.00	0.00%	Neutral

PM_{2.5}

In relation to changes in PM_{2.5} concentrations as a result of the proposed development, the results of the assessment can be seen in Table 7.14 for the modelled Opening Year 2025 and Design Year 2040.

In the Opening Year 2025, predicted annual mean concentrations of PM_{2.5} are in compliance with the annual mean limit value of 25 µg/m³ reaching at most 28% of the limit. There is predicted to be an increase in PM_{2.5} concentrations at the worst-case receptors assessed in the Opening Year when compared with the Do-Nothing scenario (see Table 7.14). Concentrations are predicted to increase by at most 0.11 µg/m³ at receptor R4. When comparing the change in concentration with the air quality limit value, it results in a maximum change of 0.44% at receptor R4. All other receptors in the area will experience similar or lesser impacts and all increases are considered 'neutral' as per the TII criteria in Table 7.3.

In the Design Year 2040, predicted annual mean PM_{2.5} concentrations are in compliance with the limit value of 10 µg/m³ at all receptors assessed. Concentrations reach at most 68% of the annual mean limit value. The proposed development will result in a 'neutral' increase in PM_{2.5} concentrations according to the TII significance criteria in Table 7.3, with concentrations increasing by at most 0.16 µg/m³ as a result of the proposed development (at receptor R3, see Table 7.14), which is an increase of 1.6% when compared with the annual mean limit value of 10 µg/m³ for PM_{2.5}.

Table 7.13 Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)

Receptor	Impact Opening Year						
	DM	% of AQLV	DS	% of AQLV	DS- DM	% Change of AQLV	Description
R1	6.7	27%	6.7	27%	0.01	0.04%	Neutral
R2	6.1	24%	6.1	25%	0.01	0.04%	Neutral
R3	6.4	26%	6.4	26%	0.02	0.08%	Neutral
R4	6.9	27%	7.0	28%	0.11	0.44%	Neutral
R5	6.4	26%	6.5	26%	0.09	0.36%	Neutral
R6	6.0	24%	6.0	24%	0.00	0.00%	Neutral
R7	6.0	24%	6.0	24%	0.00	0.00%	Neutral
Receptor	Impact Design Year						
	DM	% of AQLV	DS	% of AQLV	DS- DM	% Change of AQLV	Description
R1	6.6	66%	6.7	67%	0.01	0.10%	Neutral
R2	6.1	61%	6.1	61%	0.00	0.00%	Neutral
R3	6.3	63%	6.5	65%	0.16	1.60%	Neutral
R4	6.7	67%	6.8	68%	0.09	0.90%	Neutral
R5	6.3	63%	6.4	64%	0.13	1.30%	Neutral
R6	6.0	60%	6.0	60%	0.00	0.00%	Neutral
R7	6.0	60%	6.0	60%	0.00	0.00%	Neutral

Significance of Predicted Changes in NO₂, PM₁₀ and PM_{2.5} Concentrations

As outlined in Section 7.4.1.4, the TII guidance (2022) states that significance of effects should be assessed based on the opening year only. Non-significant effects are 'neutral' or 'slight' changes in concentrations while significant effects can be changes in pollutant concentrations that are either 'moderate' or 'substantial' however, the TII guidance (2022) states that these must be considered in the context of the project and 'moderate' or 'substantial' increases are not necessarily always significant effects.

In relation to NO₂, PM₁₀ and PM_{2.5} the predicted changes in concentrations all 'neutral' at the worst-case receptor assessed. Therefore, according to the TII criteria as outlined in Section 7.4.1.4, the impact is not significant.

For the purposes of this assessment it has been assumed that the current estimated background pollutant concentrations are applicable for both the opening and design years, with no decreases in future background concentrations allowed for. There will be some decreases in background concentrations in future years, however at present there is no guidance-based methodology available for estimating future year background concentrations and therefore, as a conservative approach, the current estimated background concentrations have been applied to future years.

Due to the large uncertainty in future improvements in fleet composition and emissions, such as projected changes to vehicle registration and electric vehicle uptake, the future year emission rates utilised by the REM do not account for the full implementation of these measures. Predicted design year concentrations are therefore currently overly conservative as future emissions improvements are not fully taken into account, as well as no improvement in background concentrations being assumed. As a result the opening year predicted concentrations are the most appropriate for determining the significance of effects as per Section 7.4.1.4.

It can be concluded that the impact of traffic emissions on air quality and human health during the operational phase is long-term, direct, localised, negative and not significant in EIA terms.

The measures set out in the *Clean Air Strategy for Ireland* (Government of Ireland 2023) aim to work towards solutions to ensure that air pollution concentrations are reduced in order to comply with the future changes in limit values. Ireland will need to continue to implement and develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved. The estimated background concentrations used in the assessment are the largest contribution to predicted pollutant concentrations, rather than pollutant contributions associated with the proposed development. Strategies to improve air quality at a national level in future years will contribute to reducing background concentrations and therefore it is envisioned that air quality will improve in the future.

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 not significant.

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 were 7 no. sites identified which may have coinciding construction phases with that of the proposed development, these include: the Phase 1 residential development on the Applicant's wider lands in Dunboyne east (Planning ref. 23/60290), Phase 2 residential development on the Applicant's wider lands in Dunboyne east (Planning ref. 24/60805), Eirgrid 440V line installation along R157 (Planning Ref. ABP 319422), Dunboyne Link Road (Planning Ref. P822022), an office development (Planning Ref. 23/424), a commercial development (Planning Ref. 23/60065), a commercial building (Planning ref. 23/60065).

There is at most a medium risk of dust impacts associated with the proposed development (see Table 7.11). 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 and the aforementioned developments are deemed 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 certain proposed new development in the wider Dunboyne east area, the full masterplan development for the Applicant's wider lands in Dunboyne east, as well as proposed road upgrades (see Traffic and Transport Assessment and Chapter 12: 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 not significant.

7.9 Mitigation

7.9.1 Construction Phase Mitigation

The proposed development has been assessed as having a medium 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 medium 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.

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 logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsters 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 not significant with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

7.10 Residual Impact Assessment**7.10.1 Construction Phase****7.10.1.1 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.

7.10.1.2 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.

7.10.2 Operational Phase**7.10.2.1 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 NO₂, PM₁₀ and PM_{2.5} at nearby sensitive receptors as a result of the proposed development will be 'neutral' in line with the TII assessment criteria (Table 7.3). Therefore, the operational phase impact to air quality is long-term, direct, negative, and not significant.

7.10.2.2 Human Health

Dispersion modelling of traffic emissions at sensitive receptors in proximity to impacted road links during the operational phase indicate pollutant emissions will be in compliance with the TII assessment criteria which is based on the impacts in the opening year. Section 7.8.2 determined that the impact to air quality as a result of increased traffic volumes during

the operational phase of the proposed development will be localised, direct, long-term, negative and not significant for the opening year. However, Ireland will need to develop measures to ensure continuing improvements in air quality in future years in order to meet the objectives of the Clean Air Strategy for Ireland (Government of Ireland, 2023) and to ensure the ambient air quality limit values set out in Directive (EU) 2024/2881 are achieved.

7.10.3 Cumulative Impact

7.10.3.1 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.

7.10.3.2 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 NO₂, PM₁₀ 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.

7.11 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.

7.12 Significant Interactions

7.12.1 Air Quality and Human Health and Population

7.12.1.1 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.

7.12.1.2 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.

7.12.2 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.

7.12.3 Air Quality and Land, Soils and Hydrogeology

7.12.3.1 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.

7.12.3.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Land and Soils during the operational phase.

7.12.4 Air Quality and Biodiversity

7.12.4.1 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 are no designated ecological sites within 250 m of the proposed development site area. Significant dust impacts are not predicted beyond this distance. Dust mitigation measures will be implemented on site as set out in Section 7.9.1 of Chapter 7 of the EIAR. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative, localised and not significant with respect to biodiversity.

7.12.4.2 Operational Phase

There are no potentially significant interactions identified between Air Quality, and Biodiversity during the operational phase.

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7.12.5 Air Quality and Material Assets – Traffic & Transport

7.12.5.1 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.

7.12.5.2 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.

7.13 References & Sources

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Department of the Environment, Heritage and Local Government (DEHLG) (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities

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UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

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CHAPTER EIGHT

CLIMATE CHANGE



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CHAPTER EIGHT

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CHAPTER 8 | Climate Change

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 Bennetstown, Dunboyne, Co. Meath.

It should be read in conjunction with Chapter 7 – Air Quality, Chapter 12 – Material Assets Traffic & Transport and the Climate Action Energy Statement prepared by ENX in relation to the development.

8.2 Expertise & Qualifications

This chapter was completed by Ciara Nolan. Ciara is a Principal Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Sciences (MIEnvSc). She has over 9 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 subject site is located within the townland of Bennetstown to the north of Dunboyne town. The proposed development will consist of a mix of residential units, including houses, duplexes and apartment units, and all associated site works. The site is phase 3 of a larger masterplan area. 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 (CO₂) 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 CO₂. 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 Guidance, Legislation & Policy

The assessment of potential impacts on climate has been prepared taking the relevant legislation, policy and guidance described in the following sections into consideration.

The principal guidance and best practice documents used to inform the assessment of potential impacts on climate are summarised below. In addition to specific climate guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022); and
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).

The assessment has made reference to national guidelines where available, in addition to international standards and guidelines relating to the assessment of climate impacts. These are summarised below:

- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022a);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2024);
- Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as Institute of Environmental Management & Assessment (ISEM)) IEMA Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (hereafter referred to as the ISEP 2022 GHG Guidance) (ISEP, 2022);
- ISEP Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (hereafter referred to as the ISEP 2020 EIA Guide) (ISEP, 2020a);
- ISEP GHG Management Hierarchy (hereafter referred to as the ISEP 2020 GHG Management Hierarchy) (ISEP, 2020b);
- ISEP Principles Series: Climate Change Mitigation & EIA (ISEP, 2010);
- Carbon Management in Infrastructure and Built Environment - PAS 2080 (BSI, 2023); and
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a).

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 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 fifth and most recent climate action plan, CAP25, was published in April 2025 (Government of Ireland, 2025).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) in March 2021. The Climate Act was signed into Law on the 23rd July 2021, giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Act (Government of Ireland, 2021b) 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 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 sectoral 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 ₂ e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO ₂ e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO ₂ e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 8.2 Sectoral Emission Ceilings 2030

Sector	Baseline (MtCO ₂ e)	Carbon Budgets (MtCO ₂ e)		2030 Emissions (MtCO ₂ e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

8.4.1.2 Policy

8.4.1.2.1 Greenhouse Gas Assessment Policy

In 2024, the Government published its Long-Term Strategy on Greenhouse Gas Emissions Reductions (Government of Ireland, 2024a). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the CAP.

In December 2023, CAP24 was published, establishing key actions to deliver a 51% reduction in GHG emissions by 2030 (compared to 2018 levels) and achieve climate neutrality by 2050 (Government of Ireland, 2023). The updated and current CAP25, published in April 2025, builds on the progress of the previous four iterations of the CAP, with CAP23 first publishing carbon budgets and sectoral emission ceilings, and reaffirms Ireland’s climate ambition, with a focus on delivery, implementation and measurable outcomes, particularly ahead of the second carbon budget period (2026–2030). 2025 is the last year in the first 5-year carbon budget period. During the initial 5-year budget period the average annual reduction required was 4.8%, this increases to 8.3% in the second budget period (2026-2030). CAP25 retains the high-impact sectors where the biggest savings can be achieved, while emphasising public sector leadership and green procurement. These sectors include renewable energy, energy efficiency of buildings, transport, sustainable farming, sustainable business and land-use change.

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CAP25 also includes targeted actions to decarbonise industrial heat and support the transition to carbon-neutral manufacturing processes. Public sector leadership is strengthened through a new Buying Greener: Green Public Procurement Strategy and Action Plan (2024–2027), the development of mandatory Climate Action Roadmaps, and enhanced emissions monitoring and reporting across government operations. To support innovation and ensure future economic resilience, IDA Ireland continues to attract and support businesses investing in climate technologies and low-carbon solutions.

CAP25 highlights a significant 17% reduction in electricity emissions in early 2024, with wind power supplying nearly 40% of Ireland’s total electricity demand and over 100,000 rooftop microgenerators connected to the grid. Investments are ongoing in grid reinforcement, offshore wind development, and interconnectors with France and the UK to enhance renewable generation capacity. EirGrid, Enterprise Ireland and IDA Ireland have recently signed an MoU to collectively support offshore wind development in Ireland.

CAP25 also reinforces targets first outlined in CAP24 to reduce the embodied carbon of construction materials, with a 10% reduction by 2025 and 30% reduction by 2030 for materials produced and used in Ireland. Cement and high embodied carbon construction materials can be reduced through product substitution, reduced clinker content in cement and uptake of low-carbon construction methods, including those outlined in the Construction Industry Federation 2021 report Modern Methods of Construction (Construction Industry Federation, 2021). There also remains scope for the construction industry to use more timber in construction. In 2022, 24% of new construction in Ireland was built using timber frames to satisfy the demand for housing. Public bodies are now required under the Public Sector Mandate to use best practice project design to reduce embodied carbon; procure concretes with clinker replacements (lower carbon); and require that large construction projects produce a whole life cycle GHG emissions assessment.

Furthermore, CAP25 advances sector-specific measures in green procurement, electrification of transport and heat, and just transition (with the introduction of a Just Transition Commission) to support vulnerable communities. Transport emissions increased by 0.3%. Electric vehicles and the use of biofuels are stated as the best means of transport emission reductions in the medium term.

Meath County Council (Meath CoCo) have published a Climate Action Plan 2024 – 2029 which outlines their commitment to “create a low carbon and climate resilient County, by delivering and promoting best practice in climate action, at the local level”. As per the Meath CoCo Climate Action Plan 2024 – 2029, the key targets are:

- Energy Efficiency: 50% improvement in energy efficiency by 2030.
- Resilience: make Meath a climate resilient region by reducing the impacts of future climate change-related events.
- GHG Reduction: 51% reduction in GHG emissions by 2030.
- Awareness: Actively engaging and informing citizens, communities and businesses on climate change.
- Net Zero by 2050.

The actions of the plan are divided across five thematic areas: governance and leadership; built environment and transport; natural environment and green infrastructure; communities, resilience and transition; sustainability and resource management.

Meath CoCo have identified 9 decarbonizing zones in their administrative area to promote GHG emission reductions, of which Dunboyne is one. The residential, manufacturing & commercial, transport and waste emissions sectors were found to be the primary sectors in relation to the decarbonizing zones.

Transitioning towards more sustainable transport systems is a key priority of Meath CoCo. Supporting active travel and public transport initiatives as well as enabling the development of electric vehicle charging infrastructure across the county will aid in reducing transport-related GHG emissions.

8.4.1.2.2 Climate Change Vulnerability Policy

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 Main Report (NCCRA) was published in June 2025 (EPA, 2025b). 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 assesses 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 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).

The *Meath CoCo Climate Action Plan 2024-2029* highlights the increasing risks posed by climate change to the county's infrastructure, residents, and businesses, particularly from extreme weather events such as flooding and windstorms. Additionally drought events have been identified as a risk for the Meath region which will impact agriculture and crop growing. Protecting the built environment, such as public infrastructure, from the impact of climate change hazards is a key priority, this will involve appropriate planning, asset management and preparedness as well as liaison with other key stakeholders, such as the OPW on flood risk.

8.4.2 Site Surveys/Investigation

No surveys were required as part of the climate assessment.

8.4.3 Consultation

A Section S32B meeting with Meath County Council was held in October 2025. Additional consultation with specific relevant bodies was not required as part of the climate assessment.

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 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.

A detailed lifecycle assessment (LCA) was undertaken by the project developer (Marina Quarter Ltd. / Glenveagh Properties) on their most commonly used house types (Glenveagh Properties, 2025). The project developer uses consistent house designs across their various developments. This level of repeatability allowed for a detailed LCA to be undertaken across the most commonly used house types, the results of which have been used to generate a typical embodied carbon figure suitable for use across all Glenveagh house types.

A specific kgCO₂e/m² figure has been calculated which can be factored based on the specific gross internal area (m²) of the unit to be assessed. Summing the embodied carbon for all of the units within the proposed development then provides an estimate of the embodied carbon associated with the specific project.

The lifecycle assessment followed the lifecycle stage terminology consistent with widely used industry standards (based on BS EN 15978:2011, BS EN 15804:2012):

- **Stage A1 – A3: Product carbon** 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.

- **Stage A4 – A5: Construction carbon** These carbon impacts arise from transporting the construction products to site, and their subsequent processing and assembly into the building.
- **Stage B1 – B5: In use carbon** – use of the building (B1), maintenance (B2), repair (B3), replacement (B4) and refurbishment (B5).
- **Stage B6, B7, B8: In use phase** operational use energy (B6), water (B7) and user activities carbon (B8). *These categories have been excluded from the assessment due to the significant variability in user emissions.*
- **Stage C1 – C4: End of Life carbon** 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.
- **Biogenic carbon:** Carbon sequestered during the growth cycle of a tree that is temporarily stored in the timber product until the end of its useful life. This element must be reported separately to the A – C carbon.

The house types assessed were of timber framed construction with a rendered blockwork façade and concrete tile roof. These house types were considered 'typical' house types for Glenveagh projects. The LCA study examined the carbon across the lifecycle of the typical home and this information can then be used to mitigate impacts from Glenveagh projects and target key areas for improvement.

The LCA was assessed in line with EN15978 and European Level(s) methodologies. The assessment has also followed *RICS Whole life carbon assessment for the built environment guidance v1*, which is comparable with the European Level(s) methodology but it has been adapted to accommodate a 50 year service life for the building to coordinate with European Level(s) methodologies.

OneClick LCA, in addition to Glenveagh specific calculations, was used to calculate embodied carbon emissions in line with detailed RICS guidance. The Inventory of Carbon and Energy (ICE) database as well as Environmental Product Declaration (EPDs) were used to find the relevant carbon factors for the specified materials.

The building element groups included in the embodied carbon assessment were: substructure; frame; floors; external walls; internal walls and partitions; windows and doors; roofs; services; MEP (mechanical, electrical and plumbing); some permanent furnishings; and some external works.

An uncertainty factor was included in the LCA calculations. Due to the early design stage, precise material quantities and types are not yet known. To ensure emissions are not under-reported a conservative uncertainty factor of 22% was added to all the embodied carbon emissions based on the RICS v2 guidance, which is more conservative than the RICS v1 guidance.

The Glenveagh LCA concluded that a figure of 500 kgCO₂e/m² for total carbon (A – C stages, total lifecycle) can be used in EIAR assessments for typical house types.

The following figures for duplex and apartment units have been provided by the developer to inform the climate assessment. These figures are considered conservative and are based on industry standards as fully detailed LCAs have not been completed by the developer at present.

- Duplex (block built/masonry): 1,171 kgCO₂e/m²
- Duplex (light gauge steel): 1,184 kgCO₂e/m²
- Apartment: 1,095 kgCO₂e/m²

The Glenveagh house types utilise a timber framed construction. Timber usage has a positive climatic impact through carbon sequestration. Carbon sequestration is the process of capturing and storing atmospheric carbon. Trees and plants absorb CO₂ from the atmosphere during photosynthesis in exchange for oxygen that they give out in return.

Biogenic carbon is the term used for carbon absorbed, stored and emitted by organic matter like soil, trees, plants and grasses. Biogenic carbon is reported in life-cycle carbon assessments as a separate line item.

The LCA found that a reduction of 21% of total embodied carbon emissions (A – C stages) can be utilised for the biogenic carbon associated with the Glenveagh house types. This will be a carbon saving or negative carbon figure (e.g.-105 kgCO₂e/ m²) within the climate impact assessment. The duplex and apartment units are not of timber frame construction and so it is not appropriate to include biogenic carbon within the calculations for these unit types.

This biogenic carbon must be reported separately to the embodied carbon results and is not included within the figures for the embodied carbon associated with the house and apartment or duplex units referenced above.

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 (CO₂) which will impact climate.

The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022b), states that road links meeting one or more of the following criteria can be defined as being ‘affected’ by a proposed development and should be included in the local air quality assessment, and also the climate assessment.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5 m or greater.

While the guidance is specific to infrastructure projects the approach can be applied to any development that causes a change in traffic.

There are a number of road links that will experience a change of over 1,000 in the AADT during the operational phase as a result of the proposed development. As a result a detailed assessment of traffic related carbon dioxide (CO₂) emissions was conducted.

PE-ENV-01104 (TII, 2022a) states that road traffic related emissions information should be obtained from an Air Quality Practitioner (i.e. the air quality EIAR chapter author) 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, 2024) 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 CO₂e.

Traffic flow information was obtained from Atkins Consulting Engineers for the purposes of this assessment. Data was provided for the Base Year 2021, Opening Year 2025 and Design Year 2040 (see Traffic and Transport Assessment for further details).

Both the Do Nothing and Do Something scenarios are quantified in order to determine the degree of change in emissions as a result of the proposed development. 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 Dunboyne area.
- The Proposed scenario – this is the “Do Something” scenario and includes traffic from the Do Nothing scenario and traffic associated with the full build-out of the masterplan lands in the ownership of the Applicant (Marina Quarter Ltd.) as well as traffic associated with cumulative developments in the wider Dunboyne area.

Further detail on the modelling scenarios can be found in the Traffic and Transport Assessment prepared by Atkins 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 12 Material Assets – Transport for further details on the traffic data.

Table 8.3 Traffic Data used in Operational Phase Climate Assessment

Road Link	Location	Speed (kph)	Base Year 2021	Opening Year 2025		Design Year 2040	
				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)
2	M3 motorway (south of J5)	102.5	35127 (3117)	36124 (3247)	38872 (3247)	40734 (3649)	45965 (3646)
2A	M3 off ramp	82	8548 (475)	9193 (451)	10649 (451)	9812 (497)	12742 (497)
2B	M3 on ramp	79	10013 (432)	10481 (373)	11763 (373)	11127 (412)	13415 (411)
3	R147, north of R147/R157 junction	78	18878 (1025)	19926 (941)	20626 (941)	21296 (1037)	22318 (1027)
5	R157, between M3-Junction 5 and M3 Parkway junction	65	14275 (526)	15486 (224)	9591 (224)	17863 (469)	25188 (462)
6	R157, between M3 Parkway Junction and proposed Navan Road distributor road junction with R157	66.5	14262 (694)	14518 (671)	17020 (671)	16865 (721)	21539 (710)
7	R157, between proposed Navan Road distributor road junction with R157 and proposed Dunboyne Business Park Distributor Road junction with R157	66.5	14262 (694)	14518 (672)	16298 (672)	16865 (721)	19926 (716)

Road Link	Location	Speed (kph)	Base Year 2021	Opening Year 2025		Design Year 2040	
				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)
8	R157, between proposed Dunboyne Business Park Distributor Road junction with R157 and Summerhill Roundabout	66.5	14262 (694)	13280 (542)	14547 (542)	15767 (604)	17503 (603)
9	L2228 Summerhill Road, between Summerhill Roundabout and Main Street signalised junction	47	4711 (235)	3277 (113)	3478 (113)	2861 (126)	4449 (139)
10	L2228 Station Road, east of Main Street signalised junction	46.5	6175 (161)	7346 (345)	8514 (345)	5952 (362)	7042 (361)
12	Old Navan Road, north of Main Street signalised junction	46	4369 (170)	4033 (159)	4997 (159)	3484 (148)	5135 (149)
13	Proposed Eastern Distributor Road	47	0 (0)	0 (0)	0 (0)	3550 (0)	4656 (0)
17	M3-Junction 5 Interchange	50.5	9706 (397)	16161 (649)	18643 (649)	17909 (699)	22106 (693)

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 Climate Action Energy Statement was prepared by ENX 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. Information on some of the measures in relation to operational energy usage and sustainability measures has been supplied 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 ISEP guidance (ISEP, 2022) which is broadly consistent with the terminology contained within Figure 3.4 of the EPA’s (2022) ‘Guidelines on the information to be contained in Environmental Impact Assessment Reports’.

The 2022 ISEP Guidance (ISEP, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact. However, some projects will replace existing development or baseline activity that has a higher GHG profile. Therefore, the significance of a project’s emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project’s residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project’s remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland’s National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended TII significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII, 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project’s GHG impact. TII reference the ISEP Guidance (ISEP, 2022) which states that the crux of assessing significance is “not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050”.Significance is determined using the criteria outlined in Table 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.

Effects	Significance Level	Description
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 the Climate Action Act in 2021 and the Climate Action Plan 2025, sectoral carbon budgets have been published for comparison with the net GHG emissions from the proposed development over its lifespan. The aim of the carbon budgets is to ensure we are on a trajectory to meet the National Climate Objective of Net Zero by 2050.

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 in order 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 below 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. The impact from climate change on the proposed development can therefore 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 2025 (EPA, 2025a), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 1.03 MtCO₂e. However, the 2024 emissions represent the second consecutive year in which Ireland's emission were below (-4.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-7.4%) and ESR (Effort Sharing Regulation) emissions decreased (-0.5%). Ireland's target is an emission reduction of 626 kt of CO₂e by 2030 on an average baseline of 2016 to 2018.

The EPA estimate that 2024 total national GHG emissions, excluding LULUCF, have decreased by 2.0% on 2023 levels to 53.75 Mt CO₂e, with a 0.7 Mt CO₂e (-8.9%) reduction in electricity industries alone. This was driven by a 39.6% share of energy from renewables in 2024 and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.6% to 6.0 Mt CO₂e in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was agriculture at 38% of the total, followed by transport at 21.7%. For 2024, total national emissions (including LULUCF) were 57.64 Mt CO₂e (EPA, 2025a) (Table 8.6).

The current estimates of National greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the National Climate ambition of a 51% reduction by 2030. The data indicate that from 2021- 2024 Ireland has used 82.8% of the 295 Mt CO₂e Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Table 8.6 Trends in Total National GHG Emissions 2021 – 2023

Sector ^{Note 1}	2021	2022	2023	2024	Total Budget (Mt CO ₂ e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2022 to 2023
Electricity	9.89	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.09	11.76	11.80	11.65	54	85.74%	-1.27%
Buildings (Residential)	6.87	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.44	1.45	1.39	1.49	7	82.43%	7.19%
Industry	7.09	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.94	21.78	20.72	20.41	106	80.05%	-1.50%
Other ^{Note 2}	1.86	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	4.63	3.98	3.89	3.89	–	–	0
Total including LULUCF	64.82	62.99	58.83	57.64	295	82.81%	-2.04%

Note 1 Reproduced from latest emissions data on the EPA (EPA, 2025).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

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 TII (TII, 2022a) and ISEP Guidance (ISEP, 2022) the future baseline is a trajectory towards net zero by 2050, "whether it [the project] contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".

The future baseline will be determined by Ireland meeting its targets set out in the CAP25, and future CAPs, alongside binding 2030 EU targets. In order to meet the commitments under the Paris Agreement, 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). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its ETS and non-ETS greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and includes GHG emissions from transport, residential and commercial buildings and agriculture.

In May 2025, the EPA released the report Ireland’s Greenhouse Gas Emissions Projections 2024-2055 (EPA, 2025b), which includes total projected emissions and a breakdown of projected emissions per sector under the ‘With Existing Measures’ and ‘With Additional Measures’ scenarios. The EPA projections indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 22% by 2030, still short of the 42% reduction target.

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 Dublin 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 Dublin 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 Dublin Airport Metrological Station were November and December, and the driest month on average was June (Met Éireann, 2025a). July was the warmest month with a mean temperature of 15.4 Celsius. January was the coldest month with a mean temperature of 5.2 Celsius.

Met Éireann’s 2023 Climate Statement (Met Éireann, 2024a) 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).

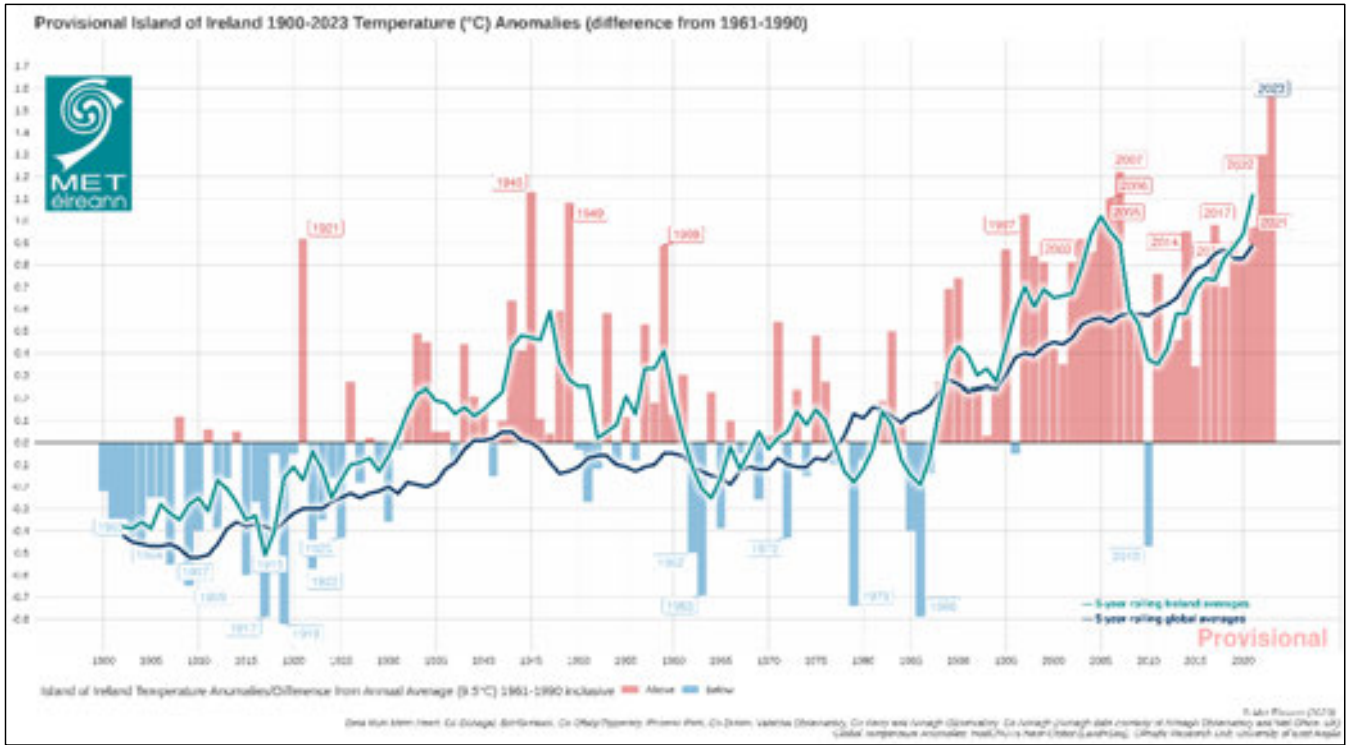


Figure 8.1 1900-2023 Temperature (°C) Temperature Anomalies (differences from 1961-1990).

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.

Met Éireann’s 2024 *Climate Statement* (Met Éireann 2025b) states 2024’s average shaded air temperature in Ireland is provisionally 10.72°C, which is 1.17°C above the 1961-1990 long-term average or 0.55°C above the most recent 1991-2020 long-term average. This is the 4th warmest year on record with 2023 breaking previous records. Seven of the top ten warmest years have occurred since 2005. Record high sea surface temperatures (SST) were recorded in 2022, and in 2024 continued at or near record high levels. 2024 was overall drier than average, however there were many instances of heavy or intense rainfall which led to flooding events. This trend is predicted to continue with climate change with an increase in both dry periods and heavy rainfall events. Considering the extraordinary 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

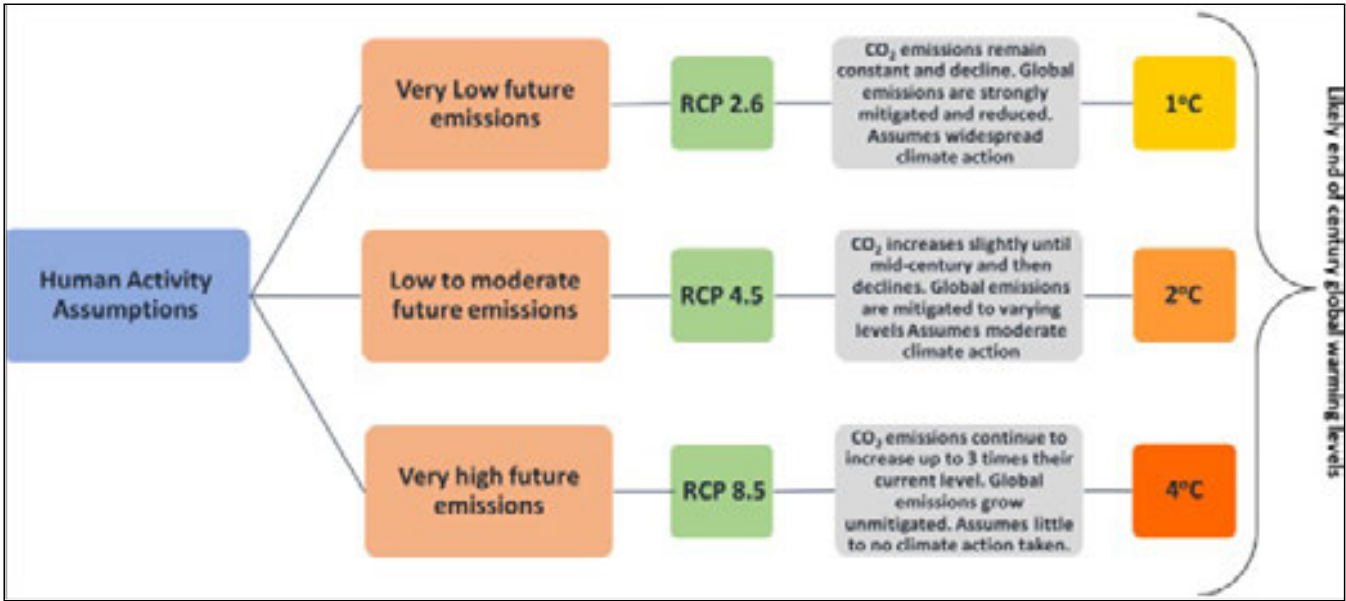
Impacts as a result of climate change will evolve with a changing future baseline, changes have the potential to include increases in global temperatures and increases in the number of rainfall days per year. Therefore, it is expected that the baseline climate will evolve over time and consideration 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.

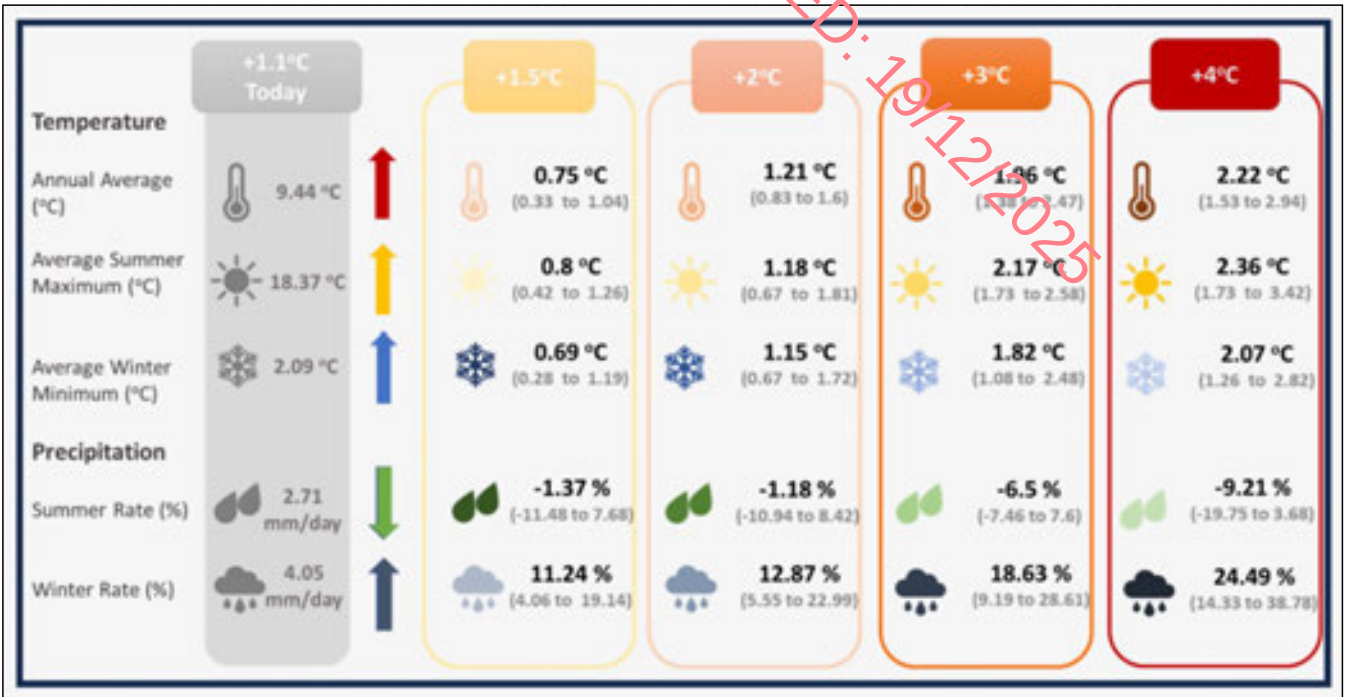
National Framework for Climate Services (NFCS) was founded in June 2022 to streamline the provision of climate services in Ireland and will be led by Met Éireann. The aim of the NFCS is to enable the co-production, delivery and use of accurate, actionable and accessible climate information and tools 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 (for example, 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. Ireland's climate is dominated by the Atlantic Meridional Overturning Circulation (AMOC), a large system of ocean currents – including the Gulf Stream – characterised by a northward flow of warm water and a southward flow of cold water. Due to the AMOC, Ireland does not suffer from the extremes of temperature experienced by other countries at a similar latitude. Recent studies have projected that the AMOC could decline by 30 – 40 % by 2100, resulting in cooler North Atlantic Sea surface temperatures (SST)s (Met Éireann, 2023b). Met Éireann projects that Ireland will nevertheless continue to warm, although the AMOC cooling influence may lead to reduced warming compared with continental Europe. AMOC weakening is also expected to lead to additional sea level rise around Ireland. With climate change Ireland's temperature and rainfall will undergo more and more significant changes e.g. 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

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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.

The projections were echoed by the *Updated High-resolution Climate Projections for Ireland Research Report: 471* (EPA, 2024f) which was in broad agreement with previous research. The future autumn and winter months are projected to be up to 10% wetter, while summer is projected to be up to 8% drier.

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 has included the following stages as per Section 8.4.4.1:

- Stage A1 – A3: Product carbon
- Stage A4 – A5: Construction carbon
- Stage B1 – B5: In use carbon
- Stage C1 – C4: End of Life carbon
- Biogenic carbon

Using 500 kgCO₂e/m² for the housing units, 1,084 kgCO₂e/m² for the duplex units and 1,095 kgCO₂e/m² for the apartment units, in conjunction with the schedule of areas supplied by the project architects, allowed a site specific carbon figure for the project to be calculated. It is estimated that the proposed development will result in total embodied carbon emissions of 19,618 tCO₂e.

As per the LCA completed on the typical house types (Glenveagh Properties, 2025) the majority (75%) of the carbon emissions are linked to the sub and superstructures. The product stage (A1 – A3) contribute the most to the overall carbon result followed by in use emissions (B1 – B5), primarily B4 replacement.

Seven key materials were identified in the assessment of the house units that together make up 87% of Stage A – C emissions: concrete; MEP (mechanical, electrical and plumbing); plastic; windows; boards; timber; and insulation.

Efforts to reduce the quantity of these materials used or swap them for lower carbon alternatives will impact on the carbon footprint of the units. It is important to highlight that although the timber framework forms a significant part of the structural skeleton of the house units; it is not as carbon intensive as other materials. Both the Climate Change Advisory Council (CCAC) and National Climate Action Plan advise for the use of timber framed buildings as a construction method. Timber frames have the additional benefit of having absorbed carbon from the atmosphere during their growth and providing a long-term carbon sink during their lifetime in the building.

The LCA (Glenveagh Properties, 2025) found that a reduction of 21% of total embodied carbon emissions (A – C stages) can be utilised for the biogenic carbon associated with the proposed development house types. This represents carbon savings of -2,340 tCO₂e for the proposed housing units. As the proposed apartment and duplex units are not of timber frame, there is no carbon saving associated with them.

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. In Table 8.7, GHG emissions have been compared against Ireland's total GHG emissions in 2024 (the existing baseline) and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO₂e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

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The estimated total GHG emissions, when annualised over the 50-year proposed development lifespan, are equivalent to 0.0007% of Ireland’s total GHG emissions in 2024 and 0.001% of Ireland’s non-ETS 2030 emissions target.

Table 8.7 Estimated GHG Emissions Relative to Targets and GHG Baseline

Predicted Development GHG Emissions (tCO ₂ e)		Annualised Development GHG Emissions (tCO ₂ e)	Target/Sectoral Budget (tCO ₂ e)		Annualised Emissions as % of Relevant Target
19,618	Total Project Stage A - C GHG Emissions	392	Ireland's 2023 Total GHG Emissions (existing baseline)	57,640,000	0.0007%
			Non-ETS 2030 Target	27,722,000	0.001%
-2,340	Total Project Biogenic Carbon	-47	-	-	-

The results of the lifecycle assessment can be compared with a number of industry benchmarks to demonstrate the carbon impact of the development.

The Royal Institute of the Architects of Ireland (RIAI) 2030 Climate Challenge embodied carbon benchmarks for small scale residential developments were used for comparison with the predicted lifecycle carbon for the proposed development units. The proposed development house types will achieve the RIAI 2025 target of <800 kgCO₂e/m² and the 2030 target of <625 kgCO₂e/m² based on the predicted figure of 500 kgCO₂e/m² for the house types.

RIAI have a 2030 higher target of <450 kgCO₂e/m². Based on the current assessment the predicted figure of 500 kgCO₂e/m² for the housing units is not currently meeting this higher target, however it is close to this target and given the ongoing commitment to sustainable development that the project developer (Marina Quarter Ltd. / Glenveagh Properties) have it is likely that in the future this higher target can be achieved.

The London Energy Transformation Initiative (LETI) Climate Emergency Design banding system for residential properties was also used for comparison with the house units.

The LCA carbon intensity of 500 kgCO₂e/m² (stage A – C) and upfront carbon (A1 – A5) of 356 kgCO₂e/m² indicates that the house units are within the LETI B band. According to the LETI carbon alignment document, banding B is considered a robust target performance.

Table 8.8 Comparison Against Industry Embodied Carbon Benchmarks

Metric	Glenveagh Embodied Carbon (kgCO ₂ e/m ²)	Target	Target Achieved
RIAI 2025 Target (Embodied Carbon (A – C) kgCO ₂ e/m ²)	500	<800	Y
RIAI 2030 Target (Embodied Carbon (A – C) kgCO ₂ e/m ²)	500	<625	Y
RIAI 2030 Higher Target (Embodied Carbon (A – C) kgCO ₂ e/m ²)	500	<450	N
LETI Embodied Carbon Band B – Upfront Carbon	356	400	Y
LETI Embodied Carbon Band B – Lifecycle Embodied Carbon	500	625	Y

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. These are outlined fully within the Climate Action Energy Statement prepared by EXN in relation to the development. The primary elements with respect to reducing climate impacts and optimising energy usage are summarised in Section 8.9.2.

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 CO₂e for the future years of 2025 and 2040 are detailed in Table 8.9. These are significantly less than Ireland’s national 2025 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 2025 the proposed development will increase CO₂ emissions by 577 tonnes CO₂e. This equates to 0.0015% of the 2025 national emission ceiling or 0.010% of the 2030 Transport sector emissions ceiling (see Table 8.9). Similarly low increases in CO₂ emissions are predicted to occur in 2040 with emissions increasing by 1,147 tonnes CO₂e. This equates to 0.004% of the 2030 national emission ceiling or 0.019% 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.

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Table 8.9 Traffic Emissions GHG Impact Assessment

Year	Scenario	CO ₂ e (tonnes/annum)
2025	Do Nothing	13,472
	Do Something	14,049
2040	Do Nothing	14,410
	Do Something	15,557
Increment Change in 2025		577
National Emission Ceiling 2025 (Tonnes) ^{Note 1}		38,991,362
Impact in 2025 (as % of national emissions ceiling)		0.0015%
Transport Sector 2030 Emission Ceiling		6,000,000
Impact in 2025 (as % of transport sector emissions ceiling)		0.010%
Increment Change in 2040		1,147
National Emission Ceiling 2030 (Tonnes) ^{Note 1}		27,722,000
Impact in 2040 (as % of national emissions ceiling)		0.004%
Impact in 2040 (as % of transport sector emissions ceiling)		0.019%

^{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 therefore been taken into account when determining the significance of the proposed development’s GHG emissions. Based on the carbon emissions intensity and policy measures the project developer has in place, it can be concluded that the proposed development is aligned with Ireland’s GHG trajectory to net zero by 2050. Therefore, 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.

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 and 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. The Site Specific Flood Risk Assessment (SSFRA) carried out for the proposed development by IE Consulting concluded that, provided the required measures are put in place, flooding is not a significant risk at the project location. However, best practice mitigation measures are to be implemented as per Section 8.9.1;
- 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

In order to determine the vulnerability of the proposed development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. The following climate hazards have been considered in the context of the proposed development: flooding (coastal, pluvial, fluvial), extreme heat, extreme cold, wildfire, drought, extreme wind, lightning, hail, landslides and fog.

The sensitivity of the proposed development to the above 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)	1 (Low)	1 (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 IE Consulting, and is submitted with this planning application. The SSFRA has concluded that flooding is not a risk to the proposed development.

Due to the development’s location the site is not at risk from tidal flooding. In relation to fluvial flooding the design of the proposed development and associated works have been developed to ensure there is a low risk of fluvial flooding. 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) (2025), indicates that the wildfire hazard is classified as medium for the Meath 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 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, 2025) was reviewed in order 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)

Extreme temperatures, both extreme heat and extreme cold, have the potential to impact the building materials and some related infrastructure. However, high quality, durable building materials will be selected for the proposed development at the detailed design stage. Throughout detailed design phase, the architects will be using guidance documents to inform with design detail decisions including; the EU Commission *Technical Guidance on Adapting Buildings to Climate Change* (European Commission (2021a), LETI emergency design guide (LETI, 2020), and the latest available IPCC report. In addition, should updated EuroCodes be published prior to completion of detailed design, which will include consideration for climate impacts, these design standards will be taken into account. Therefore, extreme temperatures are not considered a significant risk.

Summary

Overall, the proposed development has at most low vulnerabilities to the identified climate hazards and 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 ISEP (2022) and 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.
- Waste materials will be re-used on site where possible and where re-use is not possible on-site, they will be sent off-site for recycling, re-use or recovery.
- Sourcing materials locally where possible to reduce transport related CO₂ emissions.
- Material choices and quantities will be reviewed during detailed design, to identify and implement lower embodied carbon options where feasible.

The project developer, Marina Quarter Ltd. (Glenveagh Properties), has committed to achieving Net Zero by 2050 across its whole business. Therefore, the proposed development will be built with carbon reduction and sustainability in mind and will include reductions of embodied emissions during the construction phase. Glenveagh Properties have published a Net Zero Transition Plan and Annual Reports which detail a commitment to achieving Net Zero by 2050.

The above listed measures are supported by Glenveagh Properties PLC's *Net Zero Transition Plan 2023*, published in March 2023, which identifies the sources of Glenveagh Properties PLC's emissions and proposed measures to reduce these. A commitment to achieve a 55% reduction in Scope 3 (construction methods) emissions intensity (tCO₂e per 100 m² of complete floor area) by 2031 (using 2021 as the baseline year) will involve supplier engagement to make informed procurement decisions, engaging with subcontractors to support their transition to less carbon intensive fuels (diesel and gas oil is currently the norm) and investing in innovation of designing and building homes to reduce their associated embodied carbon. A reduction target of 46.2% by 2031 is also set in the plan for Scope 1 and 2 emissions (company operations). All targets have been validated by the Science Based Targets initiative (SBTi).

The Science Based Targets initiative (SBTi) is a corporate climate action organisation, incorporated as a charity, which develops standards, tools and guidance enabling companies to set GHG emissions reductions targets in line with net-zero by 2050 at the latest. Science-based targets show companies and financial institutions how much and how quickly they need to reduce their GHG emissions to prevent the worst effects of climate change (SBTi, 2024a). Glenveagh Properties PLC is one of the over 4,000 companies and financial institutions who have had their emission reduction targets validated by the SBTi (Glenveagh's targets can be searched in the SBTi's target dashboard (SBTi, 2024b)).

Glenveagh Properties PLC's *Full Year 2024 Results*, published in March 2025, identified that Scope 3 emissions are 7% below the 2021 baseline, measured on an intensity basis (tCO₂e per 100m²). This is primarily due to the focus on the energy efficiency of the residential units. Scope 1 and 2 emissions decreased by 47% compared to 2021 baseline, which can be attributed to the first full year HVO (hydrotreated vegetable oil) was used across all sites as a replacement to diesel.

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 incorporated design 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.

Such measures included in the proposed development to reduce the impact to climate from energy usage are:

- The residential units will aim to achieve a Building Energy Ratio (BER) of A2 (25-49 kwh/m²/yr.);
- Achieve air tightness standards of 3 m³/m²/hr;
- Ensure thermal bridging details are designed to achieve thermal bridging factors of 0.08W/m²K for the residential units and 0.15 W/m²k for the apartment units;
- Energy Performance Coefficient (EPC) < 0.30;
- Carbon Performance Coefficient (CPC) < 0.35;
- Renewable Energy Ratio (RER) > 0.20;
- Meet or exceed minimum U-Value standards identified in Part L 2022 Dwellings;
- A combination of low energy strategies such as air to water heat pumps, mechanical ventilation heat recovery and/or natural ventilation will be decided and implemented to achieve A2 BER Rating;
- Provide an appropriate combination of technologies to ensure energy consumption is in line with Part L 2022 Dwellings requirements;
- Use of natural daylight will be maximised to reduce the need for artificial lighting;
- Where artificial lighting is required, this will be in the form of energy efficient LED lighting within in the dwellings and common areas.
- Bicycle parking has been incorporated into the development to provide an alternative, more sustainable mode of transport compared to private vehicles.

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. Further details on some of the incorporated design measures can be found in the Climate Action Energy Statement prepared by ENX in respect of this planning application.

A number of measures have been incorporated into the design of the development in order 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. 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 reference the ISEP guidance which states that the crux of assessing significance is “not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050”. The proposed development has proposed some best practice mitigation measures and is committing to reducing climate impacts where feasible. 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 therefore 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 CO₂, 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.

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CHAPTER NINE

NOISE & VIBRATION



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CHAPTER NINE

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CHAPTER 9 | Noise & Vibration

9.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on the subject site, which is located within the townland of Bennetstown, Dunboyne.

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 impacts associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment, along with the inward impact of existing noise on the development itself. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the relevant sections of this chapter and included in the references section. In addition to specific noise guidance documents, the following guidelines were considered and consulted for the purposes of this chapter:

- 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); and
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)

9.2 Expertise & Qualifications

This chapter has been prepared by Alistair Maclaurin. Alistair holds a BSc in Creative Music and Sound Technology and a Diploma in Acoustics and Noise Control. He is a member of the Institute of Acoustics (MIOA). Alistair has worked in the field of acoustics since 2012. He has been the lead noise consultant across various sites on major infrastructure projects such as Crossrail and Thames Tideway Tunnel, specialising in construction noise assessment and control. Additionally, he has undertaken various environmental noise assessments and planning reports for infrastructure, residential, commercial and other developments.

9.3 Proposed Development

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

The site is located c.3.5km to the north of the town centre and situated west of the Dunboyne to Clonsilla Rail Line and M3 Parkway rail station and the Royal Canal and the Dublin-Maynooth Railway Line. The site is accessible via the R157 which is located at the east of the site. The proposed development is located within the townland of Bennetstown to the north of Dunboyne town. The proposed development will consist of a mix of residential units and all associated site works. The site is phase 3 of a larger masterplan area. A full description of the proposed development is outlined in Chapter 2 ‘Site Location & Project Description’ of this EIAR.

9.4 Methodology

The study has been undertaken using the following methodology:

- Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site;
- A review of the relevant standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development, this is summarised in the following sections;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the project at the nearest sensitive locations (NSL’s) to the site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most sensitive locations surrounding the development site;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development, and;
- The inward impact of noise of the surrounding environment (e.g. aircraft and road noise) into the proposed buildings has also been assessed to determine the requirements, for additional noise mitigation to provide suitable residential amenities.

9.4.1 Relevant Legislation & Guidance

9.4.1.1 Construction Noise

9.4.1.1.1 Residential Receptors

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

This document sets out guidance on permissible noise levels relative to the existing noise environment. Table 9.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228 – 1.

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Table 9.1 Example of Threshold of Potential Significant Effect at Dwellings

Assessment Category & Threshold Value Period (LAeq)	Threshold Value, in Decibels (dB)		
	Category A ^{Note A}	Category B ^{Note B}	Category C ^{Note C}
Night-time (23:00 to 07:00hrs)	45	50	55
Evening & Weekends ^{Note D}	55	60	65
Daytime (0700 to 19:00hrs) & Saturdays (07:00 to 13:00hrs)	65	70	75

- Note A) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
- Note B) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.
- Note C) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.
- Note D) 19:00 – 23:00hrs weekdays; 13:00 – 23:00hrs Saturdays and 07:00 – 23:00hrs Sundays

It should be noted that this assessment method is only valid for residential properties.

This assessment process determines if a potential significant construction noise impact is likely.

9.4.1.1.2 Non-Residential Receptors

When considering non-residential receptors, such as those sharing a boundary with the proposed development, BS 5228-1:2009+A1:2014 gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. For example, paragraph E.2 states:

“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”

Paragraph E.2 goes on to state: -

“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: -

- 70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;
- 75 decibels (dBA) in urban areas near main roads in heavy industrial areas”.

Proposed Significance 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 9.3), BS 5228-1:2009+A1:2014 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 it is considered appropriate to adopt 65 dB(A) CNT. Given the baseline monitoring carried out, it would indicate that Category A values are appropriate using the ABC method.
- For non-residential NSLs it is considered appropriate to adopt a 70 dB(A) CNT.

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 12.3), BS 5228-1:2009+A1:2014 has been used to inform the assessment approach for construction noise, in line with the ABC method.

Interpretation of the CNT

In order to assist with the interpretation of CNTs, Table 9.2 includes guidance as to the likely magnitude of the impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of DMRB: Noise and Vibration and adapted to include the relevant significance significant effects from the EPA EIAR Guidelines.

Table 9.2 Likely Impact due to Construction Noise

Guidelines for Noise Impact Assessment Significance (DMRB)	CNT per Period	EPA EIAR Significance Effects
Negligible	Below or equal to baseline noise level	Not Significant
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 to +15 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 impacts during the construction stages.

9.4.1.2 Construction Vibration

Peak particle velocity (PPV) is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values.

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

BS5228-2 and BS7385 advise that, for soundly constructed residential property properties and similar 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 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero.

The recommended vibration limits in order to avoid cosmetic damage to buildings, as set out in both documents referred to above, are reproduced in Table 9.3. The documents note that minor structural damage can occur at vibration magnitudes

which are greater than twice those presented in Table 9.3. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the Table. It should be noted that these values refer to the base of the building.

Table 9.3 Transient Vibration Guide Values for Cosmetic Damage

Vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
4 to 15 Hz	15 to 40Hz	40Hz and above
15 mm/s	20 mm/s	50 mm/s

Human response to vibration stimuli occurs at orders of magnitudes below those associated with any form of building damage; hence vibration levels lower than those indicated in Table 9.3 can lead to concern. BS5228-2 also provides a useful guide relating to the assessment of human response to vibration in terms of PPV. Table 9.4 summarises the range of vibration values and the associated potential effects on humans.

Table 9.4 Guidance on Effects of Human Response to PPV Magnitudes

Vibration Level, PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1 mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.

In order to assist with interpretation of vibration thresholds, Table 9.5 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014

Table 9.5 Human Response Vibration Significance Ratings

Vibration Level	Likely Effect (DMRB)	Significance Rating
≥10 mm/s PPV	Major	Moderate to Significant to Very Significant
≥1 to <10 mm/s PPV	Moderate	Moderate to Significant
≥0.3 to <1 mm/s PPV	Minor	Not Significant to Slight
≥0.14 to 0.3 mm/s PPV	Negligible	Imperceptible to Not significant
Less than 0.14 mm/s PPV		Imperceptible

The standard notes that single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. Where these values are routinely measured or expected, then an assessment in accordance with BS 6472-1 might be more appropriate to determine whether time time-varying exposure is likely to give rise to any degree of adverse comment.

9.4.1.3 Additional Traffic on Public Roads

In order to consider the potential noise impact associated with the proposed development introducing additional traffic onto the existing road networks and given that vehicle movements on public roads are assessed using a different parameter (the ten-percentile noise level; L_{A10}), it is appropriate to consider the increase in traffic noise level that arises as a result of vehicular movements associated with the development in terms of the L_{A10} parameter.

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 9.6 offers guidance as to the likely impact associated with any change in traffic noise level (Source DMRB).

Table 9.6 Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB L_{A10})	Subjective Reaction	DMRB Magnitude of Impact	EPA Classification Magnitude of Impact
0.0 – 0.9	Inaudible	Negligible	Imperceptible
1.0 – 2.9	Barely Perceptible		Not Significant
3.0 – 4.9	Perceptible	Minor	Slight, Moderate
5.0 – 9.9	Up to a doubling of loudness	Moderate	Significant
10.0+	Doubling of loudness and above	Major	Very Significant

9.4.1.4 Building Services Plant

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound is the industry standard method for analysing building services plant sound emissions to residential receptors. 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 sound level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{A,r,T}$) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS4142 advises that penalties be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

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The following definitions, as discussed in BS 4142 as summarised below:

- “ambient sound level, $L_{Aeq,T}$ ”

equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.
- “residual sound level, $L_{Aeq,T}$ ”

equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.
- “specific sound level, $L_{Aeq,T}$ ”

equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.
- “rating level, $L_{Ar,T}$ ”

specific sound level plus any adjustment for the characteristic features of the sound.
- “background sound level, $L_{A90,T}$ ”

A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

In order to establish an initial estimate of impact, BS 4142 states the following:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level and consider the following.

- a. Typically, the greater this difference, the greater the magnitude of the impact.
- b. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- d. 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, depending on the context.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The assessment methodology described above (i.e. comparison of rated sound level to background sound level) is quoted in BS4142 as representing a methodology to ‘obtain an initial estimate’ of impact. It is important to note that BS4142 also comments that ‘Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration’. BS4142 provides a list of potential pertinent factors that can influence the ‘initial estimate’. The plant noise assessment conducted in the following sections has been carried out with consideration of the guidance contained in BS4142 as summarised above.

9.4.1.5 Operational Noise – Inward Noise Assessment

9.4.1.5.1 Meath County Development Plan 2021-2027

Section 12 DM POL 31 of the *Meath County Development Plan 2021-2027* sets out “to manage noise sensitive development in Noise Zone B and Noise Zone C, where aircraft noise may give rise to annoyance and sleep disturbance, and to ensure, where appropriate, noise insulation is incorporated within the development.”

Noise zones are detailed in the *Fingal Development Plan 2023-2029* and are presented below. The proposed development site is located within Zone C. The noise zones are not detailed in the *Meath County Development Plan 2021-2027* and therefore the zones in Fingal Development Plan have been relied upon.

Table 9.7 Dublin Airport Noise Zones

Zone	Indication of Potential Noise Exposure during Airport Operations	Objective
D	≥ 50 dB and < 54 dB $L_{Aeq, 16hr}$ and ≥ 40 dB and < 48 dB L_{night}	To identify noise sensitive developments which could potentially be affected by aircraft noise and to identify any larger residential developments in the vicinity of the flight paths serving the Airport in order to promote appropriate land use and to identify encroachment. <i>All noise sensitive development within this zone is likely to be acceptable from a noise perspective. An associated application would not normally be refused on noise grounds, however where the development is residential-led and comprises non-residential noise sensitive uses, or comprises 50 residential units or more, it may be necessary for the applicant to demonstrate that a good acoustic design has been followed.</i> Applicants are advised to seek expert advice.
C	≥ 54 dB and < 63 dB $L_{Aeq, 16hr}$ and ≥ 48 dB and < 55 dB L_{night}	To manage noise sensitive development in areas where aircraft noise may give rise to annoyance and sleep disturbance, and to ensure, where appropriate, noise insulation is incorporated within the development <i>Noise sensitive development in this zone is less suitable from a noise perspective than in Zone D. A noise assessment must be undertaken in order to demonstrate good acoustic design has been followed.</i> <i>The noise assessment must demonstrate that relevant internal noise guidelines will be met. This may require noise insulation measures.</i> <i>An external amenity area noise assessment must be undertaken where external amenity space is intrinsic to the development’s design. This assessment should make specific consideration of the acoustic environment within those spaces as required so that they can be enjoyed as intended. Ideally, noise levels in external amenity spaces should be designed to achieve the lowest practicable noise levels.</i> Applicants are strongly advised to seek expert advice.

Zone	Indication of Potential Noise Exposure during Airport Operations	Objective
B	≥ 54 dB and < 63 dB $L_{Aeq, 16hr}$ And ≥ 55 dB L_{night}	To manage noise sensitive development in areas where aircraft noise may give rise to annoyance and sleep disturbance, and to ensure noise insulation is incorporated within the development. Noise sensitive development in this zone is less suitable from a noise perspective than in Zone C. A noise assessment must be undertaken in order to demonstrate good acoustic design has been followed. Appropriate well-designed noise insulation measures must be incorporated into the development in order to meet relevant internal noise guidelines. An external amenity area noise assessment must be undertaken where external amenity space is intrinsic to the development's design. This assessment should make specific consideration of the acoustic environment within those spaces as required so that they can be enjoyed as intended. Ideally, noise levels in external amenity spaces should be designed to achieve the lowest practicable noise levels. Applicants must seek expert advice.
A	≥ 63 dB $L_{Aeq, 16hr}$ and/or ≥ 55 dB L_{night}	To resist new provision for residential development and other noise sensitive uses. All noise sensitive developments within this zone may potentially be exposed to high levels of aircraft noise, which may be harmful to health or otherwise unacceptable. The provision of new noise sensitive developments will be resisted.
Notes: 'Good Acoustic Design' means following the principles of assessment and design as described in ProPG: Planning & Noise – New Residential Development, May 2017; Internal and External Amenity and the design of noise insulation measures should follow the guidance provided in British Standard BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'		

9.4.1.5.2 Adopted Guidance

The Professional Guidance on Planning & Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since it's adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,

- Stage 2 – Involves a full detailed appraisal of the proposed development covering four “key elements” that include:
 - » Element 1 - Good Acoustic Design Process.
 - » Element 2 - Noise Level Guidelines.
 - » Element 3 - External Amenity Area Noise Assessment; and,
 - » Element 4 - Other Relevant Issues.

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 9.1 presents the basis of the initial noise risk assessment; it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

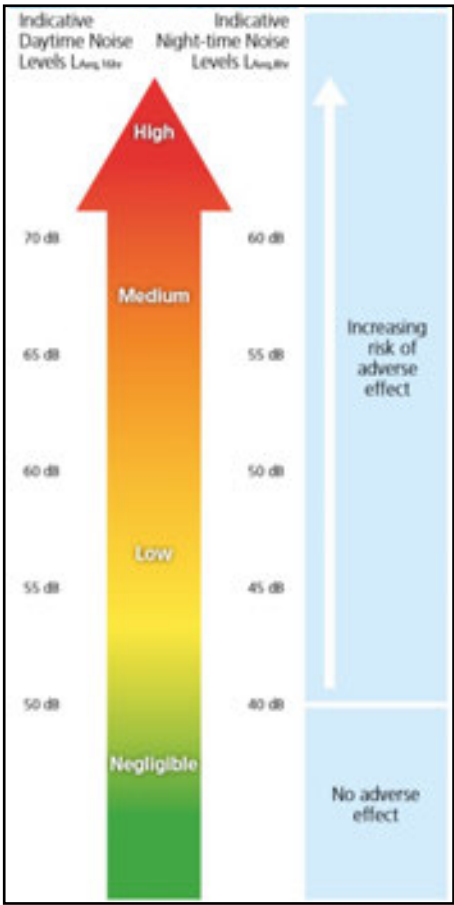


Figure 9.1 ProPG Stage 1 – Initial Noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 9.8 and are based on annual average data, they omit occasional events where higher intermittent noisy events may occur.

Table 9.8 ProPG Internal Noise Levels

Activity	Location	(07:00 to 23:00hrs)	(23:00 to 07:00hrs)
Resting	Living Room	35 dB $L_{Aeq, 16hr}$	-
Dining	Dining Room/Area	40 dB $L_{Aeq, 16hr}$	-
Sleeping	Bedroom	35 dB $L_{Aeq, 16hr}$	30 dB $L_{Aeq, 8hr}$ 45 dB L_{AFmax}

*Note - The document comments that the internal $L_{AFmax, T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq, 16hr}$ ”

9.4.1.5.3 Childcare Facility Criteria

BS 8233 also sets out recommended internal noise levels for several different non-domestic building types from external noise sources such as road and air traffic.

The recommended indoor ambient noise levels in non-domestic buildings are as follows:

Table 9.9 Typical noise levels for acoustic privacy in shared spaces

Objective	Typical Situations	Design range dB $L_{Aeq, T}$
Typical noise levels for acoustic privacy in shared spaces	Restaurant	40 – 55
	Open plan office	45 – 50
	Night club, public house	40 – 45
	Ballroom, banqueting hall	35 – 40
	Living room	35 – 40

Table 9.10 Typical Noise Levels in Non-Domestic Buildings from BS8233

Objective	Typical Situations	Design range dB $L_{Aeq, T}$
Study and work requiring concentration	Department Store Cafeteria, canteen, kitchen	50 – 55
	Concourse	45 – 55
	Corridor, circulation space	
Listening	Library, gallery, museum	40 – 50
	Staff/meeting room, training room	35 – 45
	Executive office	35 – 40
	Place of worship, counselling, meditation, relaxation	30 – 35

Based on a review of the BS 8233 standard and considering the proposed usage of the proposed development a criterion for internal noise levels for the childcare facility been identified for each of the following rooms:

Table 9.11 Typical noise levels for acoustic privacy in shared spaces

Room	Activity	Design Criterion dB $L_{Aeq, T}$
Quiet Rooms	Daytime Resting & Sleeping	35
Preschool Rooms	Study and Work requiring concentration	40
Offices		40

9.5 Difficulties Encountered

There were no particular difficulties encountered during this assessment.

9.6 Baseline Environment

A series of baseline noise surveys have been undertaken across the development site to determine the range of noise levels at varying locations across the site and to establish the existing noise climate the nearest noise sensitive locations and across the development site itself.

The surveys were 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 Local Receptors

Figure 9.3 identifies the receptors local to the proposed development. The outward noise and vibration assessments will focus on the impact on these locations. The closest receptors to the site (R1) are the permitted future residential properties to the south that comprise Phase 1 of the masterplan, these future receptors are located approximately 50m from the proposed development. To the east of the site at approximately 300m distance lie residential receptors on Pace road (R2). Other residential receptors (R3) lie to the west of the site at approximately 15m from the boundary on Kennedy Road.

In addition to this there are the permitted future residential properties to the southeast of the proposed development that comprise Phase 2 of the masterplan, these future receptors are located approximately 15m from the proposed development (R4).



Figure 9.3 Identified Receptor Locations

9.6.2 Choice of Measurement Locations

Unattended noise monitoring was undertaken at location UN1 during both day and night periods. Attended daytime measurements were undertaken at locations AT1, AT2, AT3. The locations were selected to be representative of the existing noise environment at the closest noise-sensitive locations and the noise climate within the development site itself.

The locations are described below and illustrated in Figure 9.4.



Figure 9.4 Noise Monitoring Locations

9.6.3 Survey Periods

The surveys were undertaken over the following surveys periods:

- Unattended noise monitoring was undertaken at UN1 between 23rd May 2024 and 27th May 2024;
- Attended noise monitoring was undertaken at AT1, AT2 and AT3 on 23rd May 2024.

9.6.4 Monitoring Equipment

The surveys were undertaken with a Rion NL-52 Sound Level Meter and calibrated with a B&K 4231 calibrator. Calibration certificates can be forwarded on request.

9.6.5 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 denotes the fact that the sound levels have been “A-weighted” in order to account for the non-linear nature of human hearing.

All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

9.6.6 Survey Results

The results of the noise monitoring completed at the various locations are discussed in the following sections.

9.6.6.1 Location UN1

Table 9.12 reviews the measured noise levels at Location UN1.

Table 9.12 Noise Monitoring Results Location UN1

Date	Period	dB $L_{Aeq(T)}$	L_{Amax}	dB $L_{A90(T)}$
23/05/24	Day	60	79	53
	Night	56	75	37
24/05/24	Day	62	93	56
	Night	55	77	41
25/05/24	Day	62	94	55
	Night	57	80	43
26/05/24	Day	60	79	52
	Night	56	83	37
27/05/24	Day	63	75	57

In general, the following noise sources were noted across the site:

- Aircraft activity associated with Dublin Airport;
- M3 road traffic noise;
- Local traffic movements;
- Agricultural noises
- Birdsong, and;
- A degree of wind generated noise.

Ambient noise levels ranged from 60 to 63 dB_{LAeq,16hr} over daytime periods and 55 to 57 dB_{LAeq,8hr} during night time. Background noise levels ranged from 52 to 57 dB_{LA90,16hr} and 37 to 43 dB_{LA90,8hr} during daytime and night time periods, respectively.

The L_{AFmax} levels are also of an interest here, in particular in relation to night time periods. The L_{AFmax} values were measured at 5-minute intervals over the duration of the unattended monitoring survey. Figure 9.5 presents the distribution of the magnitude of L_{AFmax} events during the four night-time periods at the noise monitoring location considered for this assessment.

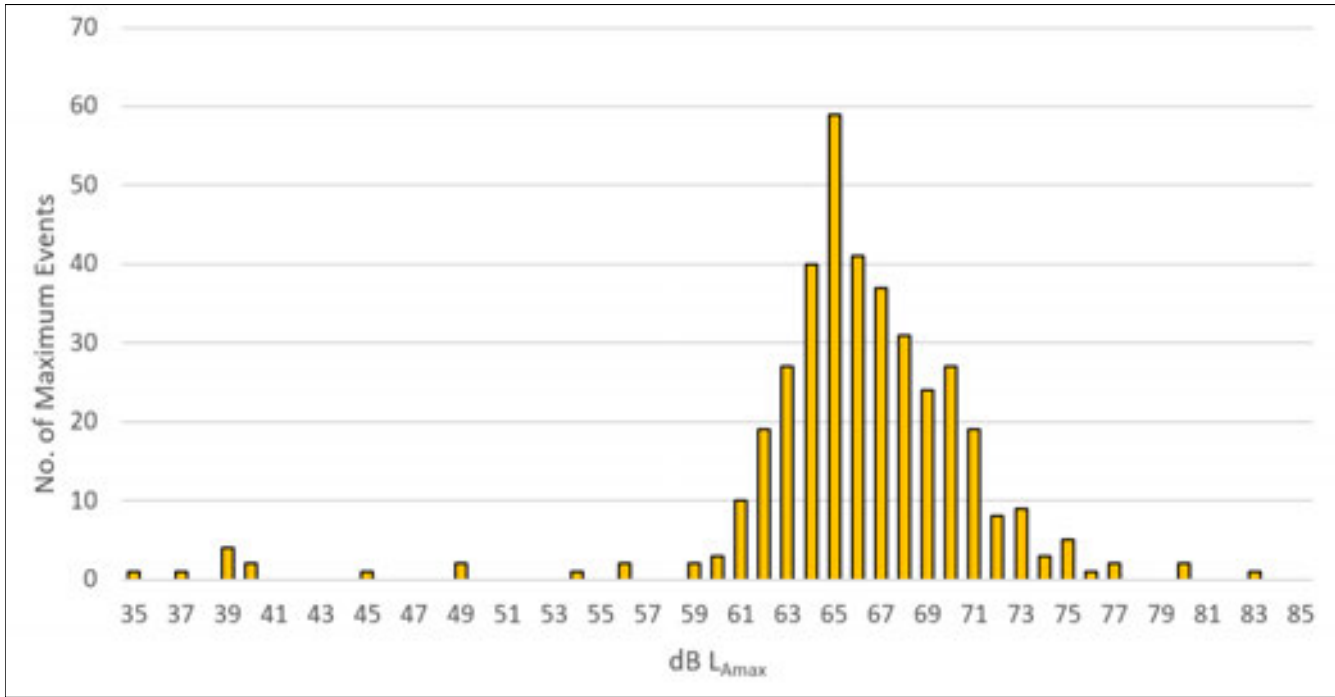


Figure 9.5 Chart Presenting Analysis of Night-time LAmax Events

These LAmax levels will be discussed in detail in subsequent sections of this assessment.

No significant level of vibration was noted at this location during setup and removal of the equipment from site.

9.6.6.2 Location AT1

Table 9.13 presents the results of the noise monitoring completed at Location AT1.

Table 9.13 Noise Monitoring Results Location AT1

Location	Date	Time	Survey Time	L _{Aeq}	L _{Amax}	dB L _{A90(T)}
AT01	23/05/2024	10:00	00:15:00	55	76	50
	23/05/2024	11:00	00:15:00	56	73	48
	23/05/2024	12:00	00:15:00	55	68	50

During the survey period noise from local traffic occurred, in the distance the M3 motorway was audible, additionally birdsong, foliage rustle and aircraft noise were noted here. Noise levels were the order of 55 – 56 dB LAeq,15min and 48 – 50 dB LA90,15min.

9.6.6.3 Location AT2

Table 9.14 presents the results of the noise monitoring completed at Location AT2.

Table 9.14 Noise Monitoring Results Location AT2

Location	Date	Time	Survey Time	L _{Aeq}	L _{Amax}	dB L _{A90(T)}
AT02	23/05/2024	10:18	00:15:00	57	76	47
	23/05/2024	11:18	00:15:00	59	75	49
	23/05/2024	12:18	00:15:00	57	71	48

During the survey period noise from local traffic occurred, additionally birdsong, foliage rustle and aircraft noise were noted here. Noise levels were the order of 57 – 59 dB LAeq,15min and 47 – 49 dB LA90,15min.

9.6.6.4 Location AT3

Table 9.14 presents the results of the noise monitoring completed at Location AT3.

Table 9.15 Noise Monitoring Results Location AT3

Location	Date	Time	Survey Time	L _{Aeq}	L _{Amax}	dB L _{A90(T)}
AT03	23/05/2024	10:37	00:15:00	56	74	42
	23/05/2024	11:37	00:15:00	55	71	42
	23/05/2024	12:36	00:15:00	57	83	41

During the survey period noise from local traffic occurred including a tractor passing by which resulted in the 83 dB LAmax measurement, additionally birdsong, foliage rustle and aircraft noise were noted here. Noise levels were the order of 56 – 57 dB LAeq,15min and 41 – 42 dB LA90,15min.

9.7 Impact Assessment

The proposed development comprises residential units; a full description of the development can be found in Chapter 2 of this EIAR.

The potential noise and vibration impact on the surroundings are considered for both the construction and operational phases of this development.

During the construction phase, the main site activities will include site clearance, foundation works, building construction, road works, and landscaping. This phase has the greatest potential noise and vibration impacts on its surrounding environment, however this phase will be of short-term impact.

During the operational phase of the development, the primary source of outward noise in the operational context relates to any changes in traffic flows along the local road network and building services noise associated with commercial and office spaces.

The potential associated with each phase is assessed in the following sections.

9.8 The 'Do nothing' Scenario

In the event of a Do Nothing Scenario the noise environment is not expected to change.

9.9 Potential Significant Effects

9.9.1 Construction Phase Noise

9.9.1.1 Demolition

The largest noise and vibration impact of the proposed development has the potential to occur during the demolition of structures on site, in this instance the demolition is to occur at a structure approximately 40m distance from location R3. BS 5228-1 contains noise level data demolition machinery. In this instance BS5228 reference C.1:9 quotes demolition machinery as 90 dB L_{Aeq} at 10m. Noise predictions conclude that the resultant noise level at location R3 due to demolition works when considering a percentage on time of 66% and attenuation provided by the barrier of 5 dB will be 69 dB L_{Aeq} which is above the designated construction noise threshold indicating that a negative, moderate to significant, brief to temporary effect will occur at this location during demolition works.

9.9.1.2 Construction

BS 5228-1 contains noise level data for various construction machinery. The noise levels relating to site clearance, ground excavation and loading lorries (dozers, tracked excavators and wheeled loaders) reach a maximum of 81 dB $L_{Aeq,T}$ at a distance of 10 m. For this assessment, a worst-case scenario is assumed of 3 no. such items with a sound pressure level (SPL) of 81 dB at 10m operating simultaneously along the closest works boundary. This would result in a total noise level of 86 dB at 10m and an equivalent combined sound power level of 114 dB L_{WA} . This conservative scenario is the typical assumption made for developments of this size, on the basis that it is unlikely that more than 3 no. items of such plant/equipment would be operating simultaneously in such close proximity to each other.

Guidance on the approximate attenuation achieved by barriers surrounding the site is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

For this scenario it is assumed that construction will be partially screened from the local receptors by way of typical 2.4m site hoarding. Table 9.16 shows the potential noise levels calculated at various distances based on the assumed sound power level, a percentage on time of 66% and attenuation provided by the barrier of 5 dB.

Table 9.16 Predicted Construction Noise Levels

Description of Noise Source	Sound Power Level (dB $L_w(A)$)	Calculated noise levels at varying distances (dB $L_{Aeq,T}$)				
		10m	20m	30m	50m	100m
3 no. items each with SPL of 81 dB at 10 m operating simultaneously.	114	76	69	63	53	51

Given that the closest residential receptors are located approximately 15m – 20m from the nearest site boundary (R3 and R4), the predictions indicate that noise levels from construction works will be within the recommended BS5228 criteria at receptor locations, and hence a **negative, moderate to significant and brief to temporary impact** will be experienced at these locations when works are within close proximity. However, it should be noted that this will only take place during periods when works are undertaken directly on the site boundary. The vast majority of construction works will take place at distances of 30m or more from the receptors when the effect from the works will be **negative, not significant to slight and short-term**.

The remaining receptors will experience a **negative, not significant to slight and short-term** effect during the construction works.

9.2.2 Construction Phase Vibration

Potential for vibration impacts during the construction phase programme are likely to be limited. During the demolition phase, there is also potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228- 2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be significantly below the vibration criteria for building damage on experience from other sites. AWN Consulting have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator
- 6 tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. The range of vibration magnitudes indicate vibration levels at the closest receptor (40m distance to the works) are likely to be orders of magnitude below the thresholds set out in Table 9.3 and Table 9.4 to avoid any cosmetic damage to buildings or disturbance to people residing at this receptor location.

The impacts are predicted to be temporary, negative and slight.

9.9.3 Operational Phase Additional Traffic on Public Roads

A traffic impact assessment relating to the proposed development has been prepared as part of this planning assessment. Information from this report has been used to determine the predicted change in noise levels in the vicinity of a number of roads in the area surrounding the proposed development, for the opening and design years.

For the purposes of assessing 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 development. The results are presented in Table 9.17.

The results indicate that the effect due to noise from a change in traffic volumes will range from imperceptible to not significant and will be long-term.

Table 9.17 Change in Traffic Noise Levels

Ref	Name	Location	Increase in Noise Level (dB)			Effect
			2025	2030	2040	
1	M3 North	-	0.0	0.0	0.0	Imperceptible
		Off-ramp	0.0	0.1	0.1	Imperceptible
		On-Ramp	0.1	0.0	0.1	Imperceptible
2	M3 South	-	0.1	0.2	0.2	Imperceptible
		Off-ramp	0.1	0.4	0.4	Imperceptible
		On-Ramp	0.1	0.4	0.4	Imperceptible
3	R147	-	0.0	0.0	0.0	Imperceptible
4	R147	-	0.0	0.0	0.0	Imperceptible
5	R157	-	-2.9	0.5	0.4	Imperceptible
6	R157	-	0.2	0.6	0.5	Imperceptible
7	R157	-	0.0	0.2	0.1	Imperceptible
8	R157	-	0.0	0.0	0.0	Imperceptible
9	L2228	-	-0.3	1.0	1.0	Imperceptible
10	L2228	-	0.1	0.3	0.2	Imperceptible
11	Main Street	-	0.1	0.4	0.3	Imperceptible
12	Old Navan Road	-	0.5	1.3	1.2	Not Significant
13	Eastern Distributor Road	-	-	0.6	0.4	Imperceptible
14	Dunboyne Business Park Distributor Road	-	0.3	0.0	-0.3	Imperceptible

Ref	Name	Location	Increase in Noise Level (dB)			Effect
			2025	2030	2040	
15	Kennedy Road	-	0.0	0.3	0.2	Imperceptible
16	Old Navan Road Distributor Road	-	-	-	-	-
17	M3 - Junction 5 Interchange	-	0.1	0.3	0.2	Imperceptible

9.9.4 Building Services Plant

Once operational, there will be building services plant items required to serve the residential aspect of the development. These will typically be limited to heating and cooling plant and extract units, depending on the building design and user requirements. Given the use of these buildings, the majority of plant items are likely to be required during daytime hours only; however, there may be requirement for a night-time operational plant, depending on specific requirements.

The location or type of building services plant has not yet been established, therefore it is not possible to calculate noise levels to the surrounding environment. In this instance, is it best practice to set appropriate noise limits that will inform the detailed design during the selection and layout of building services for the development,

These items will be selected at a later stage, however, they will be designed and located so that there is no negative impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise-sensitive location within the development (e.g. apartments, etc.) will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods as set out in this assessment. Based on the baseline noise data collected for this assessment it is considered an appropriate design criterion is the order of 43 dB $L_{Aeq,15min}$ during the day period, and 34 dB $L_{Aeq,15min}$ during the night period.

In terms of noise associated with day to day activities the associated effect is stated to be **negative, not significant, long-term.**

9.9.5 Inward Noise Assessment

9.9.5.1 Noise Environment

The development lands in question are within the Dublin Airport Noise Contour Zone C. The Dublin Airport Noise Zones account for potential future noise levels attributed to additional flights, hence, in this case they are summed with the measured baseline noise levels. In addition, the noise levels have been adjusted for future traffic flows on roads local to the area. The noise levels assumed for the site are as follows:

Table 9.18 Site noise levels

Reference Location	Day $L_{Aeq,16hr}$	Night $L_{Aeq,8hr}$
Facades facing onto R157	68	60
All other facades	64	57

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9.9.5.2 Stage 1 – ProPG Noise Risk Classification of the Site

Giving consideration to the measured noise levels and the Dublin Airport Noise Contours presented in the previous sections the initial site noise risk assessment has concluded that there is a medium level of noise risk across the site.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. In the case of the AWN survey, the L_{AFmax} noise levels measured less than 80 dB. ProPG guidance considers 20 night events over 80 dB to be a high risk, therefore this site would be considered a low to medium risk in terms of maxima events.

9.9.5.2 ProPG states the following with respect to medium risk:

Medium Risk As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS (Acoustic Design Statement) which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

Given the above an Acoustic Design Statement is required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

9.9.5.3 Stage 2 – Acoustic Design Statement

Discussion on Open Windows

In the first instance, it is important to note the typical level of sound reduction offered by a partially open window falls in the region of 10 to 15 dB.

Considering the design goals outlined in Table 9.8 and a sound reduction across an open window of 15 dB, the free-field noise levels that would be required to ensure that internal noise levels do not exceed good (i.e. at or below the internal noise levels) or reasonable internal noise levels (i.e. 5 dB above the internal noise levels) have been summarised in Table 9.19.

Table 9.19 ProPG External Noise Levels to Achieve Reasonable Internal Noise Levels with Windows Open

Activity	(07:00 to 23:00hrs)	(23:00 to 07:00hrs)
Resting	50 - 55 dB $L_{Aeq, 16hr}$	45 dB $L_{Aeq, 8hr}$
Dining	55 - 60 dB $L_{Aeq, 16hr}$	50 dB $L_{Aeq, 8hr}$

In this instance, the external noise levels are such that it will not be possible to achieve the desired good internal noise levels with windows open and therefore appropriate acoustic specifications to windows and passive vents will be provided to ensure the rooms are adequately ventilated and achieve the good internal noise levels detailed here.

External Noise Levels for External Amenity Areas

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq, 16hr}$ ”

Taking account of measured noise levels and the Dublin Airport noise contours it is calculated that external noise levels across the site during the daytime may range up to 64 to 67 dB $L_{Aeq, 16hr}$.

The external areas are calculated to be higher than the ProPG guidance noise levels, however, it is not possible to reduce the noise level across external spaces due to overhead aircraft noise being the dominant noise source as per the DAA (Dublin Airport Authority) noise contours. It should be noted that the noise levels presented here are worst case assumptions based on the potential for future noise from the airport and that current noise levels experienced across the site are lower than these values.

Mitigation measures against the inward noise impact are presented in Section 9.10.2.1.

9.9.6 Cumulative Effects

9.9.6.1 Construction Phase

There is the potential for Phase 1, 2 and 3 of the masterplan to be under construction simultaneously, however, given the distances between receptors and the potential construction sites it is expected that there will be no additional significant cumulative construction impacts.

9.9.6.2 Operational Phase

An assessment of increases in noise due to additional road traffic has been undertaken for cumulative impacts, this account for other planned future developments within the area. The results are presented in Table 9.20.

The results indicate that the effect due to noise from a change in traffic volumes will be range from imperceptible to not significant and will be long-term.

Table 9.20 Change in Traffic Noise Levels

Ref	Name	Location	Increase in Noise Level (dB)			Effect
			2025	2030	2040	
1	M3 North	-	0.1	0.1	0.1	Imperceptible
		Off-ramp	0.8	1.2	1.1	Not Significant
		On-Ramp	0.7	1.0	0.9	Not Significant
2	M3 South	-	0.3	0.6	0.5	Imperceptible
		Off-ramp	0.6	1.2	1.1	Not Significant
		On-Ramp	0.5	1.0	0.8	Not Significant
3	R147	-	0.1	0.2	0.2	Imperceptible
4	R147	-	0.2	0.2	0.2	Imperceptible
5	R157	-	-2.1	1.7	1.5	Not Significant
6	R157	-	0.7	1.3	1.0	Not Significant
7	R157	-	0.5	0.9	0.7	Imperceptible
8	R157	-	0.4	0.6	0.4	Imperceptible
9	L2228	-	0.2	1.7	1.9	Not Significant
10	L2228	-	0.6	0.8	0.7	Imperceptible
11	Main Street	-	0.1	0.4	0.3	Imperceptible
12	Old Navan Road	-	0.9	1.6	1.6	Not Significant
13	Eastern Distributor Road	-	-	1.7	1.2	Not Significant
14	Dunboyne Business Park Distributor Road	-	1.1	1.1	0.3	Not Significant
15	Kennedy Road	-	0.1	0.4	0.3	Imperceptible
16	Old Navan Road Distributor Road	-	-	-	-	-
17	M3 - Junction 5 Interchange	-	0.6	1.1	0.9	Not Significant

9.10 Mitigation

9.10.1 Construction Phase Mitigation

With regard to construction activities, best practice operational and control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2.

BS5228 includes guidance on several aspects of construction site practices, including, but not limited to: -

- Selection of quiet plant.
- Control of noise sources.
- Screening (boundary, and or localised plant screening).

- Hours of work.
- Liaison with the public.
- Monitoring.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring.

9.10.1.1 Selection of Quiet Plant

This practice is recommended in relation to sites with static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers’ proprietary acoustic enclosures where possible. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible.

9.10.1.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration should be given to noise control “at source”. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

BS5228 states that “as far as reasonably practicable sources of significant noise should be enclosed”. In applying this guidance, constraints such as mobility, ventilation, access and safety must be taken into account. Items suitable for enclosure include pumps and generators.

BS5228 makes a number of recommendations in relation to “*use and siting of equipment*”. These are all directly relevant and hence are reproduced below. These recommendations will be adopted on site.

"Plant should always be used in accordance with manufacturers’ instructions. Care should be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading should also be carried out away from such areas.

Machines such as cranes that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Machines should not be left running unnecessarily, as this can be noisy and waste energy.

Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise-sensitive areas. Attendant operators of the plant can also benefit from this acoustical phenomenon by sheltering, when possible, in the area with reduced noise levels.

*Acoustic covers to engines should be kept closed when the engines are in use and idling. The use of compressors that have effective acoustic enclosures and are designed to operate when their access panels are closed is recommended.**

Materials should be lowered whenever practicable and should not be dropped. The surfaces on to which the materials are being moved could be covered by resilient material."

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- Other forms of noise control at source relevant to the development works are set out below: -
- For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should 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 muffler or sound reducing equipment to the breaker ‘tool’ and ensure any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
 - For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
 - For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
 - Demountable enclosures can also be used to screen operatives using hand tools/ breakers and will be moved around site as necessary.
 - All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

9.10.1.3 Screening

Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver.

Screening may be a useful form of noise control when works are taking place at basement and ground level to screen noise levels at ground floor adjacent buildings.

In addition, careful planning of the site layout should also be considered. The placement of site buildings such as offices and stores and in some instances materials such as aggregate can provide a degree of noise screening if placed between the source and the receiver. The use of localised mobile (mobile hoarding screens and / or acoustic quilts) to items of plant with the potential to generate high levels of noise are an effective noise control measure. These options should be considered when percussive works are taking place in close proximity to the nearest sensitive perimeter buildings.

9.10.1.4 Liaison with the Public

A designated noise liaison should be appointed to site during construction works. All noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, prior to particularly noisy construction activity, e.g. demolition, breaking, piling, etc., the liaison officer should inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

9.10.1.5 Hours of Work

Construction works will be undertaken within the times below, taken from the Section 6 of the Draft Construction Management Plan: -

- Monday to Friday: 07:00 to 19:00hrs
- Saturday: 07:00 to 14:00hrs

- Sunday and Public Holidays: No noisy work on site.

9.10.2 Operational Phase Mitigation

9.10.2.1 Inward Noise Impact

The British Standard BS EN 12354-3: 2000: Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths.

The Standard allows the acoustic performance of the building to be assessed taking into account the following:

- Construction type of each element (i.e. windows, walls, etc.);
- Area of each element;
- Shape of the façade, and;
- Characteristics of the receiving room.

The principles outlined in BS EN 12354-3 are also referred to in BS8233 and Annex G of BS8233 provides a calculation method to determine the internal noise level within a building using the composite sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS8233 has been adopted here to determine the required performance of the building facades. This approach corrects the noise levels to account for the frequency content of the source in question. In this instance, rail and road traffic noise, depending on the buildings in question. For properties with cumulative impacts from both rail and road, the frequency content of the dominant source has been used for calculations.

As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. Table 9.21 and Table 9.22 provide the calculated specification for glazing and ventilation, respectively.

Table 9.21 Sound Insulation Performance Requirements for Glazing, SRI (dB)

Facade	Octave Band Centre Frequency (Hz)						R _w
	125	250	500	1k	2k	4k	
RED	28	29	33	42	45	53	39
All Other Facades	27	26	33	39	39	47	37

Table 9.22 Sound Insulation Performance Requirements for Ventilation, SRI (dB)

Facade	Octave Band Centre Frequency (Hz)						D _{ne,w}
	125	250	500	1k	2k	4k	
RED	46	44	38	43	43	55	42
All Other Facades	30	33	38	37	36	36	38

Figure 9.6 highlights the RED façades that require the higher level of noise mitigation, all other facades will require the lower level of mitigation.

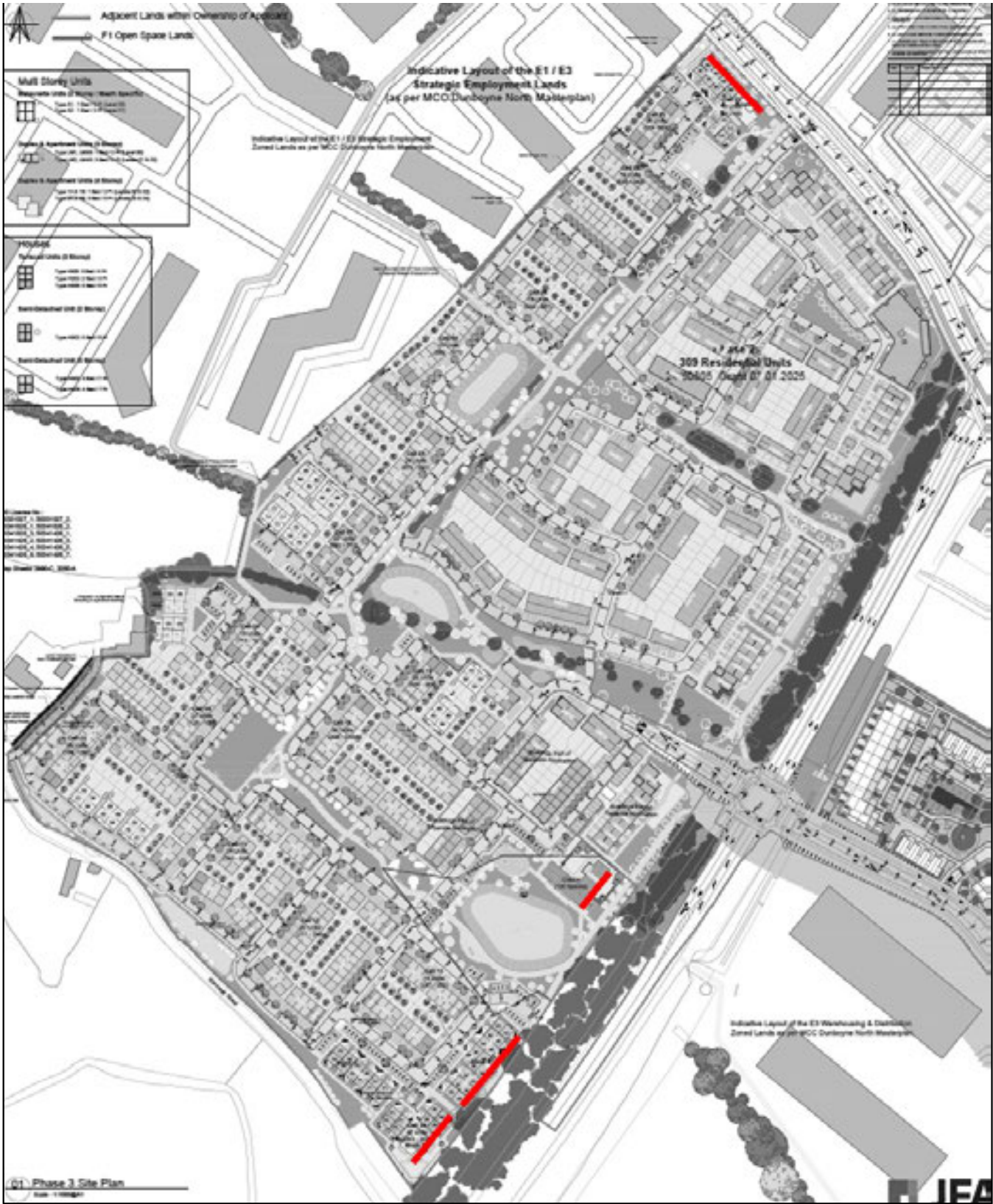


Figure 9.6 Façade Mitigation

The assessment is performed for both the residential buildings as well as the childcare facilities located on site.

The overall R_w and $D_{ne,w}$ outlined above are provided for information purposes only. The over-riding requirement is that the internal noise criteria is achieved, other combinations of upgraded glazing and ventilation may provide the same or better performance than those outlined within this report.

In the context of the acoustic performance specification the ‘glazing system’ is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

Wall Construction

In general, all wall constructions (i.e. block work or concrete) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50 dB R_w for this construction.

Internal Noise Levels

Taking into account the external façade levels and the specified acoustic performance to the building envelope, the internal noise levels have been calculated. For all buildings within the development site, the good internal noise levels are achieved with windows closed.

9.10.3 Cumulative Mitigation

No cumulative mitigation is required.

9.11 Residual Impact Assessment

9.11.1 Construction Phase

During demolition works a **negative, moderate to significant and brief to temporary** effect is predicted to occur at receptor location R3.

Construction predictions indicate that when construction works are within 30m of receptor locations R3 and R4 noise levels from construction works will cause a **moderate to significant, brief to temporary impact**. However, for the vast majority of the time works will take place at distances greater from the receptor locations and noise levels will be within the recommended BS5228 criteria at receptor locations, and hence a **negative, not significant to slight and short-term impact** will be experienced at these locations.

Given the distance to local receptors the residual vibration impacts are predicted to be **negative, short-term and not significant to slight**.

9.11.2 Operational Phase

Residual effects from noise as a result of a change in traffic volumes is predicted to **be negative, imperceptible to not significant and long-term.**

Noise levels associated with building services plant are expected to be within the adopted day and night-time noise limits at the nearest noise-sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be of **negative, not significant and long-term.**

9.11.3 Cumulative Impact

Given the distances between receptors and other potential construction sites it is expected that there will be no significant cumulative construction impacts.

An assessment of increases in noise due to additional road traffic has been undertaken for cumulative impacts and is predicted to **be negative, imperceptible to not significant and long-term.**

9.12 Significant Interactions

This chapter has used information from the traffic chapter and the architectural drawings to inform the assessment of noise and vibration impacts. With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be imperceptible due to the low-level changes in traffic flows associated with the proposed development.

9.13 References & Sources

Meath County Noise Action Plan 2024 - 2028.

Meath County Development Plan 2021 – 2027.

Fingal County Development Plan 2023 – 2029.

BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings.

British Standard BS 4142: 2014+A1:2019: Methods for Rating and Assessing Industrial and Commercial Sound

Design Manual for Roads & Bridges – LA111 Revision 2, 2020.

British Standard BS 5228 (2009 +A1 2014): Code of Practice for Control of Noise and Vibration on Construction and Open Sites Part 1: Noise & Part 2: Vibration.

British Standard BS 7385 (1993): Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.

Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1982.

ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

ISO 9613 (1996): Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.

EPA Advice Notes for Preparing Environmental Impact Statements, (May 2022).

Professional Guidance on Planning & Noise (ProPG), (IoA, 2017).

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CHAPTER TEN

WASTE



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CHAPTER TEN

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CHAPTER 10 | Waste

10.1 Introduction

This chapter evaluates the impacts, if any, which the proposed development may have on Material Assets - Waste as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) and the EPA 2022 Guidelines on the information to be contained in Environmental Impact Assessment Reports during the construction and operational phases of the proposed development, as described in Chapter 2 (Description of Proposed Development).

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN Consulting to guide and manage the waste generated during the construction phase of the proposed development and is included as Appendix 10.1, see Volume III of this EIAR. The RWMP was prepared in accordance with the Environmental Protection Agency’s (EPA) document Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (2021).

The RWMP should be viewed as a live document and is regularly being revisited throughout the project’s lifecycle so that opportunities to maximise waste reduction / efficiencies are exploited throughout, and that data is collected on an ongoing basis so that it is as accurate as possible.

A separate Operational Waste Management Plan (OWMP) has been prepared for the operational phase of the proposed Development and is included as Appendix 10.2, see Volume III of this EIAR .

This Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR (2022). It should be read in conjunction with Chapter 2 (Site Location & Project Description, Chapter 5 (Land, Soils & Geology), and Chapter 16 (Significant Interactions) of the EIAR.

These documents will ensure the management of wastes arising at the development site in accordance with legislative requirements and best practice standards.

10.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Elaine Neary and Chonaill Bradley of AWN Consulting Ltd.

Elaine Neary, BA (Natural Sciences), MAppISc. (Environmental Science) and is a Chartered Member of the Institute of Waste Management (MCWIM). She is an Associate in AWN and has over 21 years’ experience in environmental consultancy with extensive experience in Waste Management and Environmental Impact Assessment. She has project managed, coordinated and prepared specialist inputs including the Waste Management Chapters, Operational and C&D Waste Management Plans for numerous EIS/EIA’s.

Chonaill Bradley (Bsc ENV,PG Dip Circ Econ, AssocCIWM) of AWN Consulting. Chonaill is a Principal Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science from Griffith University, Australia and a Postgraduate Diploma in Circular Economy Leadership for the Built Environment from the Atlantic Technological University, Galway. He is an Associate Member of the Institute of Waste Management (AssocCIWM). Chonaill has over ten years’ experience in the environmental consultancy sector and specialises in waste management.

10.3 Proposed Development

The subject site is located within the townland of Bennetstown to the north of Dunboyne town. The proposed development consists of 356 no. residential units and a creche unit, and all associated ancillary development works. The site is phase 3 of a larger masterplan area.

A full description of the proposed development is outlined in Chapter 2 ‘Site Location & Project Description’ of this EIAR.

10.4 Methodology

The assessment of the impacts of the proposed development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management, including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the proposed development, as described in Chapter 2 of this EIAR (Site Location & Project Description) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation and excavation works);
- Operational phase; and
- Reinstatement Phase

A Desktop study was carried out which included the following;

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been calculated and are included in section 10.6 of this Chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and the National Waste Statistics.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 10.9

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 5 of this EIAR (Land, Soils and Geology).

10.4.1 Relevant Legislation & Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive

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(2008/98/EC) as amended which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 10.1).



Figure 10.1 Waste Hierarchy (Source: European Commission)

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 10.2).



Figure 10.2 Circular Economy (Source: Repak)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy (WAPCE) – Waste Management Policy in Ireland, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity, in 2012.

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The *Circular Economy and Miscellaneous Provisions Act 2022* was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value

of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including:

- The National Waste Management Plan for a Circular Economy 2024 – 2030 (NWMPC) (2024),
- BS 5906:2005 Waste Management in Buildings – Code of Practice,
- Meath County Council (MCC) Waste Management (Segregation, Storage & Presentation of Household and Commercial Waste) Bye-Laws (2018),
- EPA National Waste Database Reports 1998 – 2020, and
- EPA, The Circular Economy and National Waste Database Report 2023 (2025) and the EPA National Waste Statistics Web Resource.

10.4.2 Terminology

Note that the terminology used herein is consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows: -

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

- a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
- b) the adverse impacts of the generated waste on the environment and human health; or
- c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

10.4.3 Site Surveys/Investigation

No surveys were required as part of the waste impact assessment.

10.4.4 Consultation

Consultation with specific relevant bodies was not required as part of this assessment.

10.5 Difficulties Encountered

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

While it is possible to initially confirm all excavated material will be suitable for reuse or select a licensed waste facility for soil disposal, as there is potential to encounter contaminated material or material with naturally occurring variations in minerals and chemicals that necessitates sending it to a suitably licensed facility. The sampling and testing carried out in the Site Investigation (SI) process provides spot samples, and further testing may be required during the excavation process, as the true condition of all excavated materials cannot be ascertained with certainty until this is undertaken.

There is a number of licensed, permitted and registered waste facilities in the Meath County region, in the surrounding counties, the eastern midlands waste region and in Ireland and Northern Ireland. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which will be more beneficial from an environmental perspective.

Licensed waste facilities have annual limitations on material that they can import as part of their license agreements. Because of this it would not make it possible to commit to a singular specific receiving facility as it is not available throughout the excavation phase. It would not be viable to cease a development and wait until a receiving facilities annual receiving quotas are reset. In a normal development waste facilities would switch between facilities with available capacity.

As discussed there is large number of available waste facilities for this project to utilise. The materials used during the construction of this project will be standard construction materials and it is envisaged that there will be capacity to receive any waste materials generated by the development during the construction phase.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity, serviceability, and cost.

10.6 Baseline Environment

In terms of waste management, the receiving environment is largely defined by Meath County Council as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the NWMPCE 2024 – 2030 and the WAPCE.

The Regional Waste Management Planning Offices have issued a National Waste Management Plan for a Circular Economy 2024 - 2030 (NWMPCE) in March 2024, which supersedes the Eastern Midlands Regional (EMR) waste management plan and the two other regional waste management plans. The NWMPCE does not however dissolve the three regional waste areas. The NWCPCE sets the ambition of the plan to have a 0% total waste growth per person over the life of the Plan with an emphasis on non-household wastes including waste from commercial activities and the construction and demolition sector.

The Meath County Development Plan 2021 – 2027 sets out the objectives for the MCC area which reflect those set out in the regional waste management plan and can be found in Appendix 10.1 and 10.2.

In terms of physical waste infrastructure, MCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the EMR Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, municipal waste landfills, material recovery facilities and waste transfer stations.

However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which will be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability.

10.6.1 Demolition Stage

There will be waste materials generated from the demolition of GAA facilities, shed and agricultural buildings on site, as well as from the further excavation of the building foundations.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific RWMP in Appendix 10.1. The RWMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed development. The reuse, recycling / recovery and disposal rates have been estimated using the EPA National Waste Reports and these are summarised in Table 10.1

Table 10.1 Estimated off-site reuse, recycle and disposal rates for demolition waste

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, Bricks, Tiles, and Ceramics	184.2	30	55.3	65	119.7	5	9.2
Asphalts	3.6	0	0.0	75	2.7	25	0.9
Metals	173.3	5	8.7	80	138.7	15	26.0
Total	184.2	30	55.3	65	119.7	5	9.2

10.6.2 Construction Stage

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

There will be topsoil and subsoil excavated to facilitate site clearance, construction of new foundations and installation of underground services. The project engineers (Paul McGrail Consulting Engineers) have estimated that c. 2,524 m³ of material will need to be excavated to do so. It is currently envisaged that all of the excavated will be retained on site for reuse as fill and/or landscaping purposes. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers or the environment.

If any material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (previously Article 27 of the European Communities (Waste Directive)). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 10.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2018).

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 10.1). The RWMP provides an estimate (of the main waste types likely to be generated during the Construction phase of the proposed development. These are summarised in Table 10.2.

Table 10.2 Estimated off-site reuse, recycle and disposal rates for construction waste

Waste Type	Tonnes	Reuse/Recycle		Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	602.6	10	60.3	80	482.1	10	60.3
Timber	511.3	40	204.5	55	281.2	5	25.6
Plasterboard	182.6	30	54.8	60	109.6	10	18.3
Metals	146.1	5	7.3	90	131.5	5	7.3
Concrete	109.6	30	32.9	65	71.2	5	5.5
Mixed Waste	273.9	20	54.8	60	164.3	20	54.8
Total	1826.0		414.5		1239.8		171.6

10.6.3 Operational Stage

As noted in Section 10.1, an OWMP has been prepared for the development and is included as Appendix 10.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase including dry mixed recyclables (DMR), organic waste and mixed non-recyclable (MNR) waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the development for the main waste types based on the AWN waste generation model is presented in Table 10.3 below and is based on the uses and areas as advised by the project architects (John Fleming Architects). Further breakdowns can be found with in Appendix 10.2 OWMP.

Table 10.3 Estimated waste generation for the proposed development for the main waste types

Waste Type	m3 per week	
	Residential Waste (Combined)	Creche Waste
Organic Waste	6.07	0.06
DMR	42.99	2.31
Glass	1.17	0.01
MNR	22.60	1.26
Total	72.83	3.64

The residents will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. As required, the residents will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs).

The creche staff will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. As required, the staff will need to bring these segregated waste from the creche to their WSA.

WSAs can be viewed on the plans submitted with the application and in the OWMP (Appendix 10.2). The OWMP seeks to ensure the development contributes to the targets outlined in the NWMPC and the MCC Waste Bye-laws.

10.7 The ‘Do nothing’ Scenario

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction at this site. There would continue to be no operational waste generated from at the site. There would, therefore, be a **neutral effect** on the environment in terms of waste.

The site is zoned for development, and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies, which can be found in appendix 10.1 and appendix 10.2, and therefore the likely significant effects would be similar to this proposal.

10.8 Potential Significant Effects

10.8.1 Construction Phase

The proposed development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction (see appendix 10.1 for further detail). General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, short-term, significant and negative**.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant and negative**.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the proposed development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect short-term, significant and negative**.

There is a quantity of topsoil and subsoil will need to be excavated to facilitate the proposed development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 5. Excavated material that cannot be reused onsite will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, short-term, significant and negative**.

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10.8.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant** and **negative**.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant** and **negative**.

It is anticipated that waste contractors will be required to service the proposed development on a scheduled basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant** and **negative**.

10.8.3 Cumulative Effects

There are existing residential and commercial developments close by, along with planning permissions for new developments in the area. For the purposes of this EIAR, the following developments are considered to be relevant in terms of potential cumulative development: -

Table 10.4 Relevant potential cumulative developments

Reference	Application
P822022	Dunboyne Link Road – Dunboyne Business Park and the R157, Part 8 Development
23/424	3 no. office buildings, located to north of subject site, on the MP22 masterplan area.
23/60065	Single Storey commercial building east of subject site, located on Phase 1 lands of the MP 22 masterplan area.
23/60290	Large Scale Residential Development for 267 no. residential units, located on the Phase 1 lands of the MP 22 masterplan area. [Dunboyne Phase 1]
23/849	Large Scale Residential Development for 716 no. residential units located south of the site, c. 1km east of Dunboyne town centre.
24/60805	Large Scale Residential Development for 309 no. residential units located north of the site, c.1km west of Dunboyne town centre. [Dunboyne Phase 2]
24/60468	76 no. dwellings and a creche at Station Road, Dunboyne, Co. Meath.
24/60709	Large Scale Residential Development for 853 no. residential units
VA06F.319422	Electricity Development Application to An Bord Pleanála for a 400kV underground cable from East Meath to North Dublin, approximately 37.5km in length.
24/39	8 no. dwellings located to the south-east of the subject site
25/61001	Large Scale Residential Development for re-alignment of a portion of the link road connecting the R157 and the Old Navan Road, 1 no. pumping station and associated access road off the Old Navan Road located on Phase 1 lands of the MP 22 masterplan area. [Dunboyne Road Realignment]

10.8.3.1 Construction Stage

The aforementioned developments could potentially be developed concurrently or overlap in the construction phase. These Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the cumulative effect will be **short-term, not significant** and **neutral**.

10.8.3.2 Operational Stage

The existing, permitted and proposed developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the cumulative effect will be a **long-term, imperceptible** and **neutral**.

10.9 Mitigation

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concepts of the 'waste hierarchy' and "circular economy" are employed when considering all mitigation measures.

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. A circular economy is a model of resource production and consumption in any economy that involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products for as long as possible.

10.9.1 Construction Phase Mitigation

The following mitigation measures will be implemented during the construction phase of the proposed development: -

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the EPA 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 10.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of the mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 10.1) in agreement with MCC and in compliance with any planning conditions, or submit an addendum to the RWMP to MCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.
- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases.

A quantity of topsoil and sub soil will be excavated to facilitate the proposed development. The project engineers (Paul McGrail Consulting Engineers) have estimated that none of the excavated material will be removed off-site, and it will be retained on site for reuse as fill and/or landscaping purposes. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
 - » Concrete rubble (including ceramics, tiles and bricks);
 - » Plasterboard;
 - » Metals;
 - » Glass; and
 - » Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal);

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 (By-products), as amended, European Union (Waste Directive) Regulations 2011-2020. EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997 and the NWCPE. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

10.9.2 Operational Phase Mitigation

The following mitigation measures will be implemented during the operational phase of the proposed development: -

All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site.

As previously stated, a project specific OWMP has been prepared and is included as Appendix 10.2. The mitigation measures outlined in the OWMP will be implemented in full and form part of the mitigation strategy for the site. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the NWCPE, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland and the MCC Waste Bye-Laws.

The facilities management company, residents and creche tenants will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse and recovery at the site of the proposed development.

In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to): -
 - » Organic waste;
 - » Dry Mixed Recyclables;
 - » Mixed Non-Recyclable Waste;
 - » Glass;
 - » Waste electrical and electronic equipment (WEEE);

- » Batteries (non-hazardous and hazardous);
- » Cooking oil;
- » Light bulbs;
- » Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
- » Furniture (and from time-to-time other bulky waste); and
- All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations.
- Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials.
- The facilities management company, residents and creche tenants will ensure that all waste collected from the site will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The facilities management company, residents and creche tenants will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, the Litter Pollution Act 1997, The NWMPCE and the MCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

10.10 Residual Impact Assessment

The implementation of the mitigation measures outlined in Section 10.6 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the proposed development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

10.10.1 Construction Phase

A carefully planned approach to waste management as set out in Section 10.9.1 and adherence to the RWMP (which includes mitigation) (Appendix 10.1) during the construction phase will promote resource efficiency and waste minimisation. When the mitigation measures are implemented and a high rate of prevention reuse, recycling and recovery is achieved, the predicted impact of the construction phase on the environment will be **short-term, imperceptible** and **neutral**.

10.10.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 10.9.2 and adherence to the OWMP (which includes mitigation) (Appendix 10.2) will promote resource efficiency and waste minimisation. When the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be **long-term, imperceptible** and **neutral**.

10.10.3 Worse Case Impact

In a worst-case scenario, if no mitigation measures found in Section 10.9 or in Appendices 10.1 and 10.2 are followed, lack of waste prevention, poor onsite waste management, non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste offsite and result in negative environmental impacts or pollution as described in Section 10.8.

10.11 Monitoring

The management of waste during the construction phase will be monitored by the Contactor's appointed Resource Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation. Monitoring proposals for the construction phase are summarised in Table 10.5.

The management of waste during the operational phase will be monitored by the Operator / Facilities Management to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s). Monitoring proposals for the operational phase are summarised in Table 10.6.

Table 10.5 Monitoring Proposals for Construction Phase

Likely Significant Effect	Monitoring Proposals
Litter Pollution	The Contractor will review and maintain waste records and site audits.
Unlicensed Waste Collection (Illegal Dumping)	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Insufficient Waste Facilities	A register will be maintained and reviewed. A copy of all waste collection permits will be maintained.
Lack of waste Classification	An appointed Resource Manager will monitor all on-site waste segregation and classification

Table 10.6 Monitoring Proposals for Operational Phase

Likely Significant Effect	Monitoring Proposals
Litter Pollution	Waste storage areas will be monitored by the operator / facilities management company
Unlicensed Waste Collection (Illegal Dumping)	The operator/ facilities management company will maintain waste receipts on-site for a period of 7 years and make available to MCC as requested.
Poor Waste Segregation	Waste generation volumes will be monitored by the operator / facilities management company

10.11.1 Construction Stage

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The mitigation measures in the RWMP specify the need for a Resource Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Resource Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the proposed development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future developments.

10.11.2 Operational Stage

During the operational phase, waste generation volumes will be monitored by the Facilities Management against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the shared WSAs, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contractor costs.

10.12 Reinstatement

In the event that the proposed development is no longer occupied/operational, there is not likely to be any significant impacts on waste management at the site.

The proposed development may be decommissioned at some stage in the future. At that time, a demolition or refurbishment plan will be formulated for the decommissioning phase of the proposed development to ensure no waste nuisance occurs at nearby sensitive receptors.

10.13 Risk of Major Accidents or Disasters

There are no likely risks of major accidents and disasters in relation to waste management associated with the proposed development.

10.4 Significant Interactions

10.14.1 Waste and Land, Soils, and Geology

During the construction phase, c. 2,524 m³ of excavated soil and stones will be generated from the excavations required to facilitate site levelling, construction of new foundations and the installations of site services. It is envisaged that none of the excavated material will need to be removed off-site. When material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 10 Waste, Chapter 5 (Land, Soils and Geology) and the requirements of the RWMP (Appendix 10.1), will ensure the effect is **long-term, imperceptible and neutral**.

10.14.2 Waste and Traffic and Transport

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the proposed development. The increase in vehicle movements as a result of waste generated during the construction phase will be short term in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 12 (Material Assets: Traffic & Transport). Provided the mitigation measures detailed in Chapter 10 and Chapter 12 are adhered to, the predicted effects are **short to long-term, imperceptible and neutral**.

10.14.3 Waste and Population & Human Health

The potential impacts on human beings are in relation to incorrect management of waste during construction and /or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific RWMP and mitigation measures in Chapter 4 (Population & Human Health) and Chapter 10, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be **long-term, imperceptible and neutral**.

10.14.4 Biodiversity

The potential impacts on biodiversity in relation to the generation of waste during the construction or operational phases are that the incorrect management of waste could result in littering, pollution issues or vermin in areas affected.

Adherence to the mitigation measures set out in this chapter (Chapter 10), RWMP (Appendix 10.1) , OWMP (Appendix 10.2) and in Chapter 11 (Biodiversity) will ensure the associated effect is **long-term, imperceptible and neutral**.

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CHAPTER ELEVEN

LANDSCAPE & VISUAL IMPACT



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CHAPTER ELEVEN

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CHAPTER 11 | Landscape & Visual Impact

11.1 Introduction

This chapter of the EIAR was prepared to assess the potentially 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 as well as the Biodiversity and Cultural Heritage chapters of this report for references to and descriptions of relevant designations.

11.2 Expertise & Qualifications

JBA Consulting Engineers and Scientists Ltd. has been commissioned to conduct a Landscape and Visual Impact Assessment (LVIA) of the proposed development to the development site and environs. The chapter has been prepared by Christos Papachristou (Principal Landscape Architect and Jamie McDonald (Landscape Planner).

Christos holds a MA in Landscape Architecture and a MSc in Agricultural Engineering and Biotechnology. He is a Chartered Member of the Landscape Institute (CMLI) in the UK and a Corporate Member of the Irish Landscape Institute (MILI). Christos has carried out LVIA's and been involved in the preparation of LVIA's for EIARs as well as standalone in Ireland and the UK. Jamie holds a Master's (MSci) in Planning, Regeneration and Development. He is a Licentiate member of the Royal Town Planning Institute (RTPI) and is working towards his full chartered status. Jamie has aided in the formation of this chapter's report and associated mapping.

Below is an indicative list of projects the team members have been involved with in the production of the LVIA reports for:

- Mallow Castlelands LRD
- Brownsbarn Citywest LRD, SDCC
- Residential development in Raitnechan, Co. Wicklow
- Warehouse development in Tay Ln, SDCC
- N17 Knock to Collooney
- N72/ N73 Mallow traffic relief scheme
- N3 Virginia bypass
- Dunboyne Phase 1 LRD, Co. Meath
- Dunboyne Phase 2 LRD, Co. Meath
- Ardrostig LRD, Co. Cork
- Ratoath LRD, Co. Meath

11.3 Proposed Development

A full description is included in the statutory notices and in Chapter 2 of the EIAR.

The area surrounding the site is generally an agricultural landscape. The lands immediately adjacent to the site to the west and south are under agricultural use. A single plot of land immediately west of the site is under communal use. With more

fields designated for agriculture located to the south. The R157 is located east of the site, running alongside the boundary of the site. The Regional Road intersects with Kennedy Road at the southern corner of the site. Rural residential properties are located along Kennedy Road to the west of the site.

11.3.1 Aspects Relevant to this Assessment

This assessment is relevant to elements of other disciplines that contribute to the amenity offered to users of the areas surrounding the proposed development site. These areas are 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.

11.4 Methodology

11.4.1 Assessment Methodology

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 landscape character areas from the permanent physical changes to the site brought about by the development.

The Landscape and Visual Impact Assessment in the EIAR takes into consideration aerial photography, emerging design drawings, relevant various 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) as amended in August 2024 (LITGN); and
- Landscape Character Assessment (LCA) of Meath County Development Plan (2021-2027) (Draft Report May 2021/ 2027).

Verified photomontages in accordance with the GLVIA guidance are included in the Verified Views and CGI booklet (job ref. 26025, December 2025) by 3d-Design Bureau, to facilitate the assessment of visual impacts. The locations for the photomontages have been kept as agreed for Phase 1 and Phase 2. This chapter should be read in conjunction with these photomontages.

11.4.1.1 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.

11.4.1.2 Sensitivity of the Landscape

The sensitivity of the landscape to change is the degree to which a particular Landscape Character Area (LCA) can accommodate changes or new elements without unacceptable detrimental effects to its 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.

11.4.1.3 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 would not result in noticeable changes to the prevailing landscape character; and
- **Positive** - Changes that restore a degraded landscape or reinforce characteristic landscape elements.

11.4.1.4 Significance of Landscaped 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 summarised in Table 11.1 below.

Table 11.1: Significance of Landscape and Visual Effects Based on Magnitude and Sensitivity

	SENSITIVITY				
MAGNITUDE	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

11.4.1.5 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.

11.4.1.6 Magnitude of Visual Impact

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.

11.4.1.7 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 11.1.

11.4.1.8 Impact Classification Terminology

Table 11.2 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 11.2: Impact Classification Terminology taken from EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

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 would 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
	Frequency	Describe how often the effect would occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

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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 would occur after the proposed mitigation measures have taken effect.
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents.

11.4.1.9 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.

11.4.2 Relevant Legislation & Guidance

The landscape assessment undertaken is made with regard to the sensitivity of the landscape and its ability to undergo change. The generally accepted guidelines as the best practice methodology that is followed in this assessment is:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA), third edition (2013), Landscape Institute (UK) as amended in August 2024 (LITGN-2024-01)

Additional guidelines that have been considered on national and local policy guidelines and best practice methodology as outlined in the references below:

- 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)
- Meath County Development Plan 2021-2027; Meath County Council (Consolidated version which supersedes the older version on the 13th of May 2024)
- Eastern and Midland 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.

11.4.3 Site Surveys/Investigation

A site visit was carried out in May 2024 The site visit involved the verification of nearby views from the initial desk-based study and observations of the site and wider landscape for the purposes of the impact assessment. Field notes were recorded in relation to topography, land use, significant landscape features and overall landscape character.

11.4.4 Consultation

Pre-planning consultations were held with Meath County Council, as part of the current application and the early Phase 1 and 2 applications.

11.5 Difficulties Encountered

The site visit took place during daytime, and as a result 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. Time restrictions allowed for surveys to only take place in winter when foliage on trees was reduced removing natural screening. The level of screening seen on site would therefore be higher during summer. The assessment has accounted for summer 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.

Photography for the 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 view due to visual obstructions and/ or unsafe site conditions, the next preferred location has been selected to adequately demonstrate the potential visual impacts.

11.6 Description of Existing Environment

11.6.1 Receiving Environment – Site Context

Dunboyne is situated approximately 2.7km from the Dublin county border in the southeastern corner of County Meath. Clonee village lies to the southeast and the Pace townland lies to the north. It is the largest settlement of the Dunboyne-Clonee-Pace road and rail corridor within the Dublin Metropolitan. The three settlements form radial nodes along the M3 and M3 Parkway rail line. Dunboyne is a key town linking Dublin to Navan to the north and Kinnegad to the west. Due to these transport links, the corridor has been identified as an important location for population growth and economic development in the Metropolitan Strategic Area Plans of the National Planning Framework and Regional Spatial and Economic Strategy.

Several business parks and industrial areas surround the development site. Dunboyne Business Park sits between the site and Dunboyne town. Bracetown Business Park lies to the east across the M3 and Kilsaran Concrete HQ is located to the north. The area is attractive for large industrial investment as it has the land to accommodate large construction operations and transport connections to facilitate the movement of a skilled workforce.

The landscape character area (LCA) the site lies in is “LCA 10. The Ward Lowlands”. This Landscape Character Area has *low value, high sensitivity, low capacity for multi-house developments*, and is of regional importance. Terrain is relatively flat across the surrounding landscape, rising gently towards the northwest and falling gently to the southeast towards Dublin. The outskirts of Dunboyne have been a focal point for large, modern housing developments, which contrast with the surrounding rural environment. Meath County Council have identified a number of objectives to improve the landscape condition and consolidate urban and industrial developments, with the goal of softening the urban fringes of Dunboyne against the pastoral landscape. The following abstracts are taken from the Meath County Council Development Plan 2021-2027.

Meath County Development Plan 2021-2027, Section 3.4.8 Self-Sustaining Growth Towns (pg. 95)

“The Metropolitan settlement of Dunboyne is a strategically important settlement in Meath. It is an important centre for economic growth in the County due to its location in the Dublin Metropolitan Area and along a multi-modal corridor. The town has enjoyed recent successes in attracting inward investment. It is an objective of this Plan to continue to attract high-quality investment to the town. In addition, there is capacity for the town to accommodate significant population growth, with strategically located lands zoned for residential use in proximity to the rail stations available for development.”

Please refer to Table 11.3 for the relevant policy from the Meath County Development Plan 2021-2027. The River Tolka headwaters are located approximately 11km northwest of the development site.

Policy/ Objective Ref	Description
HER POL 19	To protect the character of Architectural Conservation Areas in Meath.
HER POL 52	To protect and enhance the quality, character, and distinctiveness of the landscapes of the County in accordance with national policy and guidelines and the recommendations of the Meath Landscape Character Assessment (2007) in Appendix 5, to ensure that new development meets high standards of siting and design.
HER POL 53	To discourage proposals necessitating the removal of extensive amount of trees, hedgerows and historic walls or other distinctive boundary treatments
HER OBJ 49	To ensure that the management of development will have regard to the value of the landscape, its character, importance, sensitivity and capacity to absorb change as outlined in Appendix 5 Meath Landscape Character Assessment and its recommendations
HER OBJ 50	To require landscape and visual impact assessments prepared by suitably qualified professionals be submitted with planning applications for development which may have significant impact on landscape character areas of medium or high sensitivity.
HER OBJ 56	To preserve the views and prospects listed in Appendix 10, in Volume 2 and on Map 8.6 and to protect these views from inappropriate development which would interfere unduly with the character and visual amenity of the landscape

Dunboyne has a rich history as a former manorial settlement. During the 1798 Rebellion, it was destroyed and later rebuilt during the early 19th Century. There is a significant number of National Inventory of Architectural Heritage (NIAH) sites located within Dunboyne town centre. A limestone railway bridge (NIAH ref. 14405001) located 560m to the east of the site is the only proximal NIAH site to the development. Norman’s Grove House and the surrounding estate are situated approximately 1km east. The house is a protected structure (RPS – 91523). Three sites listed on the National Monuments Service are located to the southwest and south, including a church/enclosure (NMS ref. ME050-029----), earthworks (NMS ref. ME050-030----), and an enclosure (NMS ref. ME050-027----).

There are no protected views, prospects, scenic routes or national trails in the surrounding environment.

11.6.2 Receiving Environment – Site

The site is an irregular shaped agricultural parcel of land with very gently undulating terrain north of Dunboyne town on the northern border of the Dunboyne townland. The site is enclosed by transport infrastructure and fields. R157 is located to the east, Bennettstown roundabout is northeast, railway tracks and the M3 are to further to the east. There are no roads within the site, and no direct access points from either R157, the railway or the M3. Well-developed vegetation is present along R157 and between the railway and M3.

The development site is zoned for new residential development.

11.6.3 Zone of Theoretical Visibility

The Zone of Theoretical Visibility (ZTV)(Figure 11-2) is based on a DTM bare-earth model and was produced for the assessment. The ZTV gives an indication of the surrounding landscape with potential visibility of the proposed development. For this development, the ZTV maps the area with potential visibility within a 2.5 km radius from the centre of the site. The ZTV was based on a viewer eye height of 1.6 m and building heights of a range of 8.2 m to 15.2 m, representing a range of 2-4 storey buildings storey.

The points from the proposed development site have been placed in the centre of the proposed building locations at the height of the proposed building as we all half way down from the highest point. This method allows a more accurate ZTV output, compared to a single height point at the centre of the proposed site, multiple points with the same maximum or average height or multiple points with the maximum heights of each proposed building. These two heights (full proposed height and half the height are shown in blue and red respectively. Overlaying these two datasets allows the identification of receptors that would be able to see the entirety of the proposal (red) and those that would be expected to see the top half of the proposal (blue).

This method and style of mapping was used in both the ZTV and Zone of Visual Influence (ZoVI) described below.

11.6.4 Zone of Visual Influence

The Zone of Visual Influence (ZoVI)(Figure 11-3) is based on a Digital Surface Model (DSM) that incorporates existing vegetation and built form, and therefore represents a screened scenario, in contrast to the bare-ground ZTV in Figure 11.2.

On review of the mapping, there is a discrepancy in visibility within the proposed development red line boundary. This is due to multiple points used throughout the site, as discussed in section 11.6.3. Visibility has not been considered internally within the site, only beyond the proposed development site boundary.

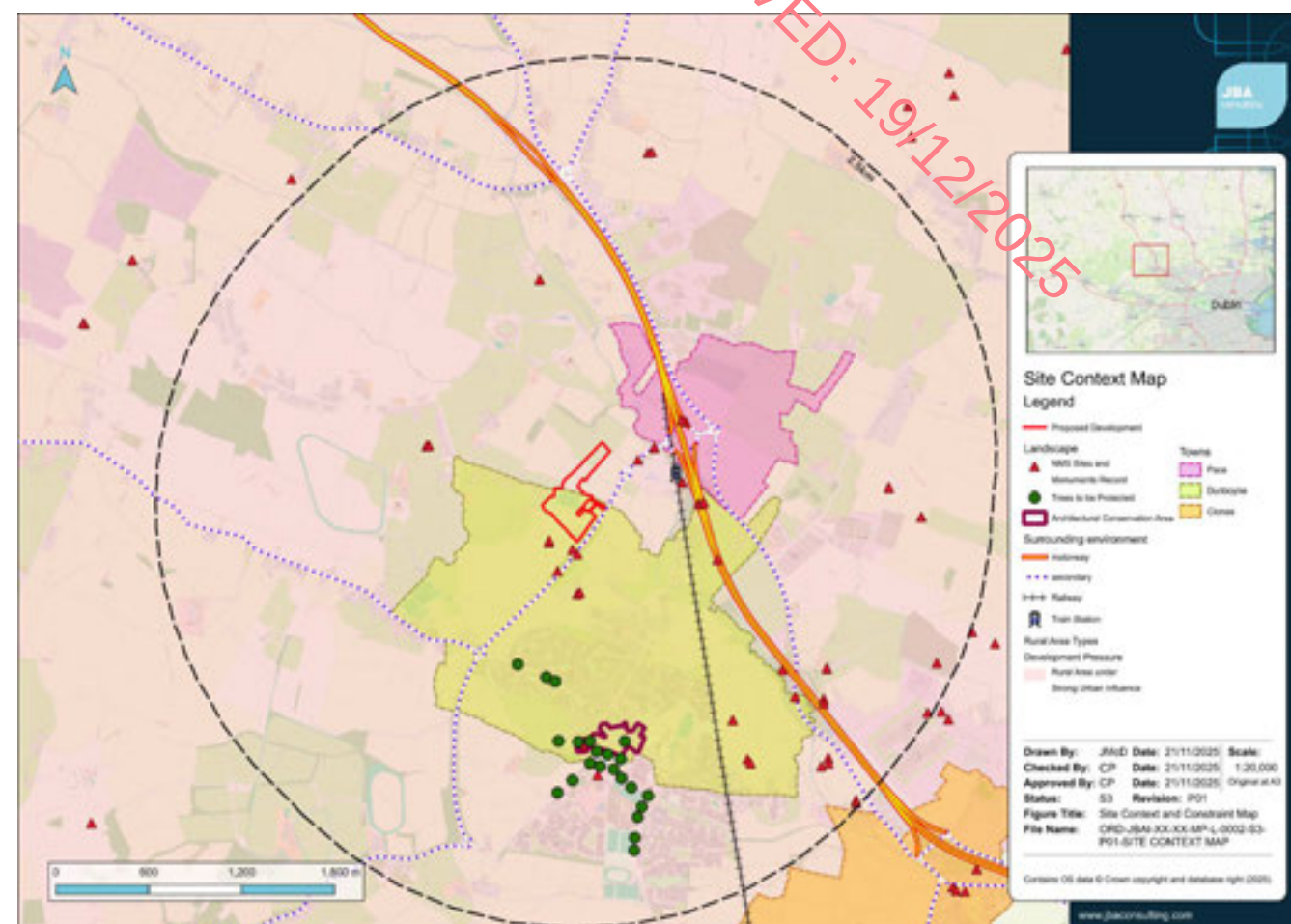


Figure 11.1 Site context map

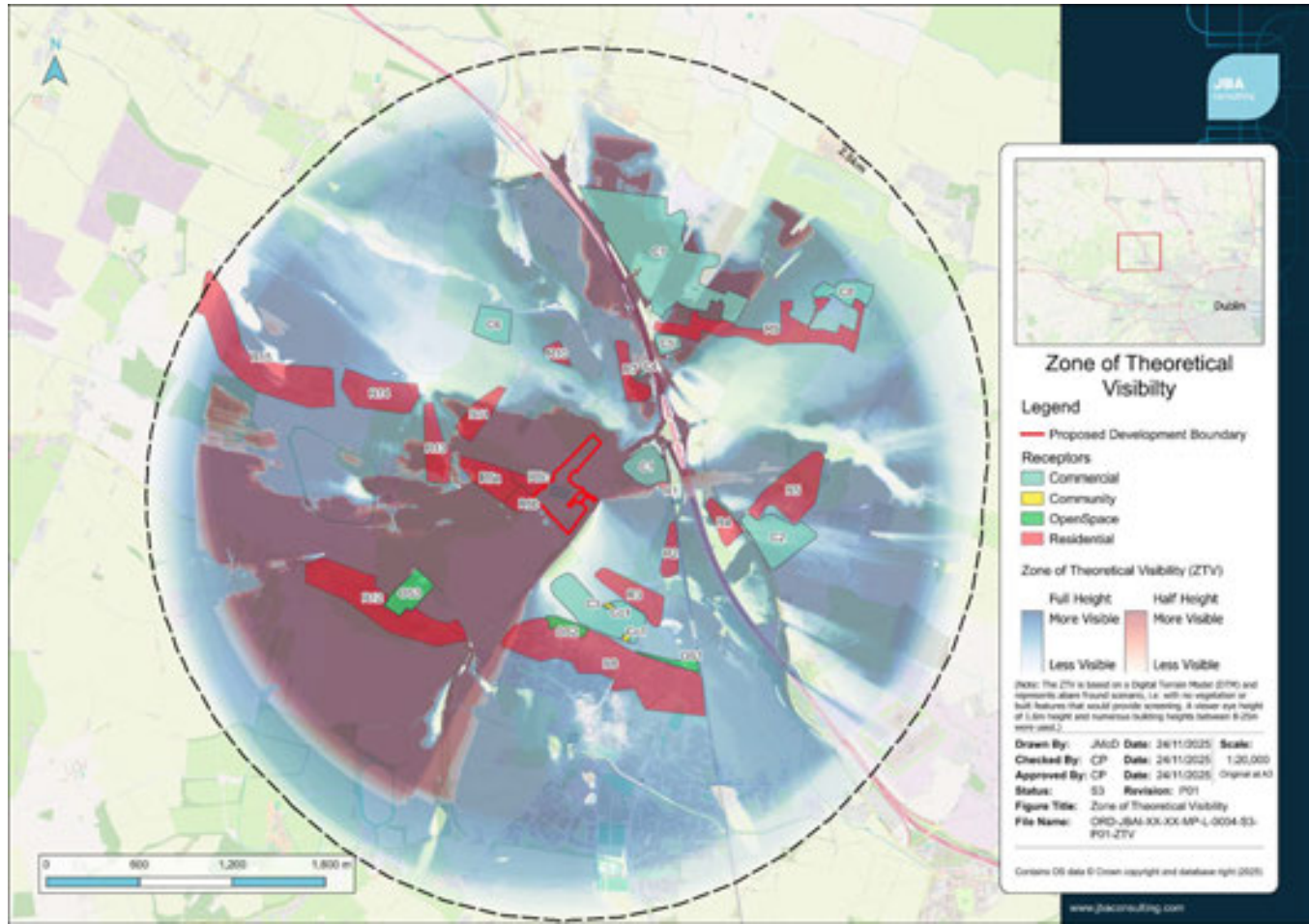


Figure 11.2 Zone of Theoretical Visibility

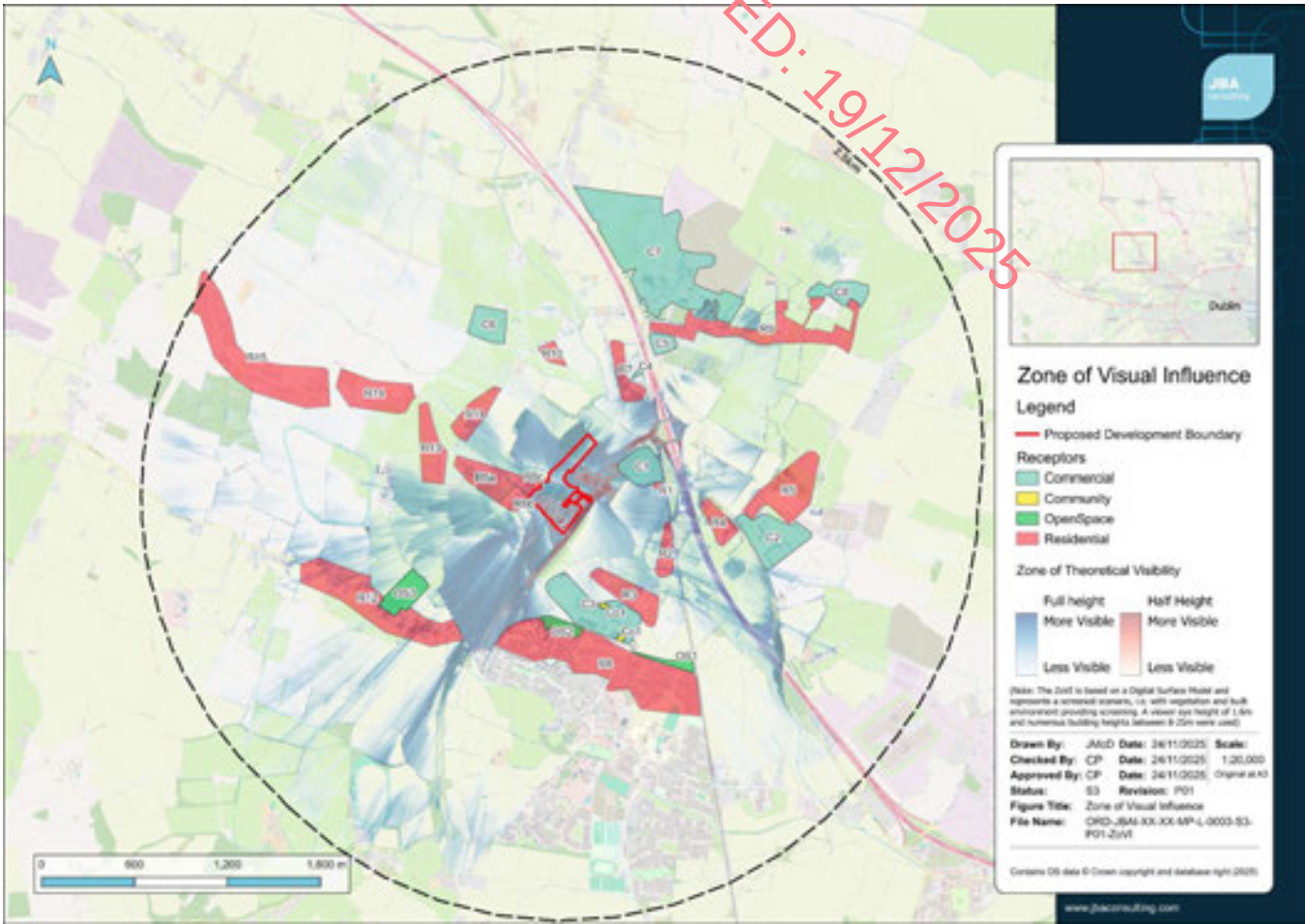


Figure 11.3 Zone of Visual Influence

11.7 Characteristics of the Project

11.7.1 Proposed Development

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

To facilitate the enabling works and construction, some internal hedgerows would be removed. The trees and hedgerows along the boundaries would be largely retained. Proposed to enhance vegetation on the boundary between the R157 and the proposed development.

The tallest elements of the site are the blocks of flats to the northern and western boundary of the site, reaching a maximum height of 15.2m. The remaining proposals comprise similar but shorter residences with front and back gardens, open spaces and a 2-storey creche.

The proposed planting includes a range of various-sized native trees and hedgerows along the site boundaries and non-native planting along with native planting throughout the site.

11.8 Predicted Impacts

11.8.1 Predicted Impact Assessment

11.8.1.1 Landscape

The Landscape Character Assessment for the Meath County Development Plan 2021 – 2027 describes the Ward Lowlands as a “large area of pasture and arable farmland” with the main urban centres being the towns of Ratoath and Ashbourne. It is under significant development pressure due to the proximity of the Dublin metropolitan area. Lack of coherence appears to be evident due to the rapid development leading to a degraded quality of landscape due to the lack of management, loss of hedgerows and larger fields adjacent to the continually expanding urban fringe.

Key characteristics include the geology that favours free-draining soils, the mixed, residential, commercial and agricultural use of land. There is a lack of ecological designations, the hedgerows are overgrown. The settlements lack vernacular buildings and most development occurs in the urban fringe.

This LCA describes the landscape as having a low potential to accommodate multi-house residential developments unless limited to the existing urban areas which have been designated to accommodate such growth. It also has medium potential capacity to accommodate new road development because busy transport corridors are part of the existing character.

The location of the proposed development, southwest of the M3 Parkway railway station and north of the urban cluster of Dunboyne is expected to consolidate the urban fringe. It sits appropriately next to a public transport corridor that is expected to promote sustainable travel and greater use of the area for amenity purposes. The proposed removal of vegetation is expected to reduce a distinct element of the existing landscape. The existing vegetation of hedgerows and trees is used to mark field boundaries. This is currently mitigated by the proposed tree and hedge planting along the proposed roads and the enhancement and improved management of the existing and proposed boundary planting. The newly proposed internal site access with boundary planting would resemble the existing field boundaries to a degree. This helps preserve in a way the landscape character, reducing in this way the magnitude of change and therefore any potential negative impacts to it.

The existing sports field, St. Paul's GFC, would be removed to make way for the proposed development. The use and offered amenity of the sports ground would be compensated with open spaces included in the proposed development that would allow users to engage in similar activities; a proposed public open space south of the proposed creche, accompanied by two smaller public open spaces in the northern area of the proposed site

According to the methodology and taking into account the proposed design, the overall impact to the landscape is expected to be *slight, temporary, negative* during construction and *long-term positive* during the operational stage.

11.8.1.2 Visual

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 11.4 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. The distance is measured in metres from the nearest to the receptor point of the proposed development boundary.

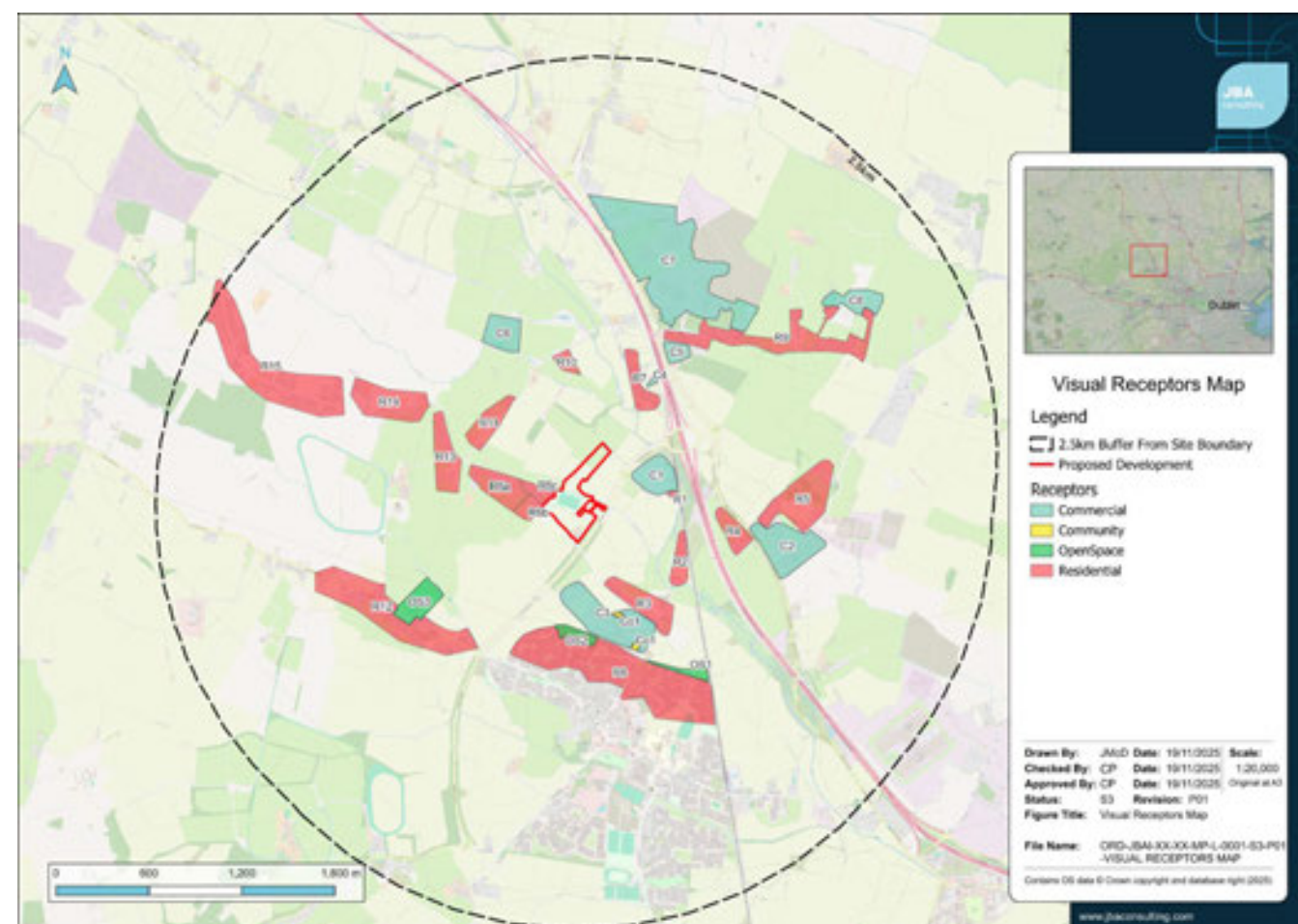


Figure 11.4 Visual receptors map

Table 11.3 Visual Impact Summary Table

Receptor	Description	Distance from site	Sensitivity	Magnitude of change		Predicted impact and duration	
				Construction	Operation	Construction	Operation
R1	Single dwelling at the east of the development site	445m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R2	8 no. houses along the western side of the railway tracks, to the southeast of the development site	520m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R3-C3-Co1	14 no. houses located along Kennedy Road and the Navan Road south of the site, Dunboyne College of Further Education and Dunboyne Boxing Club within Dunboyne Business Park and Dunboyne Business Park	300 – 750m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R4	6 no. houses on the east side of the M3	775m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R5	10 no. houses in the Tetrarch Grove cul-de-sac and 5 no. houses along L1010 including Norman’s Grove House (RPS – 91523)	1040-1285m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R6a	7 no. rural houses along Kennedy Road	120-550m	High	Medium	Medium	Temporary, slight	Permanent, slight
R6b	2 no. rural houses along Kennedy Road	0m	High	Medium	Medium	Temporary, moderate	Permanent, moderate
R6c	4 no. rural houses along Kennedy Road	0m	High	Medium	Medium	Temporary, moderate	Permanent, moderate
R7-C4	17 no. houses along Woodpark Road (Pace) and Tolka Plant Hire Limited	310-630m	High	Low	Low	Temporary, slight	Permanent, slight
R8-OS2	Housing estates comprising 150+ houses and Green space within western part of R8	575-1475m	High	Negligible	Negligible	Temporary, slight	Permanent, slight

R9-C5-C8	31 no. houses along Pace Road (L5026), Avoca Dunboyne and Derryglen Stud	780-1600	High	Negligible	Negligible	Temporary, slight	Permanent, slight
C7	Kilsaran Head Office, MSD Office and Gordon Barron Crash Repairs	840-1610m	Medium	Negligible	Negligible	Temporary, imperceptible	Permanent, imperceptible
R10 C6	Godolphin Woodpark Stud and ancillary developments to the west and east of Woodpark Road	460-840m	High	Negligible	Neutral	Temporary, slight	Permanent imperceptible
R11	7 no. residences along Woodpark Road to the west and northwest of the development site	560m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R12-OS3	12 no. residences along Summerhill Road to the southwest of the proposed development and Dunboyne AFC	900m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
C1	M3 Parkway Rail station and carpark	195m	Low	Medium	Medium	Temporary, imperceptible	Permanent, imperceptible
C2	Bracetown Business Park	1023 – 1430m	Low	Negligible	Negligible	Temporary, imperceptible	Permanent, imperceptible
OS1	Triangular green space north of R8	870m	Low	Negligible	Negligible	Temporary, imperceptible	Permanent, imperceptible
R13	7 no. residences along the Warrenstown Road to the west of the proposed development	630m	High	Low	Low	Temporary, slight	Permanent, slight
R14	19 no. residences along the Warrenstown Road to the west of the proposed development	965-1445m	High	Negligible	Negligible	Temporary, slight	Permanent, slight
R15	48 no. residences along the Warrenstown Road tills the junction with the Vasingstown Road (L6222) to the west of the proposed development	1405-2550m	High	Negligible	Negligible	Temporary, slight	Permanent, slight

R1 (Single dwelling directly south of the M3 Parkway) – Distance from nearest site boundary = 445m.

This receptor is situated on a triangular piece of land. The M3 Parkway station and adjoining carpark border it to the northwest and the railway line forms the eastern boundary.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The receptors' front windows have direct views towards the south. Angled, partial views further to the west can possibly be experienced. To the rear, views are limited by the railway, the M3 Parkway station, the M3 and the riparian vegetation along the banks of the River Tolka. Trees are located at the front of the property and within the development site. These trees are to be retained and protected during construction. The current layout with the proposed tree planting and retention along this boundary is expected to provide partial screening. Further mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change is *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight* during construction and *Permanent, Slight* during operation.

R2 (8 no. houses along the railway tracks to the east and is situated southeast of the development site) – Distance from nearest site boundary = 520m.

This receptor group comprises 8 rural-style detached houses, all of which are bungalows, with front and rear gardens. The houses are accessed from the Navan road.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The properties are oriented in an east-west direction. Most front gardens feature manicured hedges and trees. Further west, trees are present along the Navan Road and there is riparian vegetation along the River Tolka. This vegetation is largely deciduous, and any screening would vary with the season. Rear-facing views for all properties overlook the railway, M3, and surrounding hedgerow segregated pastures. Views to the proposed development are segregated by the elevated R157, which has established vegetation on each side; the majority of this vegetation is being retained. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight* during construction and *Permanent, Slight* during operation.

R3 (14 no. houses located along Kennedy Road and the Navan Road south of the development site) – Distance from nearest site boundary = 300 – 750m.

This receptor group comprises a mix of single and two-storey houses with front and rear gardens. Four houses are positioned along the Navan Road, three are oriented in a northwest-southeast direction. The remainder of houses are oriented in a northeastern-southwestern direction.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude These houses lie in a transitioning landscape between industrial infrastructure to the south and a rural environment to the north.

The development would alter the fabric of the surrounding landscape shifting it towards a suburban environment rather than a predominantly rural one. The proposed tree planting would soften the built elements visible. During the operational phase following tree maturation, the tallest elements of the development would likely still be partially visible. Views to the proposed development are segregated by the elevated R157, which has established vegetation on each side; the majority of this vegetation is being retained. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight* during construction and *Permanent, Slight* during operation.

R4 (6 no. houses east of the M3 to the east of the development site) – Distance from nearest site boundary = 775m.

This receptor group includes 6 houses located along the R147. Five of the houses are grouped together along a small road leading off R147 while a single house is situated north of this group directly off the R147. All are positioned in a northwest-southeast direction along the northwestern side of the slip road. The single house faces in the opposite direction in a northeast-southwest orientation. There is an even split between single storey and two storeys. All houses feature front and rear gardens with varying degrees of vegetation.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The M3 features wooden fences along either side which are constructed upon raised banks. This would partially screen views towards the west. Once operational, the tallest levels of the apartment blocks would be visible, however, the visibility would be minimal. Views to the proposed development are segregated by the elevated R157, which has established vegetation on each side; the majority of this vegetation is being retained. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight* during construction and *Permanent, Slight* during operation.

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R5 (10 no. houses in the Tetrarch Grove cul-de-sac and 5 no. houses along L1010 including Norman’s Grove House (RPS – 91523)) – Distance from nearest site boundary = 1040 – 1285m.

Tetrarch Groves leads off R147 in a northeastern direction and the 10 houses are oriented in a northwest-southeast direction. Houses are predominantly bungalows with the exception of the two houses at the end of the cul-de-sac which feature a second storey. Houses along L1010 and Norman’s Grove House are oriented in a similar direction. All houses have front and rear gardens.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude Hedgerows along the northwestern side of Tetrarch Grove are dense. Due to the orientation of the houses, visibility of the development site is limited. In addition, views are screened by vegetation along R147, the R157 the M3, and the River Tolka. Small, forested patches are present in pastures that form part of Norman’s Grove House estate which effectively screen all views from the house. Proposed mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight* during construction and *Permanent, Slight* during operation.

R6a (7 no. rural houses along Kennedy Road) – Distance from nearest site boundary = 120– 550m.

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to a couple of properties.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The main views from the residences face northeast-southwest. The properties are segregated by medium sized hedges and hedgerows are also present along the main road. Views from front or rear windows would be indirect and partially screened by the vegetation. The degree of screening may be reduced in the winter as much of the natural and domestic vegetation present in the area is deciduous. Terrain from the northwestern houses gently slopes down to the development site which is expected to allow views of the tallest elements of the development; however, thick hedgerows are also present at the front and back of these properties that are expected to filter views. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Medium*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R6b (2 no. rural houses along Kennedy Road) – Distance from nearest site boundary = 0 – 90m.

This receptor contains 1 no. bungalow and 1 no. two-storey dwelling, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to the properties. The receptor would neighbour the proposed development site.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The main views from the residences face northeast. The properties are segregated by medium sized hedges and hedgerows are also present along the main road. Views from front or rear windows would be indirect and partially screened by the vegetation on the receptor’s property boundary. Thick hedgerows are present at the front of these receptors that are expected to filter views. The proposed development would also retain and provide further planting in this western corner that would screen views into the site. The receptor’s existing vegetation and sheds limit the possibility of views to only above-ground floor locations. The degree of screening may be reduced in the winter, as much of the natural and domestic vegetation present in the area is deciduous. Terrain from the northwestern houses gently slopes down to the development site, which is expected to allow views of the tallest elements of the development. The front of the properties faces onto the proposed development’s western boundary but would be partially screened by the dwellings on the opposite side of the road (R6c). The magnitude of change would be *Medium*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Significant, Negative* during construction and *Permanent, Significant, Negative* during operation.

R6c (4 no. rural houses along Kennedy Road) – Distance from nearest site boundary = 0 – 200m.

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to a couple of properties. The receptor neighbours the proposed development site.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The main views from the residences face southwest. The properties are segregated by medium sized hedges and hedgerows are also present along the main road. Views from front or rear windows would be indirect and partially screened by the vegetation. The degree of screening may be reduced in the winter as much of the natural and domestic vegetation present in the area is deciduous. Terrain from the northwestern houses gently slopes down to the development site which is expected to allow views of the tallest elements of the development, however, thick hedgerows are also present at the front and back of these properties that are expected to filter views. The rear of the dwellings would look onto the proposed development. The magnitude of change would be *Medium*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Significant, Negative* during construction and *Permanent, Significant, Negative* during operation.

R7 (17 no. houses along Woodpark Road (Pace) northeast of the development site) – Distance from nearest site boundary = 310 – 630m.

Properties in this receptor are a mix of bungalows and two-storey houses with modest front gardens and large rear gardens. They are oriented along Woodpark Road in a northeast-southwest direction and an east-west direction as the road bends into a north-south stretch.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude Houses with a northeast-southwest orientation are likely to have the clearer views, while houses facing east-west are located further from the site, have no direct views, and any angled views would be screened by partitioning vegetation between properties and houses further south. The visibility of the development site for these houses would be very limited.

For houses further south, vegetation along Woodpark Road is well-developed and each house features private hedges to the front which form an effective barrier of views to or from the houses. Partial, filtered views of the upper parts of the proposed development would be visible through gaps in vegetation during the winter, however, visibility would remain limited. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R8 (Housing estates comprising 150+ houses south of the development site) – Distance from nearest site boundary = 575–1475m.

This Receptor forms the northern periphery of Dunboyne suburbs. Houses are detached single or two-storey dwellings with front and rear gardens. Houses are oriented in all directions along residential streets. Small communal green spaces are present throughout the estates. The Navan Road splits the group into eastern and western parts.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude Empty pastures segregated by hedgerows dominate the northern landscape views for houses located east of the Navan Road. For houses west of the Navan Road, Dunboyne Business Park (C3) occupies the majority of the views facing towards the development site. There is a gap between the business park and Thorntons Civic Centre, which would allow for clearer views, particularly for houses oriented in a northeastern-southwestern direction. For houses facing opposite directions, visibility would be limited, angled and partially or fully screened. The magnitude of change would be *Negligible to Neutral*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R9 (13 no. houses along Pace Road (L5026), northeast of the site) – Distance from nearest site boundary = 780m.

This group of houses is located off R147 along L5026 adjacent to Avoca Dunboyne (C5). Houses are bungalows with front and rear gardens. The orientation of properties is northeast-southwest.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude This receptor is nestled within a mixed landscape. The M3 and R147 are positioned to the west and Avoca Dunboyne (C5) is adjacent to the southwest, to the north is located the Kilsaran Head Office and construction yard and further north is the MSD Corporate Office (C7). Private clearfell sites encompass the houses from the north and south, forming a barrier between C5 to the south and C7 to the north of the western portion of R9. The east is dominated by hedgerow partitioned pastures. The terrain gently slopes down towards the development from this receptor group.

The sites of forest clearfell effectively screen all visibility of the development site from these houses. Receptor dwelling orientation is north-south facing, proposed development located to the southwest limits views to being angle or partial is visible at all. Once trees have been harvested, views may be clearer, although Avoca Dunboyne obstructs views for houses located closer to R147 and the M3 and M3 Parkway and station occupy views for houses located further east along L5026. Each property also features well-developed rear hedges that grant increased privacy. The landscape is mixed, and the development would be a subtle contribution to the shift towards a more suburban environment. Mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R10 (1 no. building on Woodpark Road, west of the site) – Distance from nearest site boundary = 460m

This ground floor receptor is lined by mature trees with limited opportunities for mid-range views.

Sensitivity The higher sensitivity receptor would be residents at home. Sensitivity is *High*.

Magnitude The existing mainly deciduous tall tree vegetation surrounding this receptor combined with the overgrown hedgerows acting as field boundaries in the fields between this receptor and the proposed development are expected to allow only glimpse views. In winter, when the foliage of the existing vegetation is not present, more filtered views are expected. This is only of the upper parts of the proposed development and in mid-range views. Proposed mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Imperceptible, Negative* during operation.

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R11 (7 no. residences along Woodpark Road to the west and northwest of the development site) – Distance from nearest site boundary = 560m

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to a number of properties. The receptors’ properties have a southeast-northwestern orientation.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude: Existing boundary hedgerows surround these residences, restricting views to the inside of the property boundaries. In winter, when any deciduous vegetation has lost its foliage, filtered views towards the proposed development are expected to be allowed. These are expected to be exceptionally limited and fully filtered by the numerous lines of trees and hedgerows between the proposed development and this receptor group. Proposed mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be Negligible.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R12 (12 no. residences along Summerhill Road to the southwest of the proposed development) – Distance from nearest site boundary = 900m

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. Their main views are facing northeast and southwest. The northeast facing views are towards the development site.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The existing mainly deciduous tall tree vegetation surrounding this location, combined with the overgrown hedgerows acting as field boundaries in the fields between this receptor and the proposed development is expected to allow only glimpse views. In winter, when the foliage of the existing vegetation is not present, more filtered views are expected. This is only the upper parts of the proposed development that are expected to be in mid-range views. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be Negligible.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R13 (7 no. residences along the Warrenstown Road) – Distance from nearest site boundary = 630m

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to a couple of properties.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The main views from the receptor are east-west facing. The properties are segregated by medium sized hedges, and hedgerows are also present along the main road. Views from front windows would be indirect and partially screened by the existing vegetation. The degree of screening may be reduced in the winter as much of the natural and domestic vegetation present in the area is deciduous. Terrain from the houses gently slopes down to the development site which is expected to allow views of the tallest elements of the development; however, thick hedgerows are also present at the front and opposite side of the road to the properties that are expected to filter views. Proposed mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R14 (19 no. residences along the Warrenstown Road) – Distance from nearest site boundary = 965- 1445m

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to a couple of properties.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The main views from the residences face north and south. The properties are segregated by medium sized hedges and hedgerows are also present along the main road. Views from front or rear windows would be partial/angled to no visibility of the proposed development, as the proposed site is located to the east. Views experienced in winter months, when deciduous vegetation is not present, may allow views of the proposed development. Proposed mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. Terrain from the houses gently slopes down to the development site to the east. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

R15 (48 no. residences along the Warrenstown Road) – Distance from nearest site boundary = 1405- 2550m

This receptor group features a mix of bungalows and two-storey dwellings, with large front and rear gardens which have varying densities of boundary vegetation. There are adjoining barns or farmyards to a couple of properties.

Sensitivity Receptors would be residents at home. Sensitivity is *High*.

Magnitude The main views from the residences face Northeast and southwest. The properties are segregated by medium-sized hedges and hedgerows are also present along the main road. Views from front or rear windows would be indirect and partially screened by the vegetation. The degree of screening may be reduced in the winter as much of the natural and domestic vegetation present in the area is deciduous. Terrain from the houses gently slopes down to the development site which is expected to allow views of the tallest elements of the development; however, thick hedgerows are also present at the front and opposite side of the road to the properties that are expected to filter views. Proposed mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight, Negative* during construction and *Permanent, Slight, Negative* during operation.

C1 (M3 Parkway train station and adjoining carpark, north of the development site) – Distance from nearest site boundary = 195m

The train station mainly serves the commuter rail services through the Dunboyne-Clonee-Pace corridor. The carpark and station are accessed from a roundabout on R157 to the west. There is also a bike locker and ESB electric vehicle charging station in addition to the carpark.

Sensitivity Receptors would be commuters and other public transport users. Sensitivity is *Low*.

Magnitude The elevated location and limited screening elements between the station and the proposed development site would allow direct, partial views of the proposed development. Proposed tree planting would soften the views such that there is a mix of natural and built features. Although the proposed development would occupy a large portion of the direct views from this location, it would not seem out of context given the strong presence of urbanising elements. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Medium*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

C2 (Bracetown Business Park, east of the development site) – Distance from nearest site boundary = 1023 – 1430m

The business park comprises seven large warehouses, a plaza, and several office buildings with L1010 cutting through the park from R147. R5 borders the business park to the northeast and R4 is located across R147 to the northwest.

Sensitivity Receptors would be staff and clients of businesses. Sensitivity is *Low*.

Magnitude The business park is situated along R147 with empty pastures surrounding to the south and rural residences of R4 and R5 to the north. Views of the development site from the front of the business park would be screening by trees and shrubs present along R147 and within the park. Vegetation associated with receptor groups R4 and R2 lie between the business park and the site. Although much of the vegetation is deciduous, the distance from the site and degree of screening, even in winter, would obscure visibility of the site such that views are insignificant. The Magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

C3 (Dunboyne Business Park southwest of the development site) – Distance from nearest site boundary = 250- 835m

Buildings are largely warehouses which are segregated by roads and small carparks.

Sensitivity Receptors are staff and clients. Sensitivity is *Low*.

Magnitude There is minimal vegetation within the park, however, hedges are present around the perimeter. The clearest views of the development would be from the westernmost parts of the business park located closest to R157. Thorntons Civic Amenity Centre which is a recycling facility is located here. Further east into the park, views towards the development site are screened by R3. Views to the proposed development are segregated by the elevated R157, which has established vegetation on each side; the majority of this vegetation is being retained. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Slight to Imperceptible, Negative* during construction and *Permanent, slight to Imperceptible, Negative* once operational.

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C4 (Tolka Plant Hire Limited, north of the development site) – Distance from nearest site boundary = 465m

This is a construction company located down a small slip road off Woodpark Road, in the Pace townland.

Sensitivity Receptors are staff and clients. Sensitivity is *Low*.

Magnitude The business is located off the Pace Road along which R7 dwellings are also positioned. Views towards the development site from the business are heavily screened by vegetation, particularly tall trees and high shrubs, that is present in the rear gardens of R7 houses. Visibility beyond the immediate site surroundings is very limited. Proposed mixed and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

C5 (Avoca Dunboyne, north of the development site) – Distance from nearest site boundary = 670m

Avoca Dunboyne is a retail space with a garden centre, food market and restaurant. R147 and the M3 border to the west and the site is accessed from L5026 just off R147.

Sensitivity Receptors are staff and customers. Sensitivity is *Low*.

Magnitude The business is nestled between R147 to the west, a small Private Clearfell forest to the southeast and the houses of R9 to the north. The premises is a two-storey building with a large R147 facing carpark. Trees and small shrubs are present within the carpark. Trees are also present along the border with R147, all of which appear to be deciduous. The building is oriented in an east-west direction where views towards the site from within the building are not likely. From the carpark, the tallest elements of the development may be visible through gaps in the vegetation which may be more apparent in the winter. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

C6 (Godolphin Woodpark Stud) – Distance from nearest site boundary = 840m

Godolphin Woodpark Stud is a horse stable located on the Woodpark Road to the southeast. The stud farm has hedgerows and other mature vegetation.

Sensitivity Receptors are staff and customers. Sensitivity is *Low*.

Magnitude The business located to the north of the Woodpark road with surrounding vegetation. The complex is a circular complex with an open courtyard with carparking to the north and south of the complex. Trees and other vegetation surround the complex, providing screening from the roadside into the property., all of which appear to be deciduous. The main entrance to the building appears to be facing a south-southwest orientation and as such is not likely to have views to the proposed

development. Vegetation surrounding the property boundary and encompass the carpark prevent views of the proposed development site. The tallest elements of the proposed development may be visible with visibility increasing in the winter months. Mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

C7 (Kilsaran Head Office, Gordon Barron Crash Repairs and MSD Office) – Distance from nearest site boundary = 840- 1610m

Sensitivity Receptors are staff and customers. Sensitivity is *Low*.

Magnitude receptor contains a Kilsaran Head Office construction yard, Gordon Barron Crash Repairs and MSD pharmaceutical lab/ office. The Kilsaran property had dense vegetation located to the south of the property, screening views of the proposed development. This also screens the site from the MSD property, with them being located to the northwest of the Kilsaran. Both commercial properties are accessed by the R147 which has trees and similar large vegetation on each side of the road. Gordon Barron Crash Repairs is set back from the Pace Road (L5026), which has hedgerows and a dwelling separating.

Kilsaran office and yard has 3 various large sheds and 3-4 storey office buildings, whereas MSD has a 4-5 storey building. Visibility of the proposed development site would be higher due to increased height and the ability to see over existing vegetation. It is expected that the sites may be able to see the tallest aspects of the proposed development once constructed due to their higher elevation. Gordon Barron Crash Repairs consists of sheds and buildings of 1 storey that do not allow elevated views from the site, views experienced in winter months, when deciduous vegetation is not present, may allow views of the proposed development. Further mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

C8 (Derryglen Stud)– Distance from nearest site boundary = 1630m

Sensitivity Receptors are staff and customers. Sensitivity is *Low*.

Magnitude The agricultural business is located on the north side of the Whiteland Road (L5025) and Stokestown Road (L5026). The premises comprise a large shed and ancillary building with outside areas for equine activities. Trees and other vegetation are present between the receptor and the Whitesland Road and help separate the complex from the surrounding fields. The degree of screening may be reduced in the winter as much of the natural and domestic vegetation present in the area is deciduous. The building does not have a clear orientation but is focused on the eastern sector of the receptor polygon, carpark, and access to this location. Visibility of the proposed site is expected to be limited, with possible views of the tallest building of the proposed development visible through gaps in vegetation or views experienced in winter months, when deciduous vegetation is not present. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

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Co1 (Dunboyne College of Further Education and Dunboyne Boxing Club located within Dunboyne Business park to the south of the development site) – Distance from nearest site boundary = 740 and 870m

This receptor is located at the north of the business park, closer to the development site while Dunboyne Boxing Club is located at the southeast corner of the business park overlooking R8.

Sensitivity Receptors are staff and students at the school, and staff and members of the club. Sensitivity is *Low*.

Magnitude Visibility of the development site from the college is partially screened by houses and associated vegetation in R3. Most trees are deciduous so visibility through gaps would be clearer in the winter when vegetation is not present. The boxing club is surrounded by large warehouses that block views to the development site. Views to the proposed development are segregated by the elevated R157, which has established vegetation on each side; the majority of this vegetation is being retained. Further mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* once operational.

OS1 (Triangular green space north of R8, south of the development site) – Distance from nearest site boundary = 870m

This small green area is positioned between eastern houses of R8 and pastures to the north.

Sensitivity Receptors would be users of the green space. Sensitivity is *Low*.

Magnitude A raised bank with trees is evident along the northern perimeter of the green space that provides some screening of northern views of the development site. No playground or other features have been identified in the space, however, the space is likely an important amenity for residents. Due to the distance of the receptor from the site and screening from R3 and C3 the change in landscape would have a minimal effect on the horizon. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* during operation.

OS2 (Greenspace, which is part of the western estates of R8, southwest of the development site) – Distance from nearest site boundary = 535m

This green space features a central walking path, some internal trees, two soccer goal posts and a line of trees along the northern boundary.

Sensitivity Receptors would be users of the open space. Sensitivity is *Low*.

Magnitude The space is positioned between R8 to the southwest and C4 to the northeast. Tall industrial buildings located in Dunboyne Business Park comprise the views from this space. Views of the development site are screened by this infrastructure, although visibility may be present through gaps. Views are further screened by vegetation present through the pastures further north Views to the proposed development are further segregated by the elevated R157, which has established vegetation on each side; the majority of this vegetation is being retained. Further mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Low*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* during operation.

OS3 (Dunboyne AFC along Summerhill Road to the southwest of the proposed development) – Distance from nearest site boundary = 875m

The sports grounds are bound by boundary hedgerows. To the north these include mature trees a part of the agricultural field boundaries. To the west and east these are shorter and are part of the property boundaries of the residences comprising R12.

Sensitivity Receptors would be users of the sports grounds. Sensitivity is *Low*.

Magnitude The existing views towards the proposed development are mid- to long- range. The upper parts of the taller duplexes and blocks are expected to appear past the existing vegetation. Even in winter when the foliage of deciduous trees is not going to be present, allowing for more views, the proposed development would appear proportionate to the surrounding landscape. Further mixed planting and vegetation retention along the receptor-facing proposed development boundary would provide further screening. The magnitude of change would be *Negligible*.

Effect In accordance with Table 11.1 and Table 11.2, the significance of the visual effect would be *Temporary, Imperceptible, Negative* during construction and *Permanent, Imperceptible, Negative* during operation.

11.9 The 'Do nothing' Scenario

The site, which is currently under agricultural use as pastureland, would likely remain under agriculture and resemble its' current condition under the *Do Nothing Scenario*. There are no hazardous trees on site that require removal. Most other elements would evolve naturally (growth, death, regeneration). Due to grazing, natural regeneration is minimal. Without intervention, there is little evidence that new planting would arise, so it can be anticipated that the site would devolve in terms of biodiversity.

The *Do Nothing* option may also result in an increased pressure on the Greater Dublin Area for available housing and stem progress of objectives outlined in the Meath CDP. As the land has been zoned for new residential development the Do Nothing option is not considered further in this report.

11.10 Potential Significant Effects

11.10.1 Construction Phase

No significant negative effects are expected during the construction phase. The highest negative expected effects would be *Moderate*. As experienced on housing sites across the country, construction of the development is expected to add temporary heavy plant traffic and operations to the visual envelope and therefore reduce the amenity offered. With existing tall vegetation removed internally, the construction scene would be more visible. It is likely that views would include temporary security fencing or hoarding. These are *negative* impacts to both visual and landscape amenity. As their duration would last for the duration of the construction, these effects are *Temporary*. Implementation of short-term mitigation measures include tree and hedgerow protection measures and the phasing of vegetation removal and replanting. This would help mitigate negative impact on the receptors mainly in the vicinity of the proposed development site.

11.10.2 Operational Phase

The highest operational impacts would be experienced by visual receptors closest to the site, particularly the residential receptors R6(b and c) that are expected to have shorter-range views over the site. These impacts are expected to be *Slight* to *Moderate Negative*. Other receptors are expected to experience *Slight* to *Imperceptible Negative* visual impacts, due to increased screening and distance from the site. These impacts are expected to be permanent and only reduce over time as proposed and existing vegetation reaches maturity.

11.10.3 Cumulative Effects

Cumulative Impact is the incremental impact created by the proposed development in the context of surrounding land uses, recent changes and considered future development. In this chapter, cumulative impact assesses the visual alterations in the landscape and the potential modification to the rural and suburban setting as a result of all recent and proposed development, regardless of who carried or would carry out the actions. In assessing future works, only reasonable, foreseeable actions are considered.

The site is Phase 3 of a larger masterplan area. Phase 1 is situated to the east of the subject site (Planning ref. 23/60290). The cumulative effect would depend largely on how sympathetic the other stages will be to the existing vegetation, with a focus on the boundary hedgerows.

North of the proposed development site, two planning applications, one for a single-storey commercial building (23/60065) and one for three office buildings (23/424), were at the FI stage at the time of writing. The cumulative effect would depend on the retention of existing vegetation, proposed planting, and the positioning of buildings. South of the proposed development, the Dunboyne Link Road – Dunboyne Business Park and the R157, a Part 8 Development, have been proposed (P822022). Eirgrid have also proposed a 440V line installation along R157 (Planning Ref. ABP 319422).

This stage of the development would consolidate the urbanisation of the area in line with Co. Meath's policy. Based on the LCA characteristics, this can be interpreted as a negative intervention due to the removal of field boundary vegetation and loss of agricultural land. Nonetheless, the proposed development is expected to provide long-term benefits to the LCA as it would reduce the demand for further urbanisation. This would be achieved by providing a high number of residences within a location that is already bound by transport and grid infrastructure. This is expected to allow for the landscape character features to be negatively impacted to a smaller extent over time and therefore protect the LCA features past the urban clusters within its rather extensive boundaries.

With regards to the visual amenity, further restriction of views is expected, yet overall, this is not expected to result in any significant negative impacts, provided that the principles of boundary vegetation retention and sympathetic to the location, additional planting is implemented. The highest magnitude of change to existing views is expected to be experienced from the location of the receptors R6 (b and c) and C1. The cumulative magnitude of change for R6 (b and c) is expected to be *Medium* which would result in **Moderate negative** impacts. For C1, the cumulative magnitude of change is expected to be medium to high. This would lead to **Slight negative** impacts. These impacts are expected provided that the proposed developments are implemented as design where the existing boundary hedgerows are largely retained and enhanced.

With the development of the previous phases to the northeast and east of the proposed scheme, views from these directions would be screened. Consequently, viewpoints such as C1, R1, and R2 would be largely obscured by Phases 1 and 2. These earlier phases would provide established screening, which would be supplemented by the proposed Phase 3. As the earlier phases become fully constructed and their associated vegetation matures, the overall level of visual enclosure is expected to increase. This is expected to reduce the magnitude of additional change introduced by Phase 3, as the character of the area will already have been influenced by the preceding phases. As a result, the visual impact experienced by receptors to the northeast is expected to be diminished.

Similarly, receptors located to the south and west of the proposed development are expected to have views of Phases 1 and 2 once they are constructed and operational prior to Phase 3. Viewpoints such as OS2, R12, and R13 would therefore already be accustomed to a more urbanised, mixed-use character formed by the earlier phases. This existing context will soften the perceived magnitude of change associated with Phase 3 during both its construction and operational stages. Phase 3 would introduce a similar style of development but would experience closer proximity to their receptor locations.

There are **no significant negative cumulative impacts** likely to occur from the proposed works in conjunction with committed developments based on a review of planning grants. The development policies of Meath County Council should be followed to ensure this.

11.11 Mitigation

This section includes the measures that need to be put in place to reduce the magnitude of change of potentially significant negative impacts. It also includes measures that ensure that the current assessment remains accurate. Any changes to the elements of mainly soft landscape that are included in this section may result in the requirement of a re-assessment of the landscape and visual impacts to the relevant receptors.

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11.11.1 Construction Phase Mitigation

Provided that the existing boundary vegetation is retained and protected as shown in the proposed layouts, no significant landscape nor visual impacts are expected during construction. Less visually intrusive hoarding is recommended if required to reduce visibility of moving plant from outside the site.

11.11.2 Operational Phase Mitigation

The retained boundary vegetation and proposed planting along the boundaries and areas where existing hedgerows are being removed is contributing to the reduction of the magnitude of change and therefore significance of the assessed impacts. For this reason, it should be followed as submitted.

11.12 Residual Impact Assessment

Provided that the existing vegetation and proposed planting are implemented as per the submitted layouts, no significant impacts are identified and therefore no further mitigation is required. For this reason, the assessment remains as per section 11.8.

11.13 Risk of Major Accidents or Disasters

The interventions are sympathetic to the purposes of the site and enhances the existing landscape character. These are not expected to pose any risk of cause any major accidents or disasters related to the landscape and visual amenity.

11.14 Significant Interactions

The landscape and visual amenity closely relate to the site’s biodiversity and cultural heritage elements. The current proposals are not expected to significantly interact with any other disciplines.

11.15 References & Sources

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); the Landscape Institute

Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports; Environmental Protection Agency (EPA)

Environmental Impact Assessment of Projects: Guidelines on the Preparation of the Environmental Impact Assessment Report (EIAR) (2017); European Commission (EC)

Meath County Development Plan 2021-2027; Meath County Council (Consolidated version which supersedes the older version on the 13th of May 2024); Meath County Council

Landscape Character Assessment (LCA) of Meath County Development Plan (Draft Report May 2021); Meath County Council

Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013); European Commission (EC)

Guidelines on Landscape and Landscape Assessment (2000); Department of the Environment, Community and Local Government (DOE)

National Landscape Strategy 2015-2025; Department of the Environment, Community and Local Government (DOE)

National Biodiversity Action Plan (2024-2030); National Parks and Wildlife Service

Eastern and Midland Regional Assembly Regional Spatial and Economic Strategy 2019 – 2031; Eastern and Midland Regional Assembly

LCA and LVIA of Specified Infrastructure Projects – Overarching Technical Document (Dec 2020); Transport Infrastructure Ireland (TII)

Visual Representation of Development Proposals (UK, 2019); Landscape Institute. Technical guidance notes for photomontages

Amenity Trees and Woodland: A Guide to their Management in Ireland (2010); Tree Council of Ireland

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CHAPTER TWELVE

TRAFFIC & TRANSPORT



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CHAPTER TWELVE

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CHAPTER 12 | Traffic & Transport

12.1 Introduction

This Chapter of the EIAR has been prepared by Nicholas van den Berg of AtkinsRéalis.

Nicholas is a Chartered Engineer with Engineers Ireland. Nicholas has carried out numerous traffic assessments and has been involved in the preparation of EIARs for the following projects:

- Dunboyne North Phase 1 and 2 – Marina Quarter Ltd.
- Harbour Point Development, Bray - Ballymore
- Lanesboro to Mullingar Uprate – Eirgrid
- Binbane to Cathleen Falls – Eirgrid
- Great Island – Kellis Uprate – Eirgrid
- Drogheda Energy Centre, Drogheda

This chapter of the EIAR reviews the current receiving environment in terms of existing road traffic characteristics and quantifies the associated baseline scenario whilst undertaking an assessment of the proposed development to identify its likely effects on the traffic environment.

The Site is associated with the development of strategic land to the north of Dunboyne adjacent the M3 Junction 5 (Pace Interchange) and the M3 Parkway train station. In principle, the zoned lands have the potential to be well connected to the national transport network with direct connections to the motorway network, regional roads, rail and bus services, together with local connectivity to existing land uses in Dunboyne.

The overall Dunboyne North development presents as a development wherein residents will be facilitated with a lifestyle that is based predominantly on active travel and public transport, minimising dependency on car travel. This opportunity is based on multi-faceted characteristics of the site location and opportunities created for travel choice and preclusion of the need to travel by car in terms of direct and adjacent proximity to existing and future services.

The Site is proposed to be developed in alignment with several future public transport initiatives/projects. The major projects include:

- DART+ expansion programme; and
- BusConnects – Core Bus Corridor: N3 Navan Corridor

The DART + expansion programme, as set out in the Greater Dublin Area Transport Strategy 2016 -2035 (NTA, 2016), it is planned to deliver additional carriages, followed in the longer term by electrification, upgrade and more frequent rail services which will see a train depart every 12 minutes in the peak hours. Customer capacity and train service frequency on these lines will be significantly increased as a result of the programme, delivering a more efficient transport system that allows more people to make sustainable travel choices to meet the goals set out in the State’s Climate Action Plan.

The NTA are currently developing the BusConnects Scheme, N3 Navan Corridor is seen as a ‘spine’ route which will operate between Blanchardstown and Dublin City Centre with continuous bus priority. Once implemented, Dunboyne will be served by routes 70 and 270 (renamed 364 and 264 respectively) which shall be extended from Dunboyne Town Centre to M3 Parkway to create a multi-modal interchange. These routes will become high frequency feeder routes to a major bus interchange at the Blanchardstown Centre.

In January 2021, the National Remote Work Strategy was published by the Department of Enterprise Trade and Employment which lays out the long-term strategy to promote home and remote working for public sector and private sector employees. The strategy mandates that 20% of the public sector workforce move to home and remote working in 2021. Furthermore, the strategy notes that more than 25% of the private sector workers in Ireland have the ability to work remotely.

Therefore, in addition to the significant opportunities to travel to work by active travel and public transport modes, residents of the Dunboyne North development will avail of the home and remote working opportunities, including flexible working opportunities, as promoted by the National Remote Work Strategy. This change in work practice will minimise overall work trips and optimise flexible working opportunities that will enable residents to avoid travel to work and to also facilitate residents to commute to their place of employment outside of the peak traffic and travel periods.

In overall terms, the Dunboyne north Development will be fully consistent with the National Planning Framework objective of compact growth in a location that will optimise the residents’ opportunities to travel by active travel and public transport modes and fully consistent with the overall objectives of the NTA Greater Dublin Area Transport Strategy.

12.2 Methodology

The assessment methodology for the traffic and transport impact is consistent with the Transport Infrastructure Ireland’s (TII) Traffic and Transport Assessments Guidelines. The methodology is summarised as follows:

- **Baseline Transportation Review:** Undertake a review of current planning policies and objectives, existing public transport services, walking and cycling network and existing and roads infrastructure;
- **Baseline Traffic Flow Review:** Undertake site visits to review current traffic conditions and to make observations on same. Identify key junctions where traffic count survey information is required;
- **Future Transport Infrastructure Review:** Undertake a review of current transport policies, plans and strategy to identify future short, medium and long term transport proposals which may have a material impact on the travel behaviour associated with the proposed development;
- **Development Proposals Review:** Review the proposed development in terms of provision for access by walking, cycling, public transport and car;
- **Transport Characteristics Review:** Undertake an assessment of the likely modal share, trip generation, assignment and distribution having regard to existing and potential future traffic patterns on the local road network;
- **Identification of Local Road Network Proposals:** Identify proposed junction works on the local road network in terms of new junctions, improvements for pedestrians, cyclists and traffic at existing junctions;
- **Assessment of Road Impact – Operational Phase:** Undertake an assessment of the key junctions during the operational base year, opening year, opening year plus five and opening year plus fifteen assessment years for both ‘without development’ and ‘with development’ scenarios in order to determine future operation and any necessary mitigation measures required; and,
- **Assessment of Road Impact – Construction Phase:** Undertake an assessment of the potential traffic generation during the construction phase and assess the percentage traffic impact likely to occur and to identify any appropriate mitigation.

As requested at full planning stage for Phase 3 of the Dunboyne North development, a Scoping Document was issued to Meath County Council in November 2024. The content of this Scoping Document was based on feedback from Meath County Council through pre-application meetings and communications including a an S247 meeting on 26th September 2024 and a 32B meeting on 23rd January 2025.

12.3 Receiving Environment

12.3.1 Development Location

The development lands owned by Marina Quarter Ltd are located near the M3 Parkway Railway station in the Dunboyne North region. The residential development lands are divided in the MP22 Masterplan into Phase 1A, Phase 1B, and Phase 1C, as outlined below. The location of lands for all three phases is summarised in the **Figure 12.1** below, which is extracted from the overall MP22 Masterplan for the area.

For the purpose of the report, the residential development along the Phase 1A lands located on the eastern side of the R157, are called Phase 1 development. The remainder of Phase 1A on the western side of the R157, along with Phase 1B, forms Phase 2 of the development. The remainder of the lands located on the western side of the R157 (Phase 1C) are referred to as Phase 3.

Planning applications were submitted by Marina Quarter Ltd for Phase 1 (Meath Planning Application Reference: 2360290) and Phase 2 (Meath Planning Application Reference: 2460805). Planning permission for both phases were granted permission in 2024, while Phase 3 lands are the subject of the current planning application.

Phases 2 and 3 will be served by an access from the new proposed western access road and directly from the R157 at a new signalised junction.

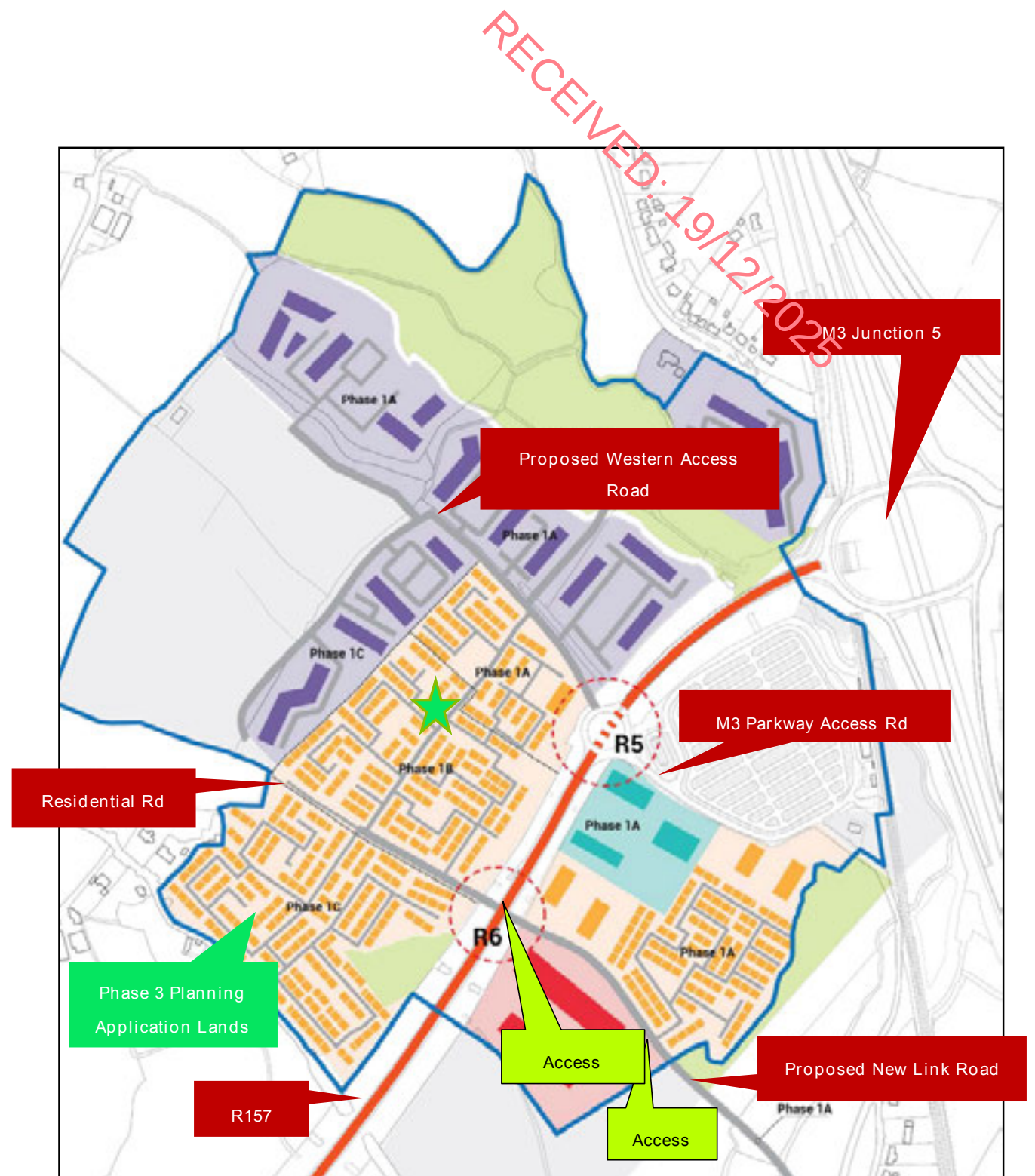


Figure 12.1 Site Location and Site Access – within MP22 Masterplan

12.3.2 Pedestrian and Cycling Facilities

12.3.2.1 Existing

There is no existing walking and cycling infrastructure connecting this development site with Dunboyne Town as this is a Greenfield area. R157 Regional Road is two way carriageway with approximately 9m wide and with 1.5/2m wide hard shoulder from both sides as shown in **Figure 12.2** below.



Figure 12.2 R157 connecting development site with Dunboyne Town

12.3.2.2 Future

The provision of safe and attractive pedestrian and cycle facilities throughout the proposed development and the wider Dunboyne area is critical to ensure that sustainable transport modes are adequately catered for and encouraged.

The proposed development includes signalised junctions on the R157 with dedicated cycle lanes and pedestrian crossings provided to facilitate movement across this busy regional road which currently serves as a barrier to these modes. The new western access road and southern link road to the Old Navan Road provide dedicated segregated cycle tracks along with footpaths throughout.

The internal road layout within the development also caters for pedestrians and cyclists with shared surfaces and reduced vehicle speeds throughout in accordance with DMURS. These link directly into the M3 Parkway where additional cycle/pedestrian facilities are proposed including zebra crossings to ensure that easy access is provided to allow sustainable trips to the rail station. In addition, dedicated shared pedestrian and cyclist facilities are proposed both adjacent to the R157 and to the extreme east of the site which will provide safe and convenient access for sustainable travel modes to access the development and the M3 Parkway.

The Dunboyne Masterplan document includes high walking and cycling permeability offering direct routes to local destinations and public transport stops. As per the document, connections will be facilitated through the introduction of north/south links

between Dunboyne Town Centre and the Dunboyne North lands through the revitalisation of the Old Navan Road, provision of new pedestrian and cycle routes and in the form of a Linear Park along the Tolka River creating a new amenity for the area. These facilities will create an attractive, sustainable and vibrant destination that supports a move away from car dependency towards more sustainable modes of transport. The proposed pedestrian and cycle facilities along the Old Navan Road will link the proposed development with the town centre and will also provide safe routes for active travel modes between the town and the M3 Parkway. Facilities along this road are planned to be provided by Meath County Council.

The following figure summarises the proposed active travel intervention as per the Dunboyne North Masterplan document.

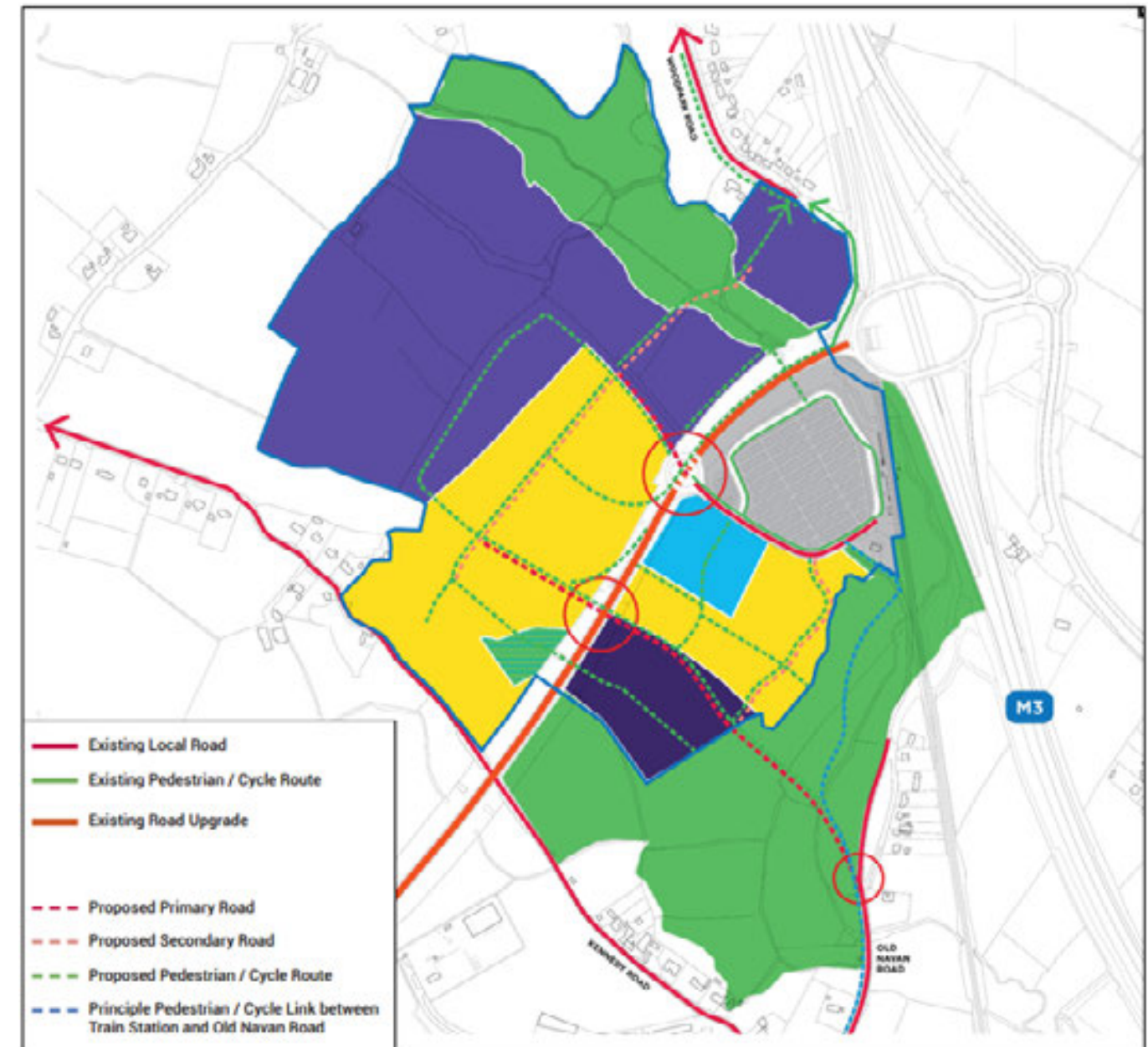


Figure 12.3 Proposed Active Travel Intervention: Dunboyne North Masterplan MP22

12.3.3 Public Transport

The east of Dunboyne is well served by public transport options, including trains and buses with train stations located within Dunboyne itself as well as a large park & ride at the M3 Parkway station to the north of the town centre.

12.3.3.1 Existing

12.3.3.1.1 Rail service

The M3 parkway, located directly adjacent to the proposed development, is a park and ride facility with 1200 parking spaces. It serves the Docklands to M3 Parkway rail route.

The rail service to/from M3 parkway rail station varies throughout the day.

Monday to Friday rail services:

- During the peak hours, trains run between Docklands and M3 parkway station, while during the off-peak hours the route is curtailed to between Clonsilla and M3 Parkway station.
- For the route from M3 parkway station to Docklands, in the morning peak, trains run between 6.50am and 9.08am. During the evening peak, 5 trains run between 4.35 pm to 6.40 pm. In addition, two trains run as far as Broombridge at 7.15 pm and 7.42 pm.
- For the route from Docklands to M3 parkway, in the morning peak, 4 trains run between 7.51 am and 9.35 am. During the evening peak, 8 trains run between 3.55 pm and 7.30 pm
- During the off-peak hours, as stated the service runs between M3 parkway and Clonsilla only at a frequency of one per hour.

Saturday, Sunday and Public holidays services:

- On Saturdays, the train services run between M3 parkway and Clonsilla only with frequency of one hour. The train services between M3 parkway and Clonsilla run between 7.30 am to 23.57 pm. For the reverse direction, the trains run between 7.50 am to 23.10 pm.
- On Saturdays, the train services also run between M3 parkway and Clonsilla only and with frequency of one hour. The train services between M3 parkway and Clonsilla run between 9.30 am to 23.57 pm. For the reverse direction, the trains run between 9.40 am to 23.10 pm,

The Docklands-M3 parkway train route is shown in the figure below.



Figure 12.4 M3 Parkway-Dockland train route

12.3.3.1.2 Bus Service

Dublin Bus and Go Ahead both have routes which serve Dunboyne Town Centre (70 and 270), linking to Dublin City Centre and Blanchardstown respectively. Route 70 runs at varying frequencies, approximately every 30 minutes in the AM Peak and up to every 10 minutes in the PM Peak. Route 270 runs approximately every hour.

However, these do not serve the lands to the north of Dunboyne or the M3 Parkway directly.

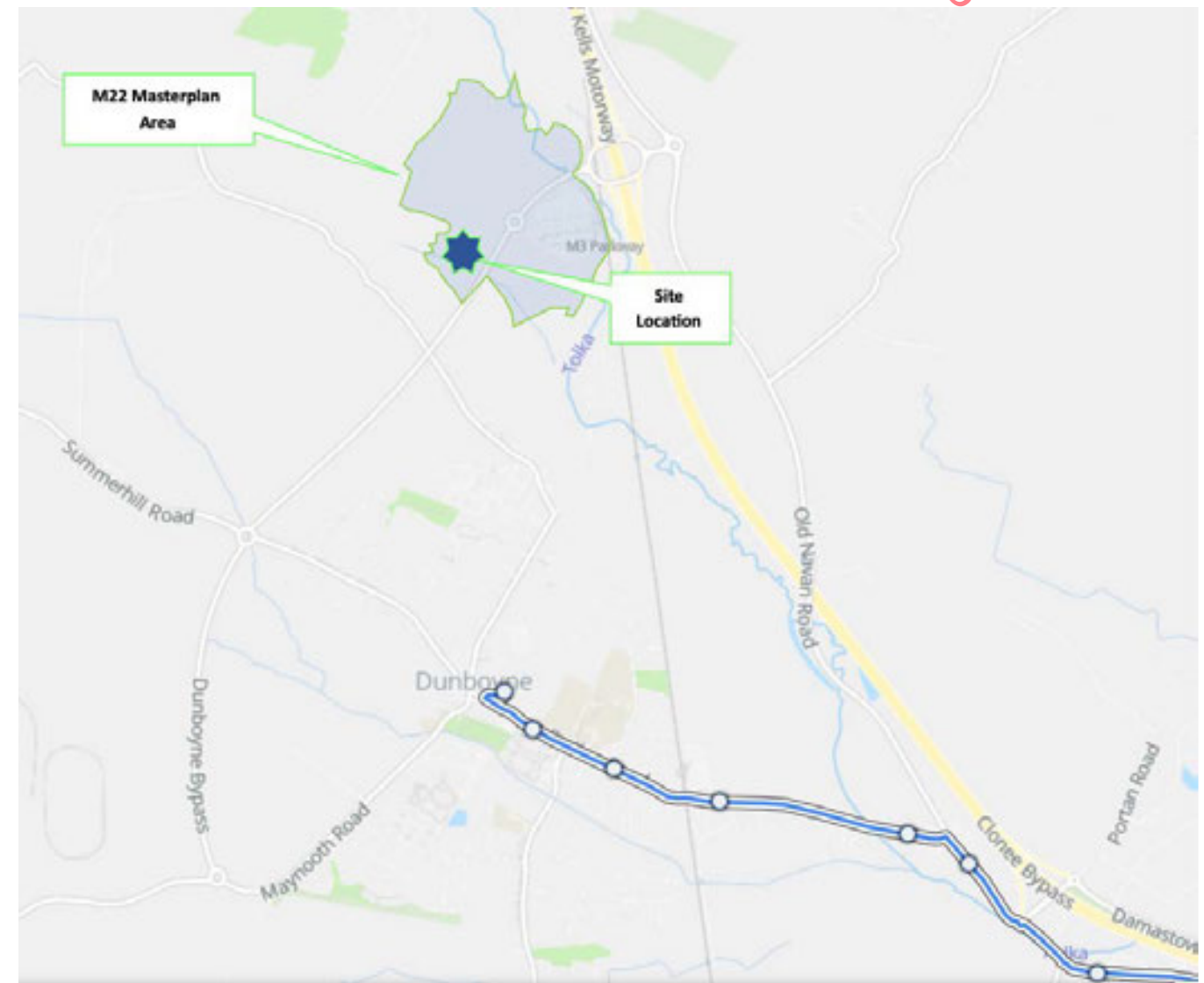


Figure 12.5 Dublin Bus Route 70 and Go Ahead Route 270

12.3.3.2 Future

12.3.3.2.1 Rail service

Significant improvements are planned for this rail line with the extension of dart services as part of Dart+ West as indicated in the figure below. The proposal will double capacity and frequency on the existing line and will offer a reliable, high-speed link to Dublin City Centre and other more local employment an education centre. The proposed development is located directly adjacent to the M3 Parkway railway station and new pedestrian and cycle links are proposed to facilitate active travel links to the station. This will encourage sustainable transport modes and reduce car dependency in the area.

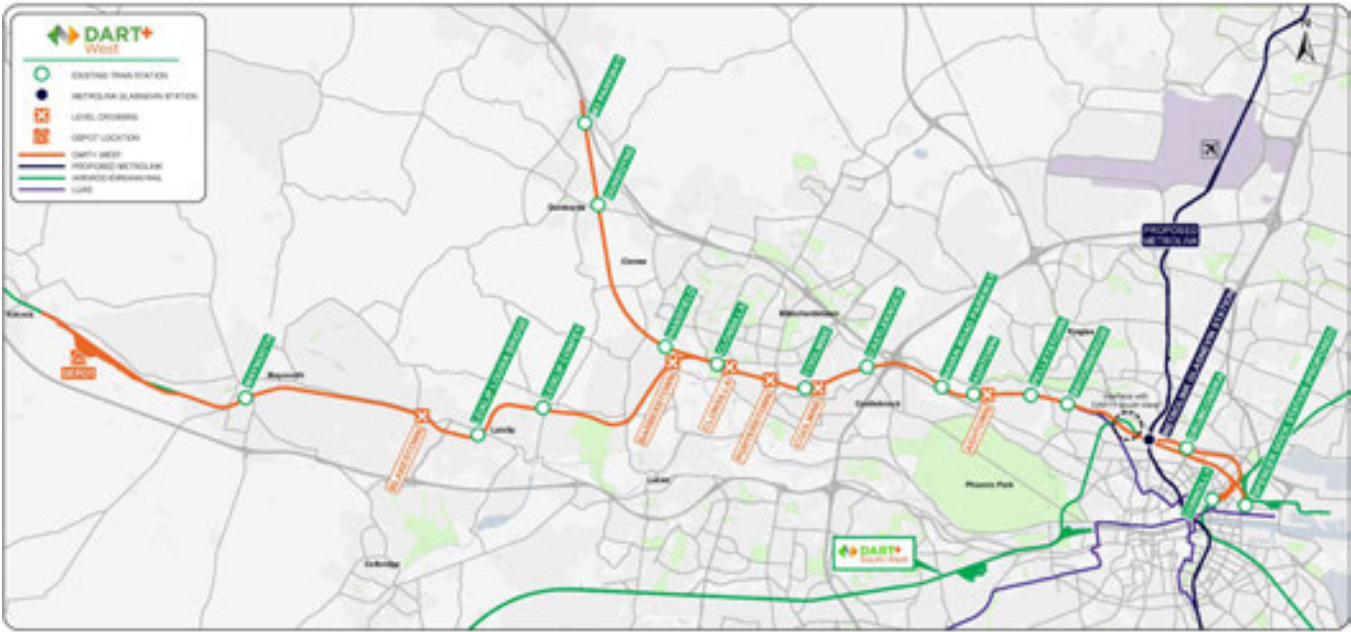


Figure 12.6 Dart+ West Route

12.3.3.2.2 Bus Service

BusConnects proposes to replace the existing services in the area with two new routes, a local route L64 which links to Blanchardstown and a peak time route P64 to the city centre as shown in the figure below. Similarly to the existing services, these do not directly serve the M3 Parkway or the proposed development. Active travel links proposed by the developer along the new southern link road and by Meath County Council along the Old Navan Road will allow people to access these services in a sustainable manner.

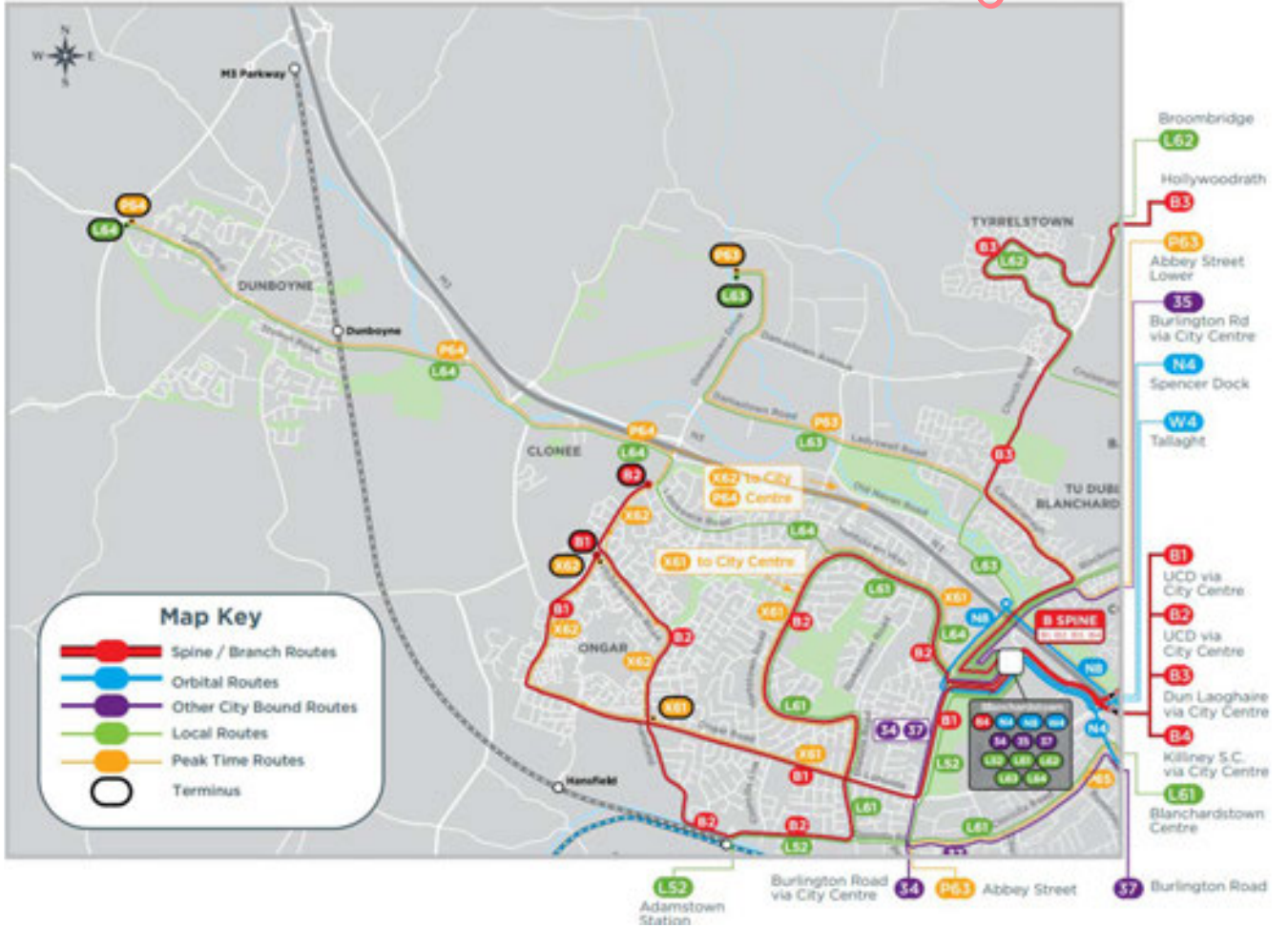


Figure 12.7 Proposed BusConnects Network

However, the Transport Study at Dunboyne & Environs report suggests extending bus services to M3 Parkway to increase the catchment area for public transportation in Dunboyne which will facilitate the Dunboyne North Development lands and further reduce car dependency. The proposed extension is shown in **Figure 12.8 Proposed TSDE Bus Service Extension** extracted from TSDE.



Figure 12.8 Proposed TSDE Bus Service Extension

12.3.4 Road Network

12.3.3.2.2 Existing Local Road Network

The proposed development site is located adjacent to a comprehensive road network consisting of national roads, regional roads and local roads. The connections from the development to the existing road network and connectivity to the wider area are outlined below and shown in

- **The M3 Motorway** – The M3 motorway forms part of the N3/M3 road corridor which connects the M50 to the midlands and northwest region of Ireland. This stretch of motorway, designated M3, begins near the end of the dual carriageway outside Clonee and terminates southwest of Kells just before the N52. Near the M3 Junction 5 interchange, the M3 motorway is a 2+2 lane dual carriageway facility with a speed limit of 120 km/hr. The M3 toll is located just to the north of the M3 Junction 5 interchange.
- **R147** – The R147 is a regional road. Near the M3-Junction 5 interchange, the R147 is a 1+1 single carriageway road with speed limit of 80 km/hr. North of the R147/R157 roundabout junction, the R147 has bus lanes on both sides.
- **R157** – The R157 is a Regional road between Dunboyne and Maynooth in Ireland. It connects to the M3 motorway. In the vicinity of Dunboyne, the R157 link is a 1+1 single lane carriageway with speed limit of 50 km/hr.
- **L2228 (Summerhill Road)** – L2228 is a local road which runs through Dunboyne Town Centre and connects Summerhill Roundabout (R156/R157 Roundabout) to the R147 at Clonee interchange (M3 Junction 4). It is a 1+1 single carriageway with a speed limit of 50 km/hr.
- **Old Navan Road** – This is a 1+1 single carriageway which starts at the L2228 signalised junction (located in the Dunboyne Town Centre) in the south and extends north where it terminates near the Tolka river. The speed limit on the road is 50km/hr.

A full description of the local road network is contained within the Traffic and Transportation Assessment (TTA).

The main junctions which are likely to be impacted by the proposed development were identified as follows, with reference numbers.

Table 12.1 - Location of Key Junctions

Junction Reference	Location	Type
Junction 1	R147/R157 Roundabout, located east of M3-Junction 5 interchange	3–Arm Roundabout
Junction 2	M3-Junction 5 Interchange (Pace Interchange)	Gyratory Interchange
Junction 3	R157/M3 Parkway Access Junction	3–Arm Roundabout
Junction 4	R156/R157/L2228 (Summerhill Road) Roundabout	4– Arm Roundabout
Junction 5	L2228 (Summerhill Road)/Main Street/Old Navan Road	Signalised Junction
Junction 6	Dunboyne Industrial Estate Road/Old Navan Road	Priority Junction

The locations of key links and junctions are summarised in below:



Figure 12.9 Key Local Roads and Junctions

12.3.4.2 Future Local Road Improvements

Based on the Transport Study at Dunboyne and Environs report and consultation with Meath County Council, the following infrastructure upgrades were proposed in the future and shown in **Figure 12.10**.

More detailed description of the future local road infrastructure Development is contained within the Traffic and Transport Assessment.

- **R147 Cordon**

Based on the provision of the Traffic Study at Dunboyne and Environs, to cater for future development and rebalance flow on the R147 and M3, the R147/R157 roundabout should be upgraded to a signalised junction. The report suggests that the junction should be upgraded in the short term in tandem with the development at Dunboyne North.

- **Signalisation along R147**

The Dunboyne environment transport study states that traffic on all roads leading to the R147 except M3 through traffic could reasonably be considered to be able to use the M3 as a viable alternative. This traffic uses the R147 to avoid the toll located north of M3 Junction 5. Hence, it is assumed that congestion developed along the R147 due to signalisation of the junctions along this corridor will encourage people to use the M3 instead of the R147 corridor.

- **Signalisation of R157 and Access Junctions**

The Traffic Study at Dunboyne & Environs has mentioned that in order to maintain effective operation of the R157 after the construction of the Dunboyne North development, it is important upgrade the R157 corridor between Summerhill Road (L2228) and the Pace Interchange (M3 Junction 5). The study states that the upgrade should include the signalisation of both Dunboyne North access points and provision of extra lane in each direction to facilitate right turning traffic.

The signalisation of these junctions must cater for pedestrian and cyclist movements across the R157 to provide sustainable transport links to the surrounding developments, the M3 Parkway train station and onwards to Dunboyne Town Centre.

- **Distributor Roads**

In the Transport Study for Dunboyne and Environs report, three new road links are proposed to provide an alternative to the built-up town centre roads to access Dunboyne including:

- » Dunboyne Business Park link to the R157;
- » Eastern Distributor Road (EDR) between Station Road and Dunboyne Business Park; and
- » Link between the R157 and the Old Navan Road.

- **Dunboyne Business Park Link**

The existing link along the Dunboyne Business Park is a cul-de-sac at Thorntons Recycling Centre at the western edge close to the R157. It is proposed that this link is extended on its western sided where it would join the R157 at a new junction. The design and type of this junction is not currently available as it is subject to a study currently underway.

- **Eastern Distributor Road (EDR)**

A new distributor road is proposed to the east of Old Navan Road. It extends from Dunboyne Business Park junction with Old Navan Road in the west to near Dunboyne Train Station in the east bypassing the Dunboyne Town Centre. The Dunboyne Environs Study suggested that EDR should be delivered prior to the occupation of the residential zones to the east of the town centre but there is no requirement for it to be delivered prior to occupation of units within Dunboyne North.

- **Proposed Junction of EDR with Business link**

The EDR is proposed to join the Old Navan Road at some point close to the existing Business Park priority junction. Following consultation with MCC, this has been assumed to be a new signalised crossroad junction with the Business Park access road.

• Link between the R157 and the Old Navan Road

The Dunboyne Environs Transport Study has a provision of another link road to connect the R157 to the Old Navan Road in addition to Business Link Road. This road is to be delivered as part of the proposed residential and commercial development with the accesses to both provided directly from this road. This road will connect from the new southern signalised junction on the R157 to the Old Navan Road. The Transport Study has stated that the link should be developed immediately prior to occupancy of the developments at Dunboyne North.

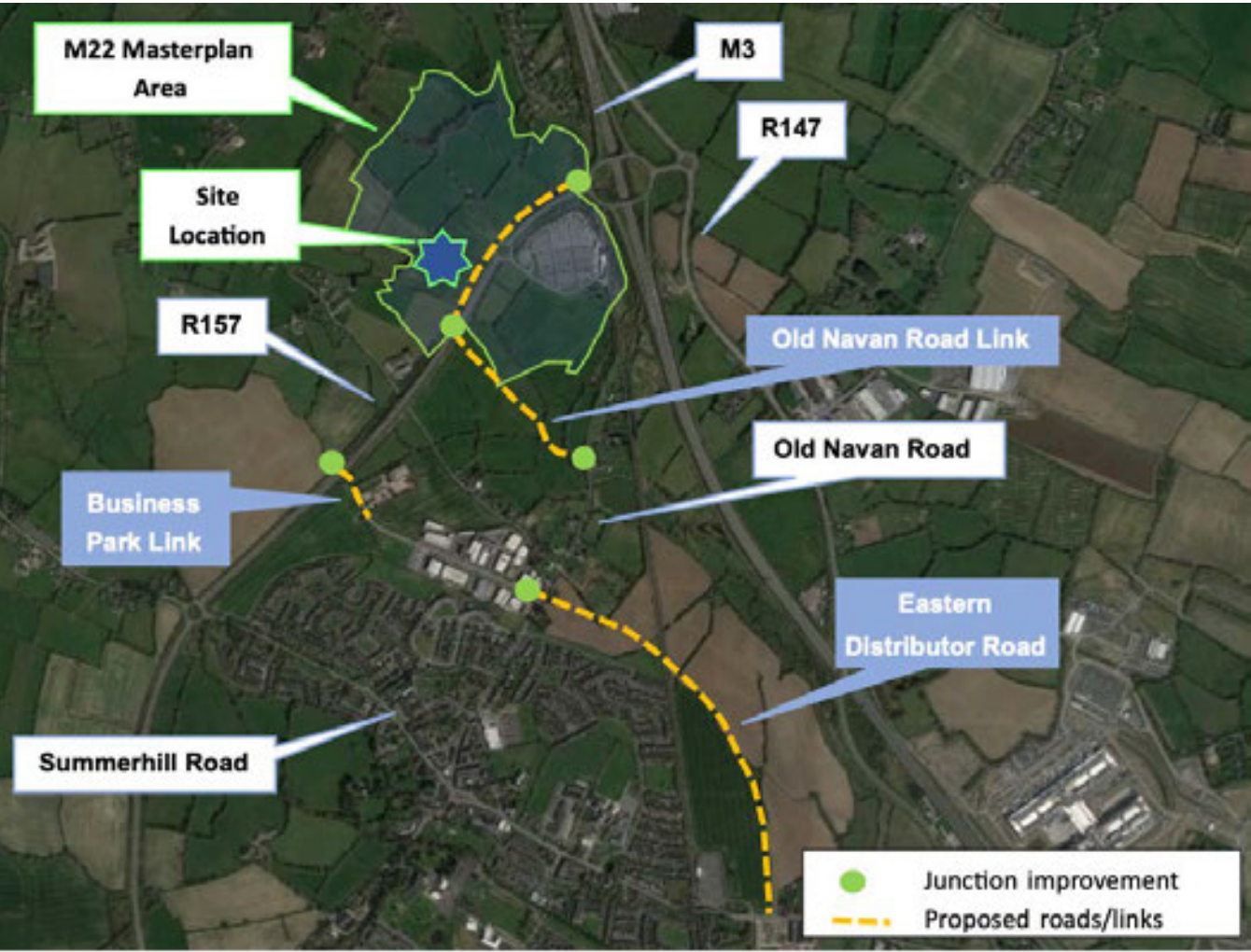


Figure 12.10 Future Local Road Improvements

12.4 Proposed development

12.4.1 Schedule of Accommodation

The proposed development includes part of the residential portion of lands identified in the Dunboyne North Masterplan area. It sits alongside the commercial and enterprise lands which are being developed by third party and represents an ideal “work-live” location with additional excellent links to the national road and rail network.

As mentioned earlier, the entire development is divided into three zones: Phase 1, Phase 2 and Phase 3 as shown in th **Figure 12.1**. The Phase 1 lands are located east of the R157, while the other two phases are located west of the R157. The schedule of accommodation is summarised below.

Table 12.2 Schedule of Accommodation: Marina Quarter Ltd

Bedroom Type	Phase 1 (East of R157)	Phase 2 (West of R157)	Phase 3 (West of R157)	Total
Apartments/Maisonettes				
1 Bed Maisonette	0	0	44	44
1 Bed Apartment	27	72	32	131
2 Bed Apartment	49	22	0	71
3 Bed Apartment	0	0	0	0
Total Dwellings	76	94	76	246
Duplex				
1 Bed	0	0	0	0
2 Bed	11	0	0	11
3 Bed	35	46	28	109
Total Dwellings	46	46	28	120
Houses				
2 Bed	85	83	142	310
3 Bed	52	76	89	217
4 Bed	8	10	21	39
Total	145	169	252	566
Total Units	267	309	356	932

12.4.2 Car Parking

The determination of car parking provision for the residential units were based on the Meath County Development Plan 2021-2027 (DM OBJ 89)¹ as stated below.

- **DM OBJ 89:** Car parking shall be provided in accordance with Table 11.2 and associated guidance notes. The rate for the houses and apartments are summarised in the figure below.

Land Use - Residential	Car Spaces
Dwellings/Apartments	Accessible locations³: Maximum of 1.5 spaces per dwelling/unit Intermediate and peripheral locations: Maximum should be 2 per dwelling/unit

Figure 12-11 Meath DP (2021-27) Guidelines for Car Parking

- » Since the proposed development is close to M3 Parkway Station, it falls under the “Accessible Locations” category.
- » As per the Guidance Note provided within the development plan a minimum of 5% of spaces should be reserved for disabled parking.
- **DM OBJ 93:** New residential development should take account of the following regarding car parking:
 - » Consideration needs to be given to parking for visitors and people with disabilities.
 - » Provision of EV Charging points.
- **DM OBJ 94:** All car parks shall include the provision of necessary wiring and ducting to be capable of accommodating future Electric Vehicle charging points, at a rate of 20% of total space numbers.

Based on the above standard, the maximum number of parking spaces that can be provided and the actual number of parking spaces provided are summarised below:

- **Houses (2bed/3bed/4bed) units:**
 - » Total number of units = 252
 - » Based on 1.5 factor, the maximum permissible spaces = 252*1.5 = 504
 - » Spaces provided = 362
- **Apartments and Maisonettes:**
 - » Total number of units = 104
 - » Based on 1.5 factor, maximum permissible spaces = 156
 - » Spaces provided = 110, which includes:
 - Normal spaces = 86
 - Disabled spaces = 6 (which is 5% of the 110 spaces provided)
 - EV spaces = 18 (which is around 16% of the 110 spaces provided)

1 <https://consult.meath.ie/en/consultation/consolidated-meath-county-development-plan-2021-2027-incl-variations-1-2-3/chapter/11-development-management-standards-and-land-use-zoning-objectives>

- The revised Meath Development Plan does not specify visitor parking requirements. However, on top of 110 spaces for apartments, 20 additional visitor spaces are also proposed. Therefore, a total of 130 spaces being provided for the apartment and maisonettes units, which is still less than the maximum permissible spaces provided (156 spaces).
- Crèche Parking:
 - » As part of Phase 2 development, 17 spaces were proposed for 120 students and 15 staff.
 - » For the phase 3, the creche is proposed to be upgraded to cater for 132 students and 17 staffs,
 - » Therefore, additional 2 number of spaces are being proposed which will include 1 disabled space. Hence, total number of spaces for creche is proposed to increase to 19.
 - » As per Meath Development Plan 2021-27, a maximum of 1 space per employee can be provided and 1 set-down area per 4 students can be provided, which allows the maximum 51 permitted spaces of 132 students and 17 staffs.
 - » Therefore, the total spaces provided are within the permitted number.
- Total Parking Spaces = 362 (Houses) + 110 spaces (apartments/duplex/maisonettes) + 20 (visitor) + 19 (Creche) = 511 spaces

Based on the above, it can be concluded that the proposed parking provision is below the maximum permitted limit, in line with the Meath Development Plan 2021-2027. The reduced car parking numbers consider the need to accommodate vehicles while also promoting a shift towards more sustainable transport.

The proposed layout of the parking spaces for Phase 3 development is summarised in the figure below.



Figure 12-12 Proposed Parking Layout

12.4.3 Bicycle Parking

Meath County Council require an appropriate number of cycle parking facilities to be provided with new development. The following are applicable:

- **DM OBJ 96:** To require the provision of cycle parking facilities in accordance with the Design Standards for New Apartments 2023, the Sustainable Residential Development and Compact Settlements Guidelines 2024 and Table 11.4 Cycle Parking Standards. For the houses and dwellings, the proposed rates are summarised in the figure below.

Type of Development	Cycle Parking Standard
Apartments	Minimum of 1 private secure bicycle space per bedroom (note - design should not require bicycle access via living area) 1 visitor bicycle space per two housing units Please refer to SP4R 4 of the 'Sustainable Residential and Compact Settlements Guidleins' (2024) for further requirements.

Figure 12-13 Meath DP (2021-27) Guidelines for Cycle Parking

- **DM OBJ 97:** Cycle parking facilities shall be conveniently located, secure, easy to use, adequately lit and well sign posted. All long-term (more than three hours) cycle racks shall be protected from the weather.
- **DM OBJ 98:** To establish and implement Cycle Parking Standards for new developments in the County.
- **DM OBJ 99:** In residential developments without private gardens or wholly dependent on balconies for private open space, covered secure bicycle stands should be provided in private communal areas.
- **DM OBJ 100:** All cycle facilities in multi-storey car parks shall be at ground floor level and segregated from vehicle traffic. Cyclists shall also have designated entry and exit routes at car parks.

Based on the above standards, the minimum required bicycle spaces and the spaces provided are summarised below

- Houses (including Marionettes):
 - » Total units = 296 (44 number of 1 bed Mannonates; 142 number of 2 bed units; 89 number of 3 bed units and 21 number of 4 bed units). This equates to 679 number of bedrooms.
 - » Minimum spaces as per the Meath Development Plan = 679
 - » Spaces provided = 919
- Apartments:
 - » Total units = 60 (32 number of 1 bed and 28 number of 3 bed spaces). This equates to 116 bedrooms.
 - » Minimum number of spaces as per Meath Development Plan = 116
 - » Spaces provided = 160
 - » Visitor spaces provided = 80, which is in accordance with 1space per 2 units.
- Creche:
 - » The Meath Development Plan does not specify cycle parking requirements for creches.
 - » However, based on school standards (25% of student enrolment), 34 spaces (25% of 136 students) are proposed.

Based on the above, the cycle parking provision for all developments aligns with the Meath Development Plan 2021-2027 guidelines.

12.5 Potential Traffic Impacts on the Local Road Network during Construction Phase

12.5.1 Development of a Design Process Traffic Management Plan

In order to mitigate the impacts of the construction works, a Design Process Traffic Management Plan will be completed by the Applicant prior to the commencement of the works.

The Design Process Traffic Management Plan will be developed in full consultation with Meath County Council and the emergency services.

The plan will be completed in full compliance with the Department of Transport Document 'Guidance for the Control and Management of Traffic at Road Works'.

The plan will focus on:

- Minimising risk and delay to commuters and road users
- Minimising impacts on surrounding businesses
- Minimising impacts on surrounding dwellings
- Minimising risks imposed on road workers.

12.5.2 Construction Traffic Impact

The likely impact of the construction works will be temporary in nature and fluctuate throughout the construction period. The predominant construction trip generation factor for the proposed site is anticipated to be associated with site operatives and general deliveries.

In terms of arrival and departure times, on-site employees are anticipated to arrive before 08:00 and will generally depart after 16:00. These arrival and departure times are outside the general commuter AM and PM peak periods and are therefore anticipated to not impact the surrounding road network. It should also be noted that, due to the location of the M3 Parkway and surrounding road network, a significant percentage of site operatives are expected to utilise public transport – further reducing the impact of the construction phase.

Although the site is expected to generate HGV movements in the form of material delivery/removal and general deliveries, they are not anticipated to be substantial. It is further recommended that all HGV trips be undertaken during network off-peak periods wherever possible. Due to the nature of construction sites, it is, however, expected there will be a negligible volume of HGV's during peak periods. Traffic volumes during the construction phase are expected to be substantially smaller than the traffic volumes during the operational phase and, therefore, is considered to have an "imperceptible" impact on the surrounding road network.

12.6 Potential Traffic Impacts on the Local Road Network

12.6.1 Assessment Years, Traffic Growth & Trip Generation

12.6.1.1 Assessment Years and Traffic Growth

A detailed traffic analysis is included in Traffic and Transportation Assessment (TTA) report. This chapter summarises the results of the detailed analysis included in the TTA and should be read in conjunction with it.

For the purpose of the EIAR Traffic chapter, the scenarios for the ultimate design year were considered which includes:

- Opening Year +15 (2040) – Do Minimum scenario
- Opening Year +15 (2040) – Do Minimum + Marina Quarter Ltd Scenario
- Opening Year + 15 (2040) – Do Minimum + All Dunboyne North Development Scenario

The Do Minimum scenario includes:

- No development in Dunboyne North but includes residential development in Dunboyne East.
- Extension of Dunboyne Business Park link on its western sided where it would join the R157 at a newly designed priority junction.
- Eastern Distributor Road connecting the residential development in the east to the business park link road.
- Upgrade of R147/R157 roundabout junction to a signalised junction

The Do Minimum + Marina Quarter Lt scenario includes the development and infrastructure upgrade included in Do Minimum plus:

- Residential development in Dunboyne North
- New Access Junctions on R157 (M3 Parkway Access Junction and southern Access Junction)
- New R157 – Old Navan Road link road

The Do Minimum + All Development will include all development and infrastructure upgrades included in Do Minimum + Marina Quarter Ltd plus:

- All Remaining MP22 Masterplan development

The comparison of Do Minimum + Marina Quarter Ltd scenario with Do Minimum scenario will provide the impact of the residential portion of lands owned by Marina Quarter Ltd, while the Do Minimum + All Development scenario will provide the cumulative impact on the surrounding road network.

The baseline traffic has then been grown in accordance with the growth in the number of person trips per day as determined by the NTA National Demand Forecasting Model. Shown below.

Table 12.3 Growth in number of trips per day (NTA National forecasting Model)

Year	Person Trip	Growth Rate over 10 years
2020	4,600,000	
2030	5,000,000	0.087
2040	5,400,000	0.080
2050	5,800,000	0.074
Average growth over each 10 year period		0.080
Average growth per year		0.008
Growth Factor		1.008

Based on the above table, the number of trips per day is expected to increase by a factor of approximately 0.8% per year. The trips per day consist of all modes of transport including cars, public transport, and active mode of travel. Thus, the actual growth per mode may differ. In reality, taking into account modal shift targets and national policy, it is likely that the vehicle trip growth rate will be less than the overall trip growth rate. However, taking a conservative approach, it was assumed that the overall growth factor applies to the baseline traffic.

12.6.2 Sensitivity Analysis

Due to the COVID-19 pandemic and the associated restrictions, traffic surveys conducted during this period reflected reduced traffic levels compared to pre-pandemic conditions. To accurately assess the impact on the road network, traffic data from the TII TMU counter between M3 Junction 4 and Junction 5 for the month of May (during which the survey was undertaken) for the years 2019, 2021, and 2023 were compared.

During Phase 2 submission, the year 2023 was used as a comparison as the data for the year 2024 was still not available for the complete year. However, for Phase 3 analysis, year 2024 was also included in the analysis. For the analysis, the AM period was considered as 7 to 10 am, while the PM peak was considered as 4 to 7 pm. The analysis is summarised in the Table 12-4 below.

Table 12-4 - Comparison of TMU Counter Traffic

Period	TMU Between Jn 4 and Jn 5		
	AM Period	PM Period	24 hr
May 2019 Traffic	9,380	11,106	44,519
May 2021 Traffic	8,264	9,445	38,674
May 2023 Traffic	9,436	10,852	46,150
May 2024 Traffic	9,563	10,814	47,419
May (2021/2019 comparison)	-12%	-15%	-13%
May (2023/2021 Comparison)	14%	15%	19%
May (2024/2021 comparison)	+15.7%	+14%	+23%

For the Phase 2 analysis, to account for the increased traffic in 2023, a sensitivity analysis was undertaken for the Opening+15 design year scenarios. For the analysis the methodology to adjust the traffic is summarised below:

- All background traffic from year 2021 was increased by 15%, and this referred to as the new baseline traffic for the year 2023.
- Thereafter, the background traffic was grown using the NTA growth factor as discussed earlier to reflect the baseline traffic for the year 2040.
- Then, the trips from all the residential and non-residential developments along Dunboyne North and residential development trips in Dunboyne East will be added on top of the background traffic to represent the traffic for the Opening year + 15 Development scenarios.

However, in 2024, the observed increase in traffic was 15.7%. If the same analysis is conducted—where background traffic from 2021 is grown by 15.7% until 2028 and then adjusted using NTA growth factors to estimate 2040 traffic—the same traffic volume would result. This can be demonstrated as follows:

- Suppose the base traffic in 2021 is 100 vehicles.
- With 15% growth, the estimated traffic for 2023 is 115 vehicles.
- With 15.7% growth, the estimated traffic for 2024 is 116 vehicles.
- From 2023 to 2040, assuming an NTA growth factor of 0.8% per annum, traffic will grow to approximately 132 vehicles [$115 * (1+0.8\%)^{17} = 131.6$]
- From 2024 till 2040, based on the NTA growth factor of 0.8% per annum, the traffic will grow to approximately 131 vehicles [$116 * (1+0.8\%)^{16} = 131.4$]

Since the net increase in traffic is nearly identical, no changes were made to the Phase 3 traffic volume.

In the future year scenarios, the majority of proposed development in the Dunboyne area has been explicitly included within the model before any background growth factors and growth based on TMU counters being applied. Therefore, this likely represents a double counting of traffic in future year scenarios in this area and thus making the traffic forecast for Dunboyne more conservative than likely to be encountered in reality.

12.6.3 Trip Rate and Trip Generation

The person trip rate for the residential developments was estimated using the TRICS (Trip Rate Information Computer System) database using the “Residential – Houses Privately Owned” and “Residential – Flats Privately Owned” subcategories respectively for Houses and Apartment Units. This gives the total number of trips generated per unit regardless of transport mode. The direct output from TRICS is included in Appendix B of the TTA and is summarised in the table below.

Considering the layout and type of units proposed as part of the development, including the reduced number of parking spaces associated with them, maisonettes and 1 and 2 bed duplexes have been assumed to have the same trip rates as apartments. For robustness, 3 bed duplexes have been assumed to have the same trip rates as houses.

Table 12.5 People Trip rate from TRICS

Period	TRICS Trip Rates (People)	
	Arrivals	Departures
Apartments		
AM Peak (07:00-08:00)	0.047	0.163
AM Peak (08:00-09:00)	0.163	0.419
PM Peak (17:00-18:00)	0.419	0.314
Houses		
AM Peak (07:00-08:00)	0.108	0.453
AM Peak (08:00-09:00)	0.234	0.776
PM Peak (17:00-18:00)	0.574	0.294

12.6.3.1 People Trips Generation

Based on the above trip rate, the total number of person trips were calculated for all phases and are summarised in the table below.

Table 12.6 People Trips from the Development

Parcel	Houses and 3-Bed Duplex			Apartments and remaining duplexes			Total Trips		
	Units	Arr	Dep	Units	Arr	Dep	Arr	Dep	Total
AM Peak (07:00 – 08:00)									
Phase 1	180	19	82	87	4	14	101	96	197
Phase 2	215	23	97	94	4	15	121	113	233
Phase 3	324	35	147	32	2	5	182	152	334
AM Peak (08:00 – 09:00)									
Phase 1	180	42	140	87	14	36	182	176	358
Phase 2	215	50	167	94	15	39	217	206	423
Phase 3	324	76	251	32	5	13	327	265	592
PM Peak (17:00 – 18:00)									
Phase 1	180	103	53	87	36	27	156	80	236
Phase 2	215	123	63	94	39	30	187	93	279
Phase 3	324	186	95	32	13	10	281	105	387

12.6.3.2 Mode Share

Based on the 2022 Census data, the mode share for the Dunboyne town is shown in the figures below. The mode share is calculated for Work only and Work/School combined. For the morning peak analysis, the mode share for work/school combined is used while, for the evening peak, the mode share for work is only used for the analysis. This takes account of the fact that the morning peak is more influenced by school trips while the evening peak is typically more commuter based.

Opening Year and Opening Year +5 Mode Share

Based on the figures below, it suggests that the majority of the people commute using private cars as either a driver or passenger while there is a relatively good active travel mode split for school trips. For the Opening Year and Opening Year +5 scenarios, no reduction in car mode share is anticipated.

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Table 12.7 Vehicle Trips Generation (Hourly Basis) for Opening and Opening Year +5 Scenarios

Mode	Work/School Combine	Work Only
Active Mode	23.3%	5.2%
Public Transport	11.4%	10.2%
Cars	41.1%	63.2%
Car Passenger	10.6%	3.0%
Work from Home	8.5%	13.2%
Others	5.1%	5.2%
Total	100%	100%

Opening Year +15 Mode Share

The Transport Strategy for the Greater Dublin Area 2022-2042, Strategy Development and Modelling Report (November 2021) published by the NTA shows that car mode share will reduce over time as shown in figure below.

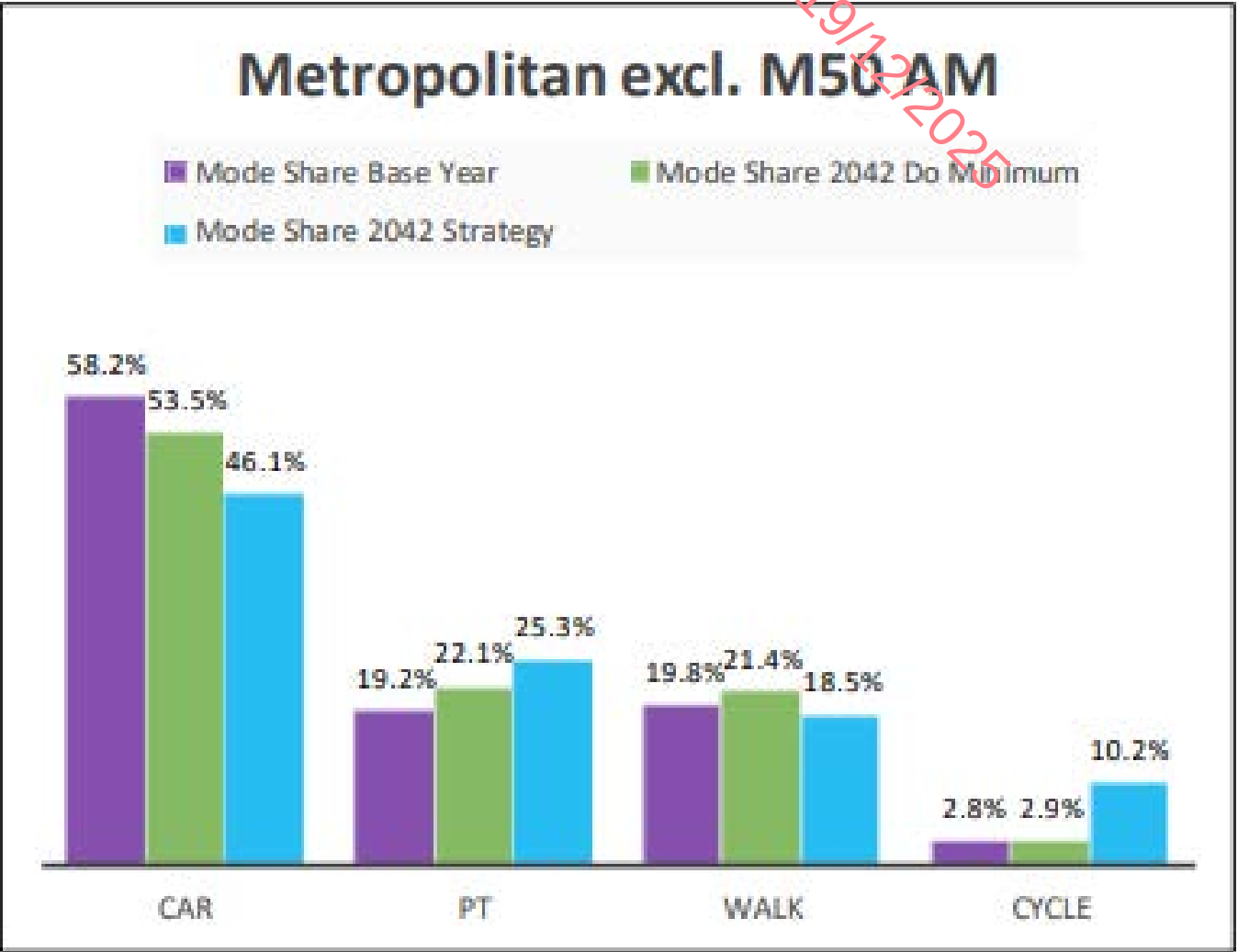


Figure 12.14 Proposed Mode Share for 2042

Dunboyne lies within the Metropolitan area, therefore, based on Figure 12.14, it can be seen that the car mode share is expected to drop by approximately 12% from the base year (2016) on implementation of the strategy. Similarly, the mode shares for Public Transport and Active Travel (Walk+Cycle) are expected to increase by 6% each. In this area, this would be delivered as a result of Dart+ West, the Dublin - Navan Rail line extension and other public transport improvements such as enhanced bus service provision.

In accordance with this, for the Opening Year +15 design year, the mode share for all modes is revised and summarised in Table 12.8.

Table 12.8 Trip rate for different modes: Base Year and Opening +15 Year

Mode	Base Year (2016 CSO data)	Opening+15
AM Peak (Work/School Combine)		
Active Mode	23.4%	29.4%
Public Transport	14.6%	20.6%
Cars	46.1%	34.1% (- 12% from base)
Other modes	15.9%	15.9%
Total	100%	100%
PM Peak (Work Only)		
Active Mode	5.0%	11.0%
Public Transport	14.3%	20.3%
Cars	72.3%	60.3% (- 12% from base)
Other modes	8.4%	8.4%
Total	100%	100%

12.6.3.3 Trip Rates by Travel Mode

Based on the Mode share discussed above, the trip rate for all the different modes was calculated by multiplying the people trip rate and the percentage share of each mode. This is summarised in Table 12.9

Table 12.9 Trip rate for different modes: Opening Year and Opening Year +5

Mode	Mode Share	Houses		Apartments	
		Arrivals	Departures	Arrivals	Departures
7 to 8 am (Work/School combined mode share)					
Active Mode	23.30%	0.025	0.106	0.011	0.038
Public Transport	11.40%	0.012	0.052	0.005	0.019
Cars	41.10%	0.044	0.186	0.019	0.067
Other modes	24.20%	0.026	0.110	0.011	0.039
Total	100%	0.108	0.453	0.047	0.163
8 to 9 am (Work/School combined mode share)					
Active Mode	23.30%	0.055	0.181	0.038	0.098
Public Transport	11.40%	0.027	0.088	0.019	0.048
Cars	41.10%	0.096	0.319	0.067	0.172
Other modes	24.20%	0.057	0.188	0.039	0.101
Total	100%	0.234	0.776	0.163	0.419
5 to 6 pm (Work only mode share)					
Active Mode	5.20%	0.030	0.015	0.022	0.016
Public Transport	10.20%	0.059	0.030	0.043	0.032
Cars	63.20%	0.363	0.186	0.265	0.198
Other modes	21.40%	0.123	0.063	0.090	0.067
Total	100%	0.574	0.294	0.419	0.314

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Table 2.10 Trip rate for different modes: Opening Year +15

Mode	Mode Share	Houses		Apartments	
		Arrivals	Departures	Arrivals	Departures
7 to 8 am (Work/School combined mode share)					
Active Mode	29.3%	0.032	0.133	0.014	0.048
Public Transport	17.4%	0.019	0.079	0.008	0.028
Cars	34.0%	0.037	0.154	0.016	0.055
Other modes	19.4%	0.021	0.088	0.009	0.032
Total	100%	0.108	0.453	0.047	0.163
8 to 9 am (Work/School combined mode share)					
Active Mode	29.3%	0.068	0.227	0.048	0.123
Public Transport	17.4%	0.041	0.135	0.028	0.073
Cars	34.0%	0.080	0.264	0.055	0.142
Other modes	19.4%	0.045	0.150	0.032	0.081
Total	100%	0.234	0.776	0.163	0.419
5 to 6 pm (Work only)					
Active Mode	11.2%	0.064	0.033	0.047	0.035
Public Transport	16.2%	0.093	0.048	0.068	0.051
Cars	60.0%	0.344	0.176	0.251	0.188
Other modes	12.6%	0.072	0.037	0.053	0.040
Total	100%	0.574	0.294	0.419	0.314

12.6.3.4 Vehicles Trip Generation

Based on the Mode share and trip rates discussed above, the car trips on an hourly basis are calculated by multiplying the car trip rates by the number of units of each type and these are summarised in the table below:

Table 12.11 Vehicle trips generation for Opening Year Scenarios

Phase	Houses					Apartments					Total Trips	
	No.	Trip rate		Trips		No.	Trip rate		Trips			
		Arr	Dep	Arr	Dep		Arr	Dep	Arr	Dep	Arr	Dep
AM Peak (07:00 - 08:00)												
Phase 1	180	0.044	0.186	8	34	87	0.019	0.067	2	6	10	39
Phase 2	0	0.044	0.186	0	0	0	0.019	0.067	0	0	0	0
Phase 3	0	0.044	0.186	0	0	0	0.019	0.067	0	0	0	0
AM Peak (08:00 - 09:00)												
Phase 1	180	0.096	0.319	17	57	87	0.067	0.172	6	15	23	72
Phase 2	0	0.096	0.319	0	0	0	0.067	0.172	0	0	0	0
Phase 3	0	0.096	0.319	0	0	0	0.067	0.172	0	0	0	0
PM Peak (17:00 - 18:00)												
Phase 1	180	0.363	0.186	65	33	87	0.265	0.198	23	17	88	51
Phase 2	0	0.363	0.186	0	0	0	0.265	0.198	0	0	0	0
Phase 3	0	0.363	0.186	0	0	0	0.265	0.198	0	0	0	0

Table 12.12 Vehicle Trips Generation for Opening Year +5 Scenarios

Phase	Houses					Apartments					Total Trips	
	No.	Trip rate		Trips		No.	Trip rate		Trips			
		Arr	Dep	Arr	Dep		Arr	Dep	Arr		Arr	Dep
AM Peak (07:00 - 08:00)												
Phase 1	180	0.044	0.186	8	34	87	0.019	0.067	2	6	10	39
Phase 2	215	0.044	0.186	10	40	94	0.019	0.067	2	6	11	46
Phase 3	324	0.044	0.186	14	60	32	0.019	0.067	1	2	15	62
AM Peak (08:00 - 09:00)												
Phase 1	180	0.096	0.319	17	57	87	0.067	0.172	6	15	23	72
Phase 2	215	0.096	0.319	21	69	94	0.067	0.172	6	16	27	85
Phase 3	324	0.096	0.319	31	103	32	0.067	0.172	2	6	33	109
PM Peak (17:00 - 18:00)												
Phase 1	180	0.363	0.186	65	33	87	0.265	0.198	23	17	88	51
Phase 2	215	0.363	0.186	78	40	94	0.265	0.198	25	19	103	59
Phase 3	324	0.363	0.186	118	60	32	0.265	0.198	8	6	126	67

Table 12.13 Vehicle Trips Generation for Opening Year +15 scenarios

Phase	Houses					Apartments					Total Trips	
	No.	Trip rate		Trips		No.	Trip rate		Trips			
		Arr	Dep	Arr	Arr		Arr	Dep	Arr		Arr	Dep
AM Peak (07:00 - 08:00)												
Phase 1	180	0.037	0.154	7	28	87	0.016	0.055	1	5	8	33
Phase 2	215	0.037	0.154	8	33	94	0.016	0.055	2	5	9	38
Phase 3	324	0.037	0.154	12	50	32	0.016	0.055	1	2	12	52
AM Peak (08:00 - 09:00)												
Phase 1	180	0.080	0.264	14	47	87	0.055	0.142	5	12	19	60
Phase 2	215	0.080	0.264	17	57	94	0.055	0.142	5	13	22	70
Phase 3	324	0.080	0.264	26	85	32	0.055	0.142	2	5	28	90
PM Peak (17:00 - 18:00)												
Phase 1	180	0.344	0.176	62	32	87	0.251	0.188	22	16	84	48
Phase 2	215	0.344	0.176	74	38	94	0.251	0.188	24	18	98	56
Phase 3	324	0.344	0.176	112	57	32	0.251	0.188	8	6	120	63

12.6.4 Operational Traffic Impact: Opening Year+15 Do Minimum + Marina Quarter Ltd Development Scenario

12.6.4.1 Network Performance

Main Analysis

- Compared to the Do Minimum Scenario, the average delay increased by around 8-10 seconds across both hours of the morning peak, and by around 17 seconds for the PM peak.
- Compared to the Do Minimum Scenario, the average speed reduced by an order of 5 to 6 km/hr for both peak periods during the AM peak and by 8 km/hr for the PM peak.
- The latent demand was observed to be zero across all the modelled periods.

Therefore, based on the above results, the impact of Do Minimum + Marina Quarter Ltd Development scenario was found to be “not significant”.

Sensitivity Analysis

- Compared to the Do Minimum Scenario, the average delay increased by around 4-30 seconds across both hours of the morning peak, and by around 33 seconds for the PM peak.
- Compared to the Do Minimum Scenario, the average speed reduced by an order of 3-6 km/hr for both peak periods during the AM peak and by 11 km/hr for the PM peak.
- The latent demand was observed to be around 16 vehicles for AM peak. The congestion was gain found to be clearing during the cooldown period (9 to 9.15 am). For the PM peak, the latent demand was observed to be zero vehicle.
- The network is mostly free flowing with slight slow areas near the R157 access signalised junctions and R147/R157 signalised junction which is common for the signalised junctions.
- M3 motorway is free flowing and no impact on the mainline was observed.
- Similar to other scenarios, the new link road from R157 to Old Navan Road was again observed to be slow as it was made unattractive for the through traffic.

Therefore, based on the above results, the impact of Do Minimum + Marina Quarter Ltd Development scenario for sensitivity analysis was found to be **“slight”**.

12.6.4.2 Junctions Performance**Main Analysis**

- Across all the modelled periods, all junctions were operating within capacity.
- Compared to the Do Minimum scenario, across all junctions, the maximum increase in average queue was observed to be around 6 PCU, while the maximum increase in average delay was found to be in the order of 22 seconds.
- The proposed new signalised junctions on the R157 also operate with adequate capacity to cater to the development traffic.
- The queue along both ramps at M3-Junction 5 wasn't found to be backing up to the M3 mainline.

Therefore, based on the above results, the impact of Do Minimum + Marina Quarter Ltd Development scenario for all the junctions were found to be **“not significant”**.

Sensitivity Analysis

- In the sensitivity analysis for the Do Minimum + Marina Quarter Ltd development scenario, all junctions were operating within the typical queue and delay ranges of an urban environment and were found to have adequate capacity to cater to future development trips.
- For all junctions, the maximum increase in queue was observed to be in the order of 17 PCU, while a maximum increase of 33 seconds in delay was observed.
- The queue along the ramps at M3-Junction 5 wasn't found to be backing up to the mainline in the sensitivity analysis either.
- The proposed new signalised junctions along R157 were found to have slightly more queue than in the non-sensitivity analysis, but the delays were found to be within 60 seconds, which is typical for an urban environment.
- During the AM peak, the queue along the R147 southbound arm of the R147/R157 signalised junction was found to be higher to that of the Do Minimum scenario by around 13 pcus and with a delay around 36 seconds for both the scenarios.

Therefore, based on the above results, the impact of Do Minimum + Marina Quarter Ltd Development scenario for sensitivity analysis on all the junctions were found to be **“slight”**.

12.6.4.3 Conclusion

The proposed infrastructure outlined within the Transportation Study at Dunboyne & Environs report is adequate to support the proposed development within the Dunboyne area.

The volume of traffic generated by the proposed Marina Quarter Ltd residential lands for all phases have **“not significant”** to **“slight”** impact on the proposed network and junctions within the network.

12.6.5 Cumulative Traffic Impact: Opening Year+15 Do Minimum+All Development Scenario

For this section the trips attributed to remaining non-residential development in MP22 masterplan was included.

12.6.5.1 Network Performance**Main Analysis**

- For the Do Minimum + All Development scenarios, the average delay throughout the network was found to be in the order of 30 – 120 seconds for both AM and PM peaks across all design years.
- When compared to the Do Minimum + Marina Quarter Ltd Development scenario, the average delay increased by a maximum of around 46 seconds for the AM peak and around 75 seconds for the PM peak.
- The greater impact on the network is primarily due to the additional traffic generated by the proposed non-residential developments within the Dunboyne North MP22 Masterplan area to the west of the R157. This results in additional congestion, particularly along the R157 at the new signalised access junctions and at the entrance to M3 Junction 5. Congestion was also observed along the Business Park Link at its new priority junction with the R157, especially during the PM peak. Additionally, congestion was noted along the R147 southbound arm at the R147/R157 signalised junction, particularly during the AM peak period, and slightly along the northbound off-ramp during the PM peak. This latter congestion is mainly attributed to trips using the R147 as an alternative to the M3 to avoid the toll. However, congestion did not reach the M3 mainline. During the PM peak, congestion was observed along the access arm of the commercial development located northwest of the M3 Parkway access junction.
- The delays experienced are typical of more urbanized areas. For the AM peak, no latent demand was observed at the end of the modelled period, suggesting that the network was operating within capacity and queues were cleared by the end of the modelled periods. For the PM peak, latent demand was observed at the end of the modelled period due to congestion along the access arms of the northwestern commercial development at the M3 Parkway junction. Otherwise, for the other parts of the network, congestion was found to clear by the end of the modelled period, and the network was overall reasonably free flowing.
- In all scenarios, no impact on the M3 mainline was observed. The proposed new Link Road between the R157 and Old Navan Road is primarily used by local traffic, with through traffic utilising the new Dunboyne Business Park Link Road and Summerhill Road instead. This suggests that the proposed traffic management measures on this road are effective. In AM peak, no latent demand was observed at end of modelled period while for PM peak the latent demand was observed due to congestion along northwest non-residential development arm at M3 Parkway junction.

Therefore, based on the above results, the cumulative impact on the network for All Development scenario for non-sensitivity analysis was found to be **“slight”**.

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Sensitivity Analysis

- For the sensitivity analysis, the average delay was found to be in order of 76 seconds to 3 minutes for both AM and PM peaks.
- When compared to Do Minimum+Marina Quarter Ltd Development scenario, the average delay further increased by 23 seconds for 7 to 8 am, by 89 seconds for 8 to 9 am and by around 1 minute 48 seconds for 5 to 6 pm.
- When compared to Do Minimum+Marina Quarter Ltd Development scenario, the average speed further reduced by 5 km/hr for 7 to 8 am, by 8 km/hr for 8 to 9 am and by 13 km/hr for 5 to 6 pm period.
- For the AM Peak, the latent demand was observed to be around 182 vehicles at the end of the modelled period (7 to 9 am) which was not observed to clear during the cooldown period (9 to 9.15 am).
- For the PM Peak period, the latent demand was observed to be 145 vehicles at the end of the modelled peak period (5 to 6 pm) and the congestion was still observed after the cooldown period (6 to 6.15 pm).
- Similar to the non-sensitivity scenario, a greater impact was observed due to the additional non-residential development trips at Dunboyne North. For the sensitivity scenarios, congestion observed along the R157 at access junctions and at the entrance of M3 Junction 5 increased compared to the non-sensitivity scenario for the same design year. Additionally, during the AM peak, congestion along the R147 southbound arm further increased, leading to latent demand at the end of the modelled period. For the PM peak, the latent demand was still due to congestion along the northwest non-residential development arm at the M3 Parkway junction. However, congestion also increased along the northbound off-ramp, sometimes backing up to the M3 mainline. This was limited to the left two lanes, which were found to have sufficient stacking capacity to cater to the additional trips without impacting the mainline.
- The congestion along the R147 southbound during the AM peak and the northbound off-ramp during the PM peak was mainly attributed to trips using the R147 as a bypass to avoid the toll along the M3. It is anticipated that this level of congestion will further reduce this rat run and encourage people to use the M3 instead of the R147 as an alternative.
- Congestion along the Business Park Link Road at the new priority junction increased for the sensitivity scenario. The usage of the new link road from the southern access junction to Old Navan Road was again found to be smaller compared to other distributor roads.
- For AM peak, the latent demand was observed due to congestion along R147 southbound arm, while for PM peak, similar to non-sensitivity scenario, the latent demand was attributed to the congestion along northwestern non-residential development arms at M3 Parkway junction.

Therefore, based on the above results, the cumulative impact on the network for All Development scenario for sensitivity analysis was found to be **“moderate”**.

12.6.5.2 Junctions Performance**Main Analysis**

- For the Do Minimum + All Development scenario, all the junctions were found to be operating within typical urban queue and delay. The maximum average delays across all the junctions were found to be in order of 120 - 125 seconds which is typical for an urban environment.
- In terms of impact, compared to the Do Minimum scenario, the maximum increase in queue was observed to be around 30 PCU, while the maximum increase in delay was around 118 seconds.
- For both AM and PM peaks, slight queues were observed along the R157 arms at both access junctions. This is mainly attributed to the fact that both junctions are proposed to be developed as protected signalised junctions with tighter radii and setbacks for pedestrian and cycle crossings. This increased the intergreen times between stages and the pedestrian crossing times. However, the delay was under 60 seconds, which is typical for an urban environment.
- During PM peak, an increase in queues was observed on the R157 eastbound approach to the M3 Junction 5 as a result of the additional trips generated by the development in Dunboyne North. However, delays remain within

acceptable ranges as the queue is transitory and continuously clearing.

- At the Southern Access Junction, some queues and delays are experienced when traveling southbound as a result of the merging of two lanes into one immediately south of the junction. These are most notable in the PM peak; however, the delays experienced again suggest that these are transitory queues which continue to clear.
- For the new Business Link Road/R157 priority junction, delays were found to be on the higher side for the vehicles traveling along the Business Park link road, especially during the evening peak due to it being a priority junction with significant flow on the major arm.
- The queue was not found to be backing up to the mainline along both ramps of M3-Junction 5. Overall, ranges with sufficient capacity to cater to future development trips, and no impact was observed on the M3 mainline.

Therefore, based on the above results, it can be said that the cumulative impact of all the trips on the junctions were found to be **“slight”**.

Sensitivity Analysis

- During the AM peak, the R147 southbound arm was observed to have an increase of around 21 PCUs in the queue, but the delay for the arm increased only by 11 seconds. For the PM peak, a queue of around 66 PCUs was found along the northbound off-ramp of M3-Junction 5. As stated earlier, this queue was found to be backing up to the M3 but was mainly limited to the left two lanes, which did not impact the mainline. In both cases, the congestion is attributed to people using the R147 as an alternative to the M3 to avoid the toll. The increase in congestion is expected to encourage them to use the M3 instead of the R147.
- During both peak hours, the flow along the M3 mainline was not impacted.
- Compared to the main analysis, the queue increased along the R157 at both access junctions. But the delay was under 112 seconds, which is typical for an urban environment. In addition, it should be noted that for the Dunboyne region, a highly conservative traffic volume has been used, and this level of queue is not expected in reality.
- A slightly higher delay was experienced along the Business Park link at its junction with the R157, but the queue observed was small.
- The maximum average delays across all the junctions were found to be in order of 60 - 180 seconds which is typical for an urban environment.

Therefore, based on the above results, it can be said that the cumulative impact of all the trips for sensitivity scenario on the junctions were found to be **“moderate”**.

12.6.5.3 Impact on M3 Mainline

In order to analyse any impact on the M3 mainline due to the proposed Dunboyne North Masterplan trips, M3 Junction 5 interchange was included in the model along with the R147/R157 junction located east of the interchange. Both junctions were included as the majority of traffic heading north of Junction 5 uses this interchange and the R147/R157 junction to avoid tolls located north of the M3 Junction 5 interchange.

The model captured the following driving behaviours:

- It captured the use of the northbound off-ramps at Junction 5 by vehicles travelling towards areas north of the R147/R157 junction, allowing assessment of any potential queuing impact at M3 Junction 5 and the R147/R157 junction on the M3 northbound mainline.
- There is an auxiliary lane of approximately 2 km between M3 Junction 4 and Junction 5 in the northbound direction. This long lane enables vehicles to exit the motorway smoothly, making any impact of diverging behaviour on the mainline very unlikely. However, this was coded into the model to ensure exit behaviour was captured.

- Vehicles merging onto the M3 southbound mainline from the north of the R147/R157 junction, covering interaction and merging behaviour. Similar to the northbound mainline, there is an approximately 2 km auxiliary lane between M3 Junctions 5 and 4, which provides sufficient opportunity for vehicles entering the M3 without significantly impacting mainline flow.
- The model also captured queuing of vehicles along the southbound off-ramp, the impact of exit behaviour of vehicles diverging from the southbound mainline, and merging along the northbound on-ramp, although the number of vehicles performing these movements is much lower compared to the two primary movements above.

To determine the impact of additional trips at M3 Junction 5, the following analyses were undertaken:

- Travel times along the M3 mainline in both directions were analysed for Do Something scenarios and compared with Do Minimum scenarios.
- Queues along the off-ramps were assessed to determine if they backed up onto the mainline in either direction.

From the results, it was found that:

- For both the main and sensitivity analyses, across all design years, journey times on the M3 for the development scenarios were similar to the Do Minimum scenario.
- Queues along the ramps at Junction 5 were not found to back up to the mainline in either the main or sensitivity analysis for Do Something scenarios.

The above analysis indicated that the impact of additional trips on the M3 mainline near Junction 5 is **“not-significant”**, and that congestion that may occur on the M3 in this area is, therefore, as a result of issues further downstream of this junction and not as a result of any of the proposed development traffic.

12.6.5.4 Conclusion

- The proposed quantum of development proposed by Marina Quarter Ltd is in accordance with the Dunboyne Masterplan – MP22 document.
- The proposed infrastructure outlined within the Transportation Study at Dunboyne & Environs (TSDE) report is adequate to support the proposed development within the Dunboyne area.
- The volume of traffic generated by the proposed Marina Quarter Ltd residential lands has minimal impact on the proposed network with ample capacity remaining at all junctions.
- The full build-out of the Dunboyne North MP22 Masterplan lands results in some congestion along the R157 at the new Northern Access Road and the approach to M3 Junction 5. However, the overall delay and queues around the network are typical of busy urbanised areas and are temporary in nature, clearing within the peak hours. The congestion is primarily as a result of traffic generated by the non-residential developments in Dunboyne North.
- A sensitivity analysis was undertaken for the Opening Year +15 design year scenarios, in which the traffic data from the 2021 survey was increased by 15% based on TMU data to establish a new baseline for 2023. Thereafter, the NTA growth factor was applied. This process was also done for traffic to/from the Dunboyne region. However, for the future year, all possible trip-generative developments within Dunboyne were included, leading to double counting of traffic for the Dunboyne region and thus employing a highly conservative approach.
- In sensitivity analysis, the impact was found to be along R147 southbound and offramp during AM and PM peak respectively. However, this will encourage people to use M3 instead of R147.
- In sensitivity analysis, other junctions were found to be operating with typical queue and delay of an urban environment. For signalised junctions, traffic has to wait for mostly one cycle to clear the junction and in some case two cycle which is typical for urban environment.

- There is no impact on the M3 mainline in any modelled scenario, with queues on off-ramps remaining reasonably short in all cases, and travel times along the mainline found to be of a similar order for both Do Minimum and Do Something scenarios across all design years.

12.7 Mitigation Measures

12.7.1 Construction Stage

The following mitigation measure shall apply during the construction stage:

- All construction activities will be managed and directed by a Construction Traffic Management Plan (CTMP). The details of the CTMP will be agreed with the roads department of the Local Authority in advance of construction activities commencing on-site.
- Below is a list of proposed traffic management measures to be adopted during the construction works by the Contractor. Note that this is not an exhaustive list, and it will be the appointed contractor's responsibility to prepare a detailed Construction Traffic Management Plan to be approved with the Planning Authority prior to commencement of construction.
- Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access;
- Construction and delivery vehicles will be instructed to use only the approved and agreed means of access and movement of construction vehicles will be restricted to these designated routes;
- Restriction of HGV movements during drop off and pick up times associated with the adjacent schools;
- Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material;
- Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within the Site;
- Parking of Site vehicles will be managed, and will not be permitted on public roads, unless proposed within that designated area that is subject to traffic management measures;
- A road sweeper will be employed to clean the public roads adjacent to the Site of any residual debris that may be deposited on the public road leading away from the construction Site;
- On Site wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the Site, to avoid any potential for debris on the local roads;
- All vehicles will be suitably serviced and maintained to avoid leaks or spillage of oil, petrol or diesel. Spill kits will be available on Site. All scheduled maintenance carried out off Site will not be carried out on the public highway; and,
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footway. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users and mobility impaired persons.
- HGV movements will be managed so as not to occur during the network traffic peak period, particularly the AM school drop off period.

The above mitigation measures will minimise any significant environmental degradation or safety concerns in the vicinity of the proposed works, due to the presence of construction traffic. Furthermore, it is in the interest of the construction programme that deliveries, particularly concrete deliveries are not unduly hampered by traffic congestion, and as a result continuous review of haulage routes, delivery timings and access arrangements will be undertaken as construction progresses to ensure smooth operation.

12.7.2 Operational Stage

The proposed development is consistent with all national, regional and local policies. In particular, those policies and objectives aligned with active and sustainable travel and transportation. Some of the mitigation measures proposed by the local and national authorities in the future include the following:

- The upgrades of road infrastructure were proposed in the future such as R147/R157 roundabout upgrade to Signalised junction, Signalisation along R147, Signalisation of R157 and Access Junctions, Dunboyne Business Park link to the R157, Eastern Distributor Road (EDR) between Station Road and Dunboyne Business Park and Link between the R157 and the Old Navan Road
- The DART + expansion programme, as set out in the Greater Dublin Area Transport Strategy 2016 -2035 (NTA, 2016), it is planned to deliver additional carriages, followed in the longer term by electrification, upgrade and more frequent rail services which will see a train depart every 12 minutes in the peak hour. Customer capacity and train service frequency on these lines will be significantly increased as a result of the programme, delivering a more efficient transport system that allows more people to make sustainable travel choices to meet the goals set out in the State's Climate Action Plan
- BusConnects Scheme, N3 Navan Corridor is seen as a 'spine' route which will operate between Blanchardstown and Dublin City Centre with continuous bus priority. Once implemented, Dunboyne will be served by routes 70 and 270 (renamed 364 and 264 respectively) which shall be extended from Dunboyne Town Centre to M3 Parkway to create a multi-modal interchange. These routes will become high frequency feeder routes to a major bus interchange at the Blanchardstown Centre,
- The development takes cognisance of the NTA's plans to redesign the bus network and provide a more efficient network with high frequency spines, new orbital routes and increased bus services
- The National Remote Work Strategy was published by the Department of Enterprise Trade and Employment which lays out the long-term strategy to promote home and remote working for public sector and private sector employees. The strategy mandates that 20% of the public sector workforce move to home and remote working in 2021. Furthermore, the strategy notes that more than 25% of the private sector workers in Ireland have the ability to work remotely,
- The development is adjacent and accessible to Routes DB1, DB2 and M14 of the N5 Greater Dublin Area Cycle Network Plan. Also, the Dunboyne North Masterplan document includes high walking and cycling permeability offering direct routes to local destinations and public transport stops. As per the document, connections will be facilitated through the introduction of north/south links between Dunboyne Town Centre and the Dunboyne North lands through the revitalisation of the Old Navan Road, provision of new pedestrian and cycle routes and in the form of a Linear Park along the Tolka River creating a new amenity for the area and
- The propensity for car ownership and car use is managed through measures that include reduced residential parking provision and increased cycle parking provision in line the 'Design Standards for New Apartments'. The provision of car club parking spaces will facilitate a lower level of car ownership.

The above mitigation measures will provide alternatives to the private car for making trips and are envisaged to promote low car ownership which will in turn ensure that the level of traffic generation and thus the traffic impact on the local road network is mitigated.

12.8 Residual Impacts

12.8.1 Construction Stage

There will be a slight negative impact due to construction traffic. However, this impact will be short term. This will be mitigated by the introduction of a Construction Traffic Management Plan (CTMP). The CTMP will manage these potential impacts, but they will remain as a short term slight negative impact on the adjacent local and strategic road network.

12.7.2 Operational Stage

During the operation of the proposed development (Opening Year) there will be a long term not significant negative impact due to increased traffic flows.

Additionally, there will be new pedestrian and cyclist movements, due to the development's proximate location to the Dunboyne town centre amenities and public transport facilities, and the local authorities proposed upgrade of the active travel infrastructure from proposed development to the town centre. This will positively impact the proposed development and will assist in reducing dependency on car travel.

12.9 Monitoring Requirements

Not applicable for this Chapter.

12.10 References

The following is a list of sources of information consulted for use in this Chapter:

European Union (Planning & Development) (Environmental Impact Assessment) Regulations 2018.

Planning and Development Act 2000 (as amended).

Planning and Development Regulations 2001-2021.

Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems – Key Issues Consultation Paper (2017; DoHPCLG).

Preparation of guidance documents for the implementation of EIA directive (Directive 2011/92/EU as amended by 2014/52/EU) – Annex I to the Final Report (COWI, Milieu; April 2017).

Guidelines on the information to be contained in environmental impact assessment reports, EPA, (2022)

Environmental Impact Assessment – Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018; DoHPLG).

Guidance for Consent Authorities regarding Sub-threshold Development (2003; DoEHLG).

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Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU).

Transport Infrastructure Ireland (TII) Transport Assessment Guidelines (TII, 2014).

Department of Transport Tourism and Sport (DTTaS) The Traffic Signs Manual (2010).

Department of Transport Tourism and Sport - The Design Manual for Roads and Bridges (DMRB).

The Design Manual for Urban Roads and Streets (DMURS) (DTTAS, 2013).

Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG) Unit 16.0 – Estimating AADT on National Roads.

Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG) Unit 16.1 – Expansion Factors for Short Period Traffic Counts.

Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG) – Unit 5.5 Link Based Traffic Growth Forecasting.

Meath County Development Plan 2021-2027

Sustainable Residential Development and Compact Settlements Guidelines for Planning Authorities (2024)

CHAPTER THIRTEEN

MATERIAL ASSETS: SERVICE INFRASTRUCTURE & UTILITIES

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CHAPTER THIRTEEN

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CHAPTER 13 | Material Assets: Service Infrastructure & Utilities

13.1 Introduction

This Material Assets chapter relating to Services, Infrastructure and Utilities of the EIAR has been prepared by Paul Mc Grail Consulting Engineers.

Resources that are valued and that are intrinsic to specific places are called “material assets”. They may be either human or natural origin and the value may arise for either economic or cultural reasons.

This chapter is intended to deal with the physical resource in the environment which may be of either human or natural origin. The objective of the assessment is to ensure that these assets are used in a sustainable manner, so that they are available for future generations, after the delivery of the proposed development. This chapter comprises an assessment of the likely impact of the proposed development on existing surface water, water supply, foul drainage, and utility services in the vicinity of the site as well as identifying proposed mitigation measure to minimise any impacts.

The material assets considered in this chapter of the EIAR include Surface Water Drainage, Foul Drainage, Water Supply, Power, Gas, Telecommunications and Waste. This Chapter should be read in conjunction with all relevant chapters of the EIAR.

13.1.1 Author Information and Competency

This Chapter has been prepared by Paul McGrail, Managing Director of Paul McGrail Consulting Engineers, graduated from Bolton Street DIT in 1999. He worked for various Consulting Engineers on a variety of projects from Residential, Commercial, Food Industry and Conservation projects prior to setting up practice in 2009. Paul is a Chartered Engineer with Engineers Ireland and has completed two post grad courses in Project Management and Conservation in Trinity.

13.1.2 Characteristics of the Proposed Development

The proposed development subject of this application relates to Phase 3 of a residential development at Bennetstown, Dunboyne, Co Meath. The proposed development comprises the construction of the following:

The proposed Large Scale Residential Development will consist of the construction of 356 no. residential units, a creche, and all associated site development works including drainage, landscaping, and boundary treatments.

13.1.3 Methodology

The methodology used to prepare this section of the EIAR is in accordance with the EPA “Guidelines on the information to be contained in Environmental Impact Assessment Report May 2022” and EPA “Draft Advice notes for preparing environmental Impact Statements September 2015”.

These draft guidelines include information on the assessment of the effects of development on material assets and advises on the nature of the material assets which should be examined as part of the preparation of an EIAR.

The following sources have been used to collate information on built services within the general area of the site.

- Public Foul Drainage and Water Network system operated by Uisce Eireann
- Review of Uisce Eireann utility plans (foul drainage and water supply).
- Review of Meath County Council Surface Water Drainage plans
- Submission of a Pre-Connection Enquiry Application to Irish Water.
- Review of ESB Networks Utility Plans.
- Review of Gas Networks Ireland Service Plans.
- Review of Eircom E-Maps.
- Review of Virgin Media Maps.

The information above has been supplemented by site inspections and surveys.

The information above has been supplemented by site inspections and surveys carried out as part of the construction of phase 1 and phase 2.

The foul and watermain design for the proposed development has been reviewed by Uisce Eireann and a “Statement of Design Acceptance” has been issued by Irish water. The surface water design has been reviewed by Meath County Council and any comments made have been incorporated in the current design. The following documents have been used in the design if the foul, watermain and surface water.

- Code of Practice for Wastewater Infrastructure (IW CDS 5030-03, 2025)
- Code of Practice for Water Infrastructure (IW CDS 5020-03, 2025)
- Sewers for adoption 8th Edition (August, 2018)
- CIRIA C753 The SUDS Manual (December, 2015)
- Greater Dublin Strategic Drainage Study (2005)

13.1.4 Difficulties Encountered

The exact location of the existing infrastructure is reliant upon the records obtained from the relevant service providers. Overall, no difficulties were encountered in preparing this chapter of the EIAR.

13.2 Description of the existing environment

The site is bounded to the east by R157 road, to the northeast by M3 Parkway and greenfield land in all other directions.

13.2.1 Access

Vehicular access and egress to and from the application site will be provided via a proposed road on the north of the site and from the existing road R157.

13.2.2 Surface Water Drainage

There is no existing surface water network within the existing site. It is evident that existing rainwater drainage from the site is by means of direct infiltration and percolation into the existing agricultural ground.

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The local groundwater flow direction is likely to mirror the site topography and catchment drainage.

The greenfield run off from the site travels in a northeast direction.

It is proposed to discharge surface water from the site to the existing surface water field drain which then discharges to the Tolka River.

The entire development will be constructed as one phase. The current site will be one catchment area and will be attenuated to reflect the greenfield run off rate.

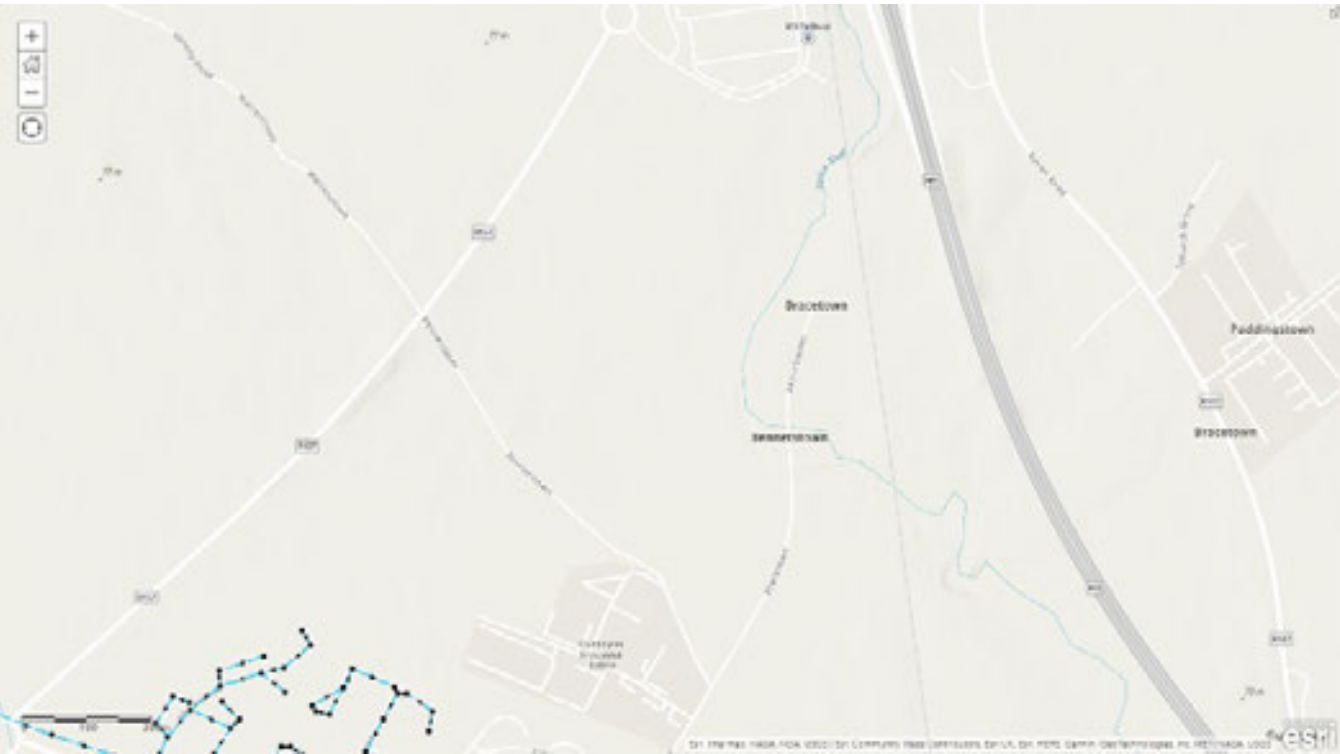


Figure 13.1 Existing Records of Storm Water Drainage South of proposed site

13.2.3 Foul Water Design

There are no records or evidence of any foul water infrastructure within the proposed site. Figure 13.2 below shows the existing foul network around of the proposed development.

The proposed foul sewer network will connect to the under construction foul sewer pumping station located at the phase 1 which will discharge to the existing Uisce Eireann foul sewer network.

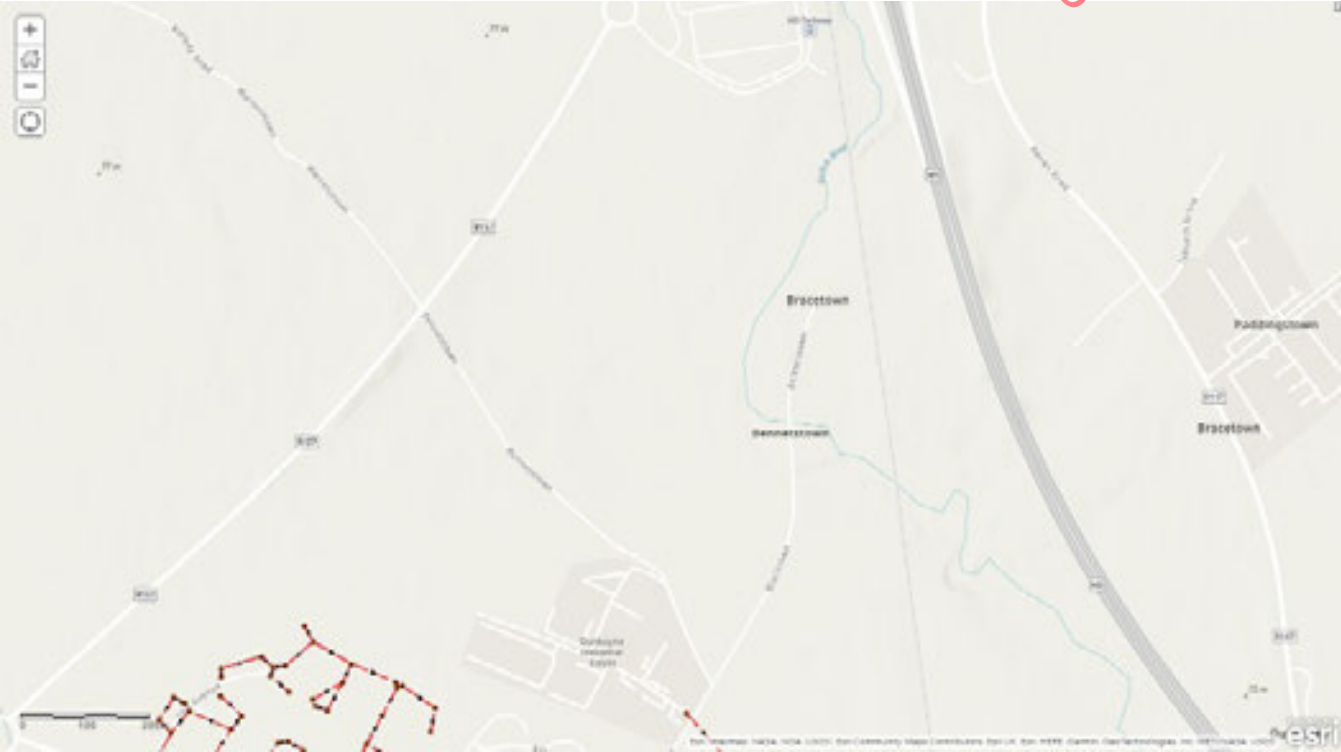


Figure 13.2 Existing records of Foul Water Services East of proposed site

13.2.4 Watermain Design

There is no existing watermain pipeline located within the proposed site.

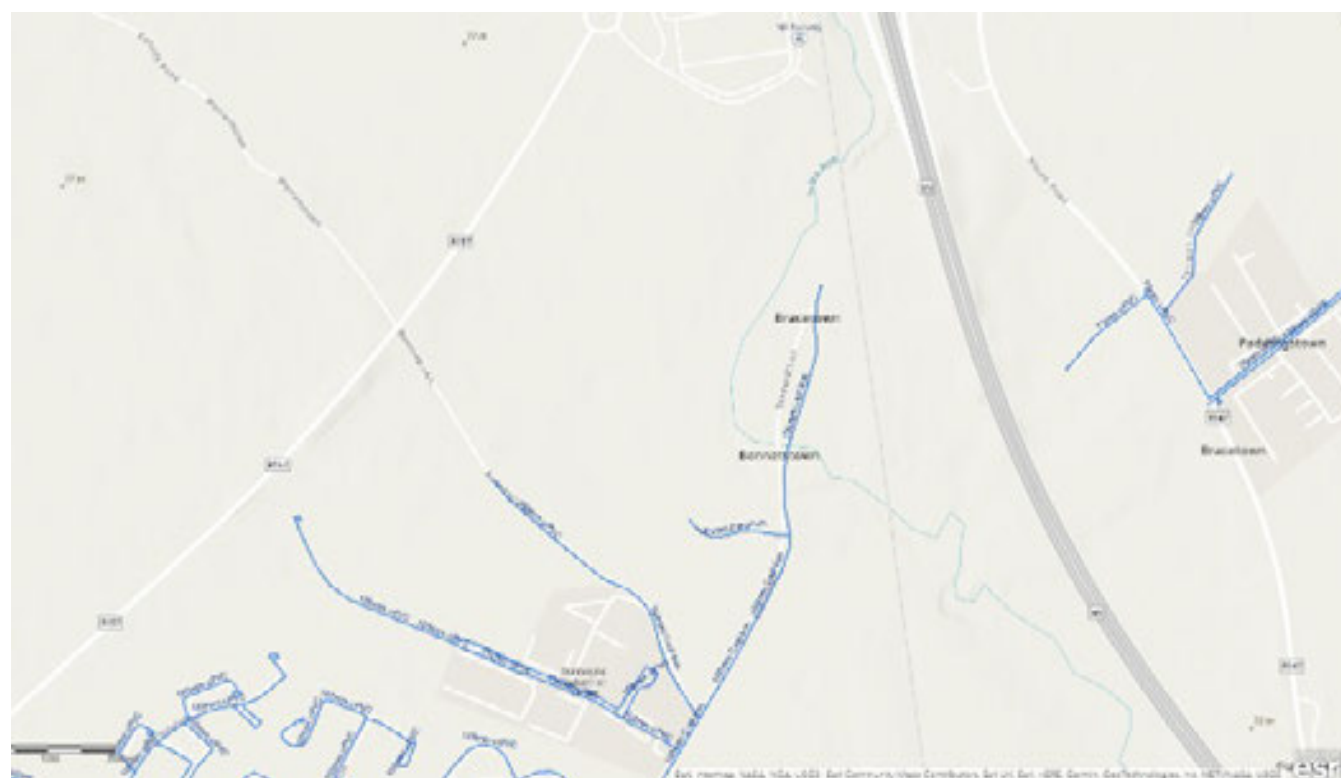


Figure 13.3 Existing records of Watermain Services East of proposed site

13.2.5 Natural Gas

There is no existing gas pipeline located in the adjoining lands as shown

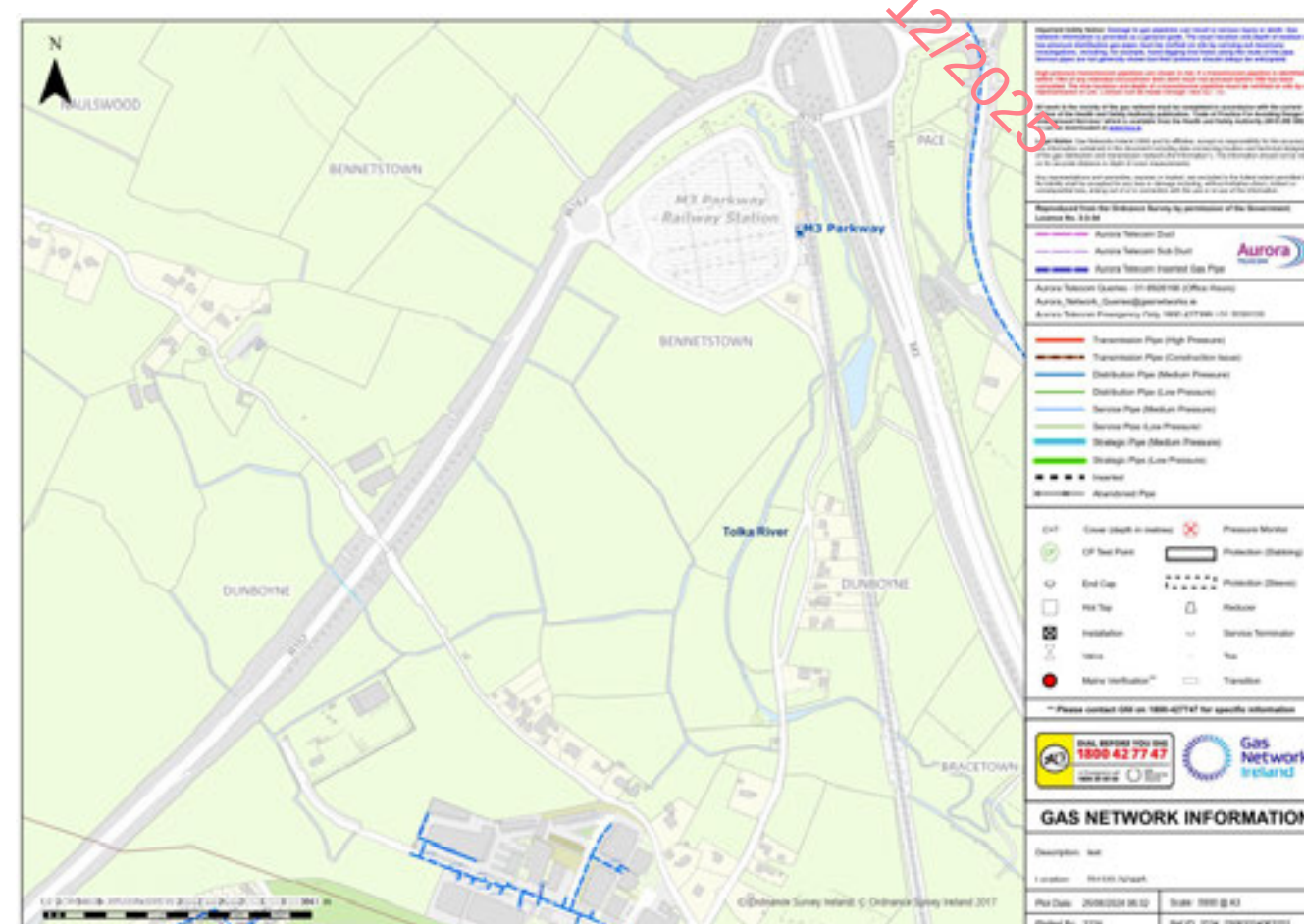


Figure 13.4 Existing Gas Main Network

No connections to the natural gas network will be required.

13.2.6 Electricity Supply

Four substations will be provided to serve this development. The proposed substation will provide power to a number of mini pillars which will provide power to the residential dwellings.

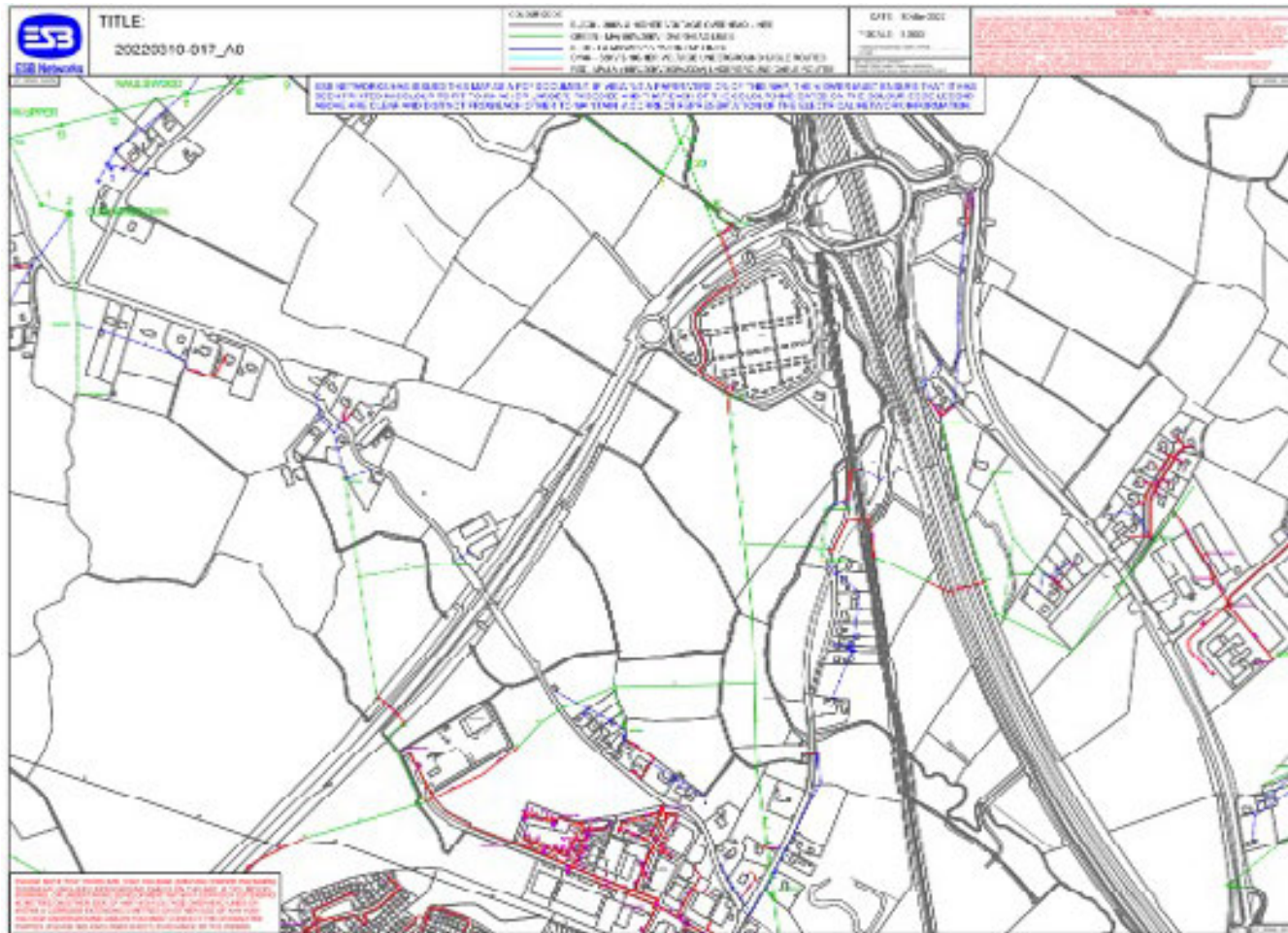


Figure 13.5 Existing records of ESB East of the proposed site

13.2.7 Communications

See below for the nearest communication network which is provided by EIR along the Southern Boundary.



Figure 13.6 Existing records of Virgin Network South of proposed site

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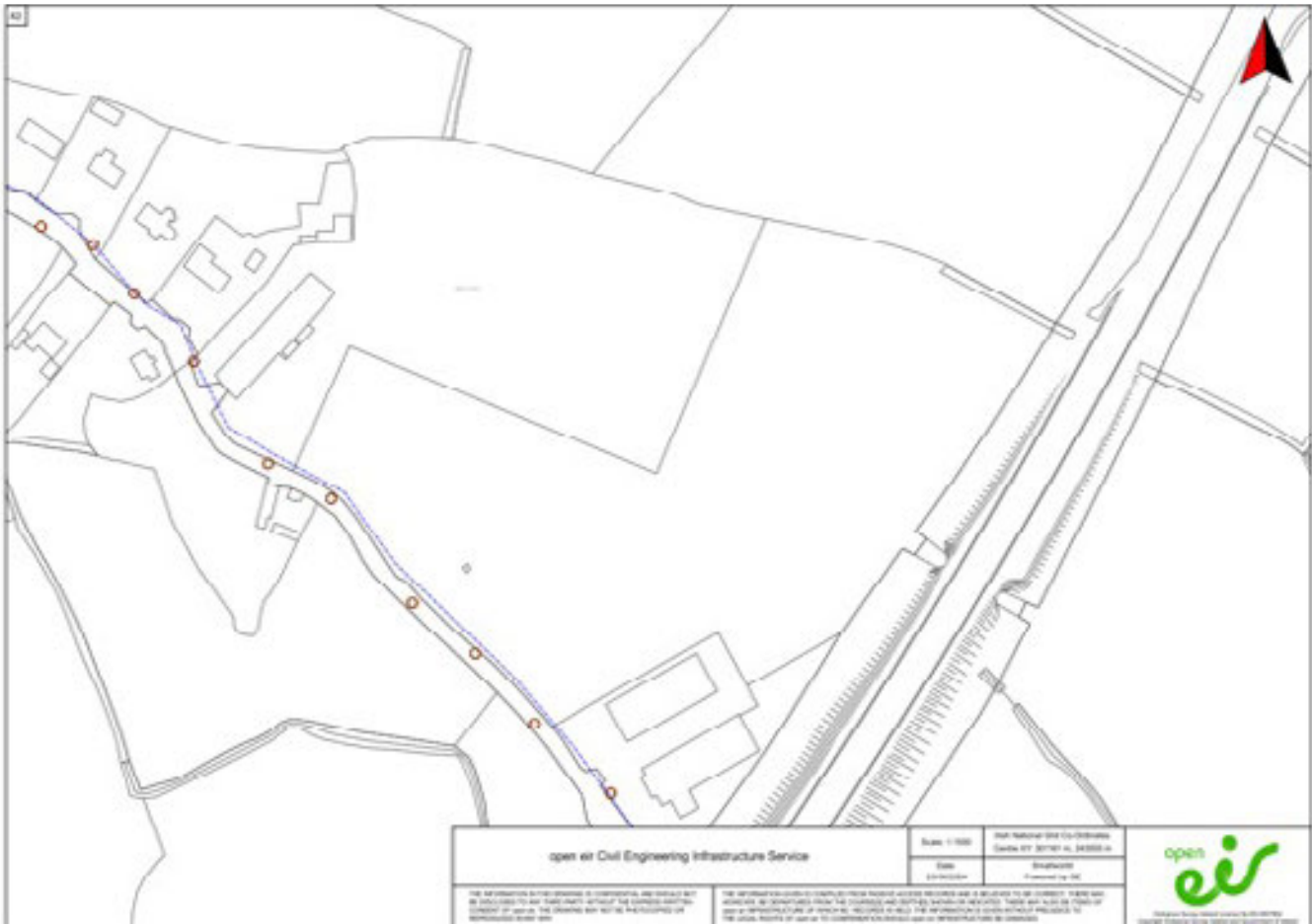


Figure 13.7 Existing records of Eir Network South of proposed site

13.2.8 Waste

The site is a greenfield with no waste facilities. There are a number of waste collectors operating in the area collecting the waste from the dwellings further south of the development and it is anticipated that during the operational phase a similar plan will be in place.

13.3 Characteristics of the Proposed Development.

The proposed development subject of this application relates to Phase 3 of a residential development at Bennetstown, Dunboyne, Co Meath. The proposed development comprises the construction of the following:

The proposed Large Scale Residential Development will consist of the construction of 356 no. residential units, a creche, and all associated site development works including drainage, landscaping, and boundary treatments.

13.3.1 Surface Water Network

The surface water design has been designed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Sewers (GDSDS) for adoption 8th edition. Following consultation with Meath County Council, a detention basin will be provided for surface water storage volume. The allowable flow rate has been set at the greenfield run off rate. Surface water run-off from the surface water catchment will be attenuated using a Hydrobrake on the surface water outlet from the catchment area.

It is proposed to use a sustainable urban drainage system (SuDS) approach to stormwater management throughout the site. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in stormwater. The proposed SUDs that feature in the development are modular permeable paving, swales, bioretention, detention basins, and Hydrobrake flow control.

The proposed connection point to the existing field drain is centrally located in the development and runs in an easterly direction. See figure 13-8 below. The connection point is within the ownership of the client.

Calculations have been provided in Engineering Services Report to show that the proposed pipes have the capacity to take the development. Figure 13-8 below shows the proposed surface water network.

Surface water runoff from the development will be attenuated to greenfield runoff (Qbar), in accordance with the recommendations of the GDSDS. Surface water run-off from the surface water catchment will be attenuated using a Hydrobrake on the surface water outlet.

Qbar is calculated using the Institute of Hydrology equation, as recommended in the Greater Dublin Strategic Drainage Study (GDSDS), as follows:

- $Qbar \text{ (rural)} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times Soil^{2.17}$
- AREA is the area of the catchment in km2. For a catchment area less than 50ha, calculate Qbar for 50 ha and pro rata it;
- SAAR = 825mm;
- SOIL TYPE 3 = soil index 0.37.

The attenuation design has been based on the 1:100 year Return Period plus 20% Climate Change required storage volume. This has been achieved with the detention basin above ground.

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Figure 13.8 Discharge Point

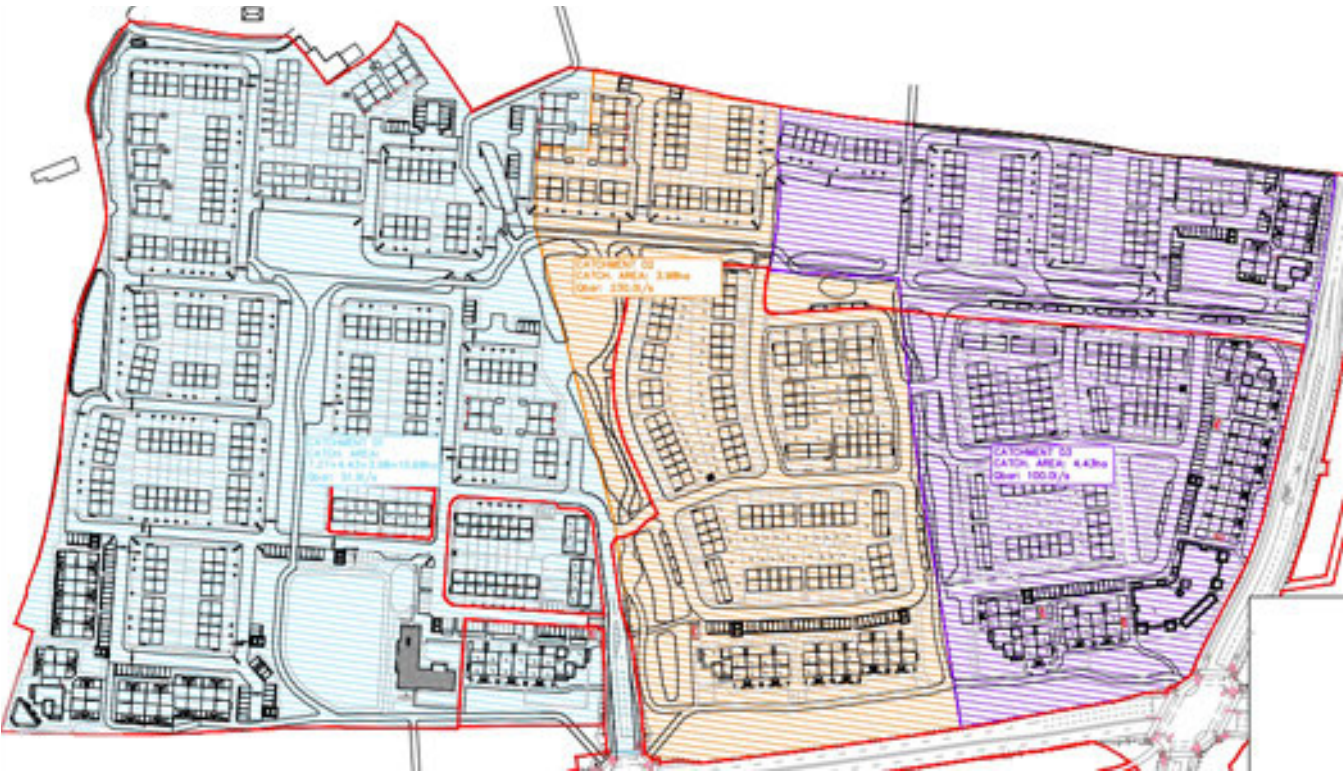


Figure 13.9 Catchment Area

Table 13.1 Green field Run-off

Element	Catchment SW1	Catchment SW2	Catchment SW3
Area [ha]	7.27+3.98+4.43 =15.68	3.98	4.43
Green Field Run-off (Q _{rural}) [l/s]	51.9	230.0	100.0

Percentage of Impervious Area Factor (PIMP)		
Roof	-	100%
Roads	-	100%
Permeable Paving	-	50%
Green Roof	-	100%

Table 13.2 Attenuation for Catchment Areas

	Element	Contributing Area to Attenuation (Ha)	Allowable Outflow Q _{bar} (l/s)	Basin Level Attenuation (m OD)	Top Water Level (mOD)	Required Volume +20%CC (m³)
ATTENUATION SW1	Detention Basin 100-year	7.27+3.98+4.43 = 15.68	51.9	71.176	71.476	758.0
	Underground Stormtech 30yr+20%CC			69.000	-71.010	2112.67
ATTENUATION SW2	Detention Basin 100-year	3.98	230.0	73.207	73.507	173.56
ATTENUATION SW3	Detention Basin 100-year	4.43	100.0	74.907	75.207	235.05

For design information please consult section 2 of the Planning Engineer Report and issued drawings attached to this application:

- 2024-114-030311 Surface Water & Foul Sewer Layout - Sheet 01
- 2024-114-030312 Surface Water & Foul Sewer Layout - Sheet 02
- 2024-114-030321 Surface Water Longitudinal Sections - Sheet 01
- 2024-114-030322 Surface Water Longitudinal Sections - Sheet 02
- 2024-114-030371 Catchment Area

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- 2024-114-030361 Suds Layout & Details - Sheet 01
- 2024-114-030362 Suds Layout & Details - Sheet 02
- 2024-114-030807 Surface Water Standard Details

13.3.2 Foul Network

The internal foul network has been designed in accordance with Uisce Eireann Code of Practice for Wastewater Infrastructure (2025). The proposed foul sewer network will connect to the under construction foul sewer pumping station located within the proposed phase 1. The discharge for the site is to an existing 450mm foul sewer located along the Navan Road. For network design consult engineering drawing nos. 2024-114-030311 - 2024-114-030312 - 2024-114-030313 - 2024-114-030314. For pumping station design and connection point consult engineering drawings nos. 2024-114-030381, 2024-114-030382 and 2024-114-030383.

The foul water drainage system for the proposed development has been designed in accordance with the Uisce Eireann Code of Practice and will be separate to the surface water drainage system. The foul water from the development will discharge via soil vent pipes within the buildings by gravity flow before connecting into the proposed foul sewer pumping station. The foul sewerage for each house will have a separate connection to the proposed 225mm and 150mm diameter foul sewer along the road.

Design Criteria

- Demand 446 l/dwelling/day
- Pipe Friction (Ks) 1.5 mm
- Minimum Velocity 0.75 m/s (self-cleansing velocity)
- Maximum Velocity 3.0 m/s (1:22 maximum pipe gradient)
- Frequency Factor 0.5 for domestic use

Residential Dwellings

Wastewater Discharge Calculation	
Dry Weather Flow	446 l/dwelling/day
No. of Dwellings	356
Post Development Average Discharge	1.84 l/sec
Post Development Peak Discharge (6x)	11.04 l/sec
Daily Foul Discharge Volume (446l per dwelling)	158776 l

Non-Residential i.e. Creche

Wastewater Discharge Calculation	
Assumed Occupancy	136 Children + 20 Staff
Flow rate (Based on IW Code of Practice for Wastewater Infrastructure – Appendix C, Flow Rates for Design)	50 l/person/day
Post Development Average Discharge (Based on 8-hour occupancy)	0.090 l/sec
Post Development Peak Discharge (4.5x)	0.406 l/sec
Daily Foul Discharge Volume	7800 l

A 150mm diameter sewer at a min gradient of 1:60 has been designed to cater up to 9 dwellings, and a 150mm diameter sewer at a min gradient 1:150 slope to cater 10 to 20 dwellings with no chance of any more house connecting. Pipes that cater more than 20 dwellings has been designed as 225mm diameter sewer at a min gradient of approximately 1:200.

150mm diameter sewer at a min gradient of approximately 1:60

Hydraulic performance with ks = 1.5

Discharge capacity = 20.0 l/s (>11 l/s)

150mm diameter sewer at a min gradient of approximately 1:150

Hydraulic performance with ks = 1.5

Discharge capacity = 12.6 l/s (>11 l/s)

225mm diameter sewer at a min gradient of approximately 1:200

Hydraulic performance with ks = 1.5

Discharge capacity = 32.1 l/s (>11 l/s)

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For design information please consult the issued drawings attached to this application:

- 2024-114-030311 Surface Water & Foul Sewer Layout - Sheet 01
- 2024-114-030312 Surface Water & Foul Sewer Layout - Sheet 02
- 2024-114-030313 Surface Water & Foul Sewer Layout - Sheet 03
- 2024-114-030314 Surface Water & Foul Sewer Layout - Sheet 04
- 2024-114-030331 Foul Sewer Longitudinal Sections - Sheet 01
- 2024-114-030332 Foul Sewer Longitudinal Sections - Sheet 02
- 2024-114-030805 Foul Sewer Standard Details – Sheet 01
- 2024-114-030806 Foul Sewer Standard Details – Sheet 02

13.3.3 Watermain Network

Following consultation with Uisce Eireann the watermain network has been designed in accordance with IW Code of Practice for Water Infrastructure. As part of the design for phase 1, as per granted permission under planning Ref. ABP-3200449-24, Irish Water are finalising a design for a new 300mm watermain which will be taken from the 350mm main along the R147. A 225mm diameter HDPE watermain is proposed to supply water to the proposed development.

The proposed network has been designed to comply with Uisce Eireann specification. Individual houses will have their own connections to the distribution main via service connections and boundary boxes. Individual service boundary boxes will be of the type to suit Uisce Eireann and to facilitate possible future domestic meter installation.

The water main layout and details are in accordance with Uisce Eireann Connection and Developer Services, ‘Code of Practice for Water Infrastructure’ and ‘Water Infrastructure Standard Details’.

Water Demand has been calculated in accordance with guidelines outlined in Irish Water’s Pre-connection Enquiry Application Form:

Residential Dwellings

No. of Housing Units	356
Average Occupancy Ratio (Persons Per Dwelling)	2.7
Per-Capita Consumption (l/person/day)	150
Average Domestic Daily Demand (l/sec)	1.67
Post Development Average Hour Water Demand (l/sec)	2.09
(1.25 x Average Domestic Daily Demand)	
Post Development Peak Hour Water Demand (l/sec)	10.43
(5.0 x Post Development Average Hour Water Demand)	

Non-Residential i.e. Creche

Assumed occupancy	136 Children & 20 Staff
Per-Capita Consumption (l/person/day)	50
Average Domestic Daily Demand (l/sec)	0.090 l/s
Post Development Average Hour Water Demand (l/sec)	0.113 l/s
(1.25 x Average Domestic Daily Demand)	
Post Development Peak Hour Water Demand (l/sec)	0.564 l/s
5.0 x Post Development Average Hour Water Demand)	

Refer to watermain drawings number 2024-114-030301 and 2024-114-030302.

A pre connection enquiry was lodged with Uisce Eireann and the Confirmation of Feasibility has been granted.

13.3.4 Road Network

Considering the topography, the site has been carefully designed to ensure that the road network fully complies with DMURS 2019 and Part M of the building regulations. Refer to DMURS compliance statement for details.

Vehicular and pedestrian access to the proposed development will be via the proposed new junction at R157 and the new Road to the north of the development.

13.3.5 Electrical Supply

There is a substation which is been constructed as the previous phase and the power for the proposed development will be fed from this existing ESB substation. Four proposed substations will provide power to a number of mini pillars which will provide power to the residential dwellings.

13.4 Potential Impact of the Proposed Development

This section provides a description of the specific, direct and indirect impacts that the proposed development may have during both the construction and operational phase of the proposed project.

13.4.1 Construction Stage

The construction phase of the proposed development is likely to result in short term impacts on the existing urban settlement in the vicinity of the site. The development will be constructed in two phases with an anticipated completion by 2028.

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13.4.1.1 Ownership and Access

The subject lands are not developed at present. There will be some temporary disturbance during construction to the surrounding area, however, this will be minimized as best as possible through appropriate mitigation measures as set out in the Construction Environmental Management Potential. Impacts on the local road network are assessed in Chapter 12 and mitigation measures are proposed.

Once a contractor has been appointed a detailed and final CEMP including traffic management details will be prepared and agreed prior to the commencement of the development. The surrounding road network is suitable to accommodate the construction traffic associated with the proposed development and the Construction Traffic Management Plan will include a range of mitigating measures as identified in the CEMP to ensure the safety of the workforce on the site and accessing the site, and the public on the surrounding roads and to minimise construction traffic generation and disruption on the surrounding road network.

The construction phase of the proposed development is likely to result in slight negative and short-term impact on the existing urban settlement in the vicinity of the site. The development will be constructed in two phases, with the completion date of 2028.

The operational stage will result in the provision of an additional 356 no. residential units and a creche along with open space and recreational areas.

13.4.1.2 Surface Water Drainage

In terms of the construction phase, the proposal will involve providing new connection to the existing surface water drainage ditch. The proposed service will consist of a connection to an existing ditch and will be performed in one working day. Any impacts will be neutral, imperceptible and brief. Potential impacts on the surface water infrastructure that may arise during the construction phase include:

Contamination of surface water runoff due to construction activities.

Without the consideration of mitigation measures the construction phase of the proposed development will likely have a neutral, short-term, moderate impact.

13.4.1.3 Foul Water Drainage

The proposal for the construction stage is to apply to Uisce Eireann for a temporary connection and to connect to the existing foul infrastructural network. There will be minimal impact on the existing service to the development under construction during the construction stage on the foul network.

The proposal will involve providing new connection to the proposed foul water network granted for phase 2. The proposed service will consist of a connection to a proposed manhole and will be performed in one working day. Any impacts will be neutral, imperceptible and brief.

To mitigate the above best practice construction practices should be adhered to and Uisce Eireann procedures followed. The impact on foul drainage during the construction stage will be brief, neutral and imperceptible and no long-term impacts will result from the construction stage.

Without the consideration of mitigation measures the construction phase of the proposed development will likely have a neutral, short-term, moderate impact.

13.4.1.4 Watermain

During the construction of the water main network, there will be minimal disruption to the quality of the local water supply to facilitate connections to the network. All such temporary shutdowns will be agreed with Uisce Eireann in accordance with the appropriate procedures and people that will be affected will be advised in advance of the short-term impacts that they may experience.

There is a risk of contamination to the existing water supply during the construction phase when the development is being connected to the water supply. All water mains will be cleaned and tested in accordance with Uisce Eireann guidelines and standards prior to connection to the public water main.

To mitigate the above best practice construction practices should be adhered to and Uisce Eireann procedures followed.

There will be a minor water demand for the site works, compound and offices during the construction stage.

Any potential impacts to water supply will be brief, neutral and imperceptible.

Without the consideration of mitigation measures the construction phase of the proposed development will likely have a neutral, short-term, moderate impact.

13.4.1.5 Natural Gas

No works will be undertaken to the existing Gas network.

13.4.1.6 Electricity Supply

Construction related activities will require temporary connection to the local electricity supply network. The potential impact from the construction phase of the proposed development on the local electrical supply network is likely to be brief and imperceptible.

Without the consideration of mitigation measures the construction phase of the proposed development will likely have a neutral, short-term, moderate impact.

13.4.1.7 Communications

Fixed telecoms will be provided from the existing network running along the central local road.

The potential impact from the construction phase of the proposed development on the local telecoms network is likely to be brief, neutral and imperceptible and negligible.

Without the consideration of mitigation measures the construction phase of the proposed development will likely have a neutral, short-term, moderate impact.

13.4.1.8 Waste Management

The construction phase of the proposed development will give rise to the requirement to remove or to bring to the site quantities of material, including excavated material not suitable for reuse. Construction related material will also be created on the proposed development site. This has the potential to impact on the local municipal waste disposal network, but this will be short term and moderate. Refer to the Construction and Demolition Waste Management Plan for further details.

13.4.2 Operational Phase Impacts

The proposal will result in the provision of an additional 356 no. residential units and a creche along with open space and recreational areas.

13.4.2.1 Ownership and Access

The proposed development includes for two vehicular accesses to the proposed development from the proposed local road on north boundary and the existing road R157 on east boundary. A Traffic and Transport Assessment has been prepared by Atkins and is submitted with this planning application as a standalone report. The potential impacts are also identified in Chapter 12 Traffic and Transport. The Traffic and Transport Assessment assesses the anticipated levels of traffic generated by the proposed development and models the impacts of the proposed development on surrounding road infrastructure.

13.4.2.2 Surface Water Drainage

The proposed connection point of the Surface water will be to the existing field drain running centrally through the site.

Without the consideration of mitigation measures the operational phase of the proposed development will likely have a neutral, permanent, slight impact.

13.4.2.3 Foul Water Design

During the operational phase there will be an increase in the foul discharge from the proposed development. This was discussed with Uisce Eireann a confirmation of feasibility was issued.

Without the consideration of mitigation measures the operational phase of the proposed development will likely have a neutral, permanent, slight impact.

13.4.2.4 Watermain

The potential impact from the operational phase on the water infrastructure is an increase in the quantity of water to be treated and supplied through the network. Uisce Eireann have confirmed that they will provide a new 300mm watermain along the R157 to supply the development.

Without the consideration of mitigation measures the operational phase of the proposed development will likely have a neutral, permanent, slight impact.

13.4.2.5 Natural Gas

All houses will utilise Air to Water Heat pumps which will negate the need for gas. No impacts on supply are anticipated.

13.4.2.6 Electricity Supply

The impact of the operational phase of the proposed development on the electricity supply network is likely to increase the demand on the existing supply. The existing network has the capacity to cater for the proposed development. Therefore, it will likely have a neutral, permanent, imperceptible impact.

13.4.2.7 Communications

The installation of the telecoms (Virgin and Eir) will be in accordance with the requirements of the utility provider and will be carried out by approved contractors. There will be no impact in the operational phase of the telecoms network. The existing network has the capacity to cater for the proposed development. Therefore, it will likely have a neutral, permanent, imperceptible impact.

13.4.2.8 Waste

There will be an increased demand on the municipal waste disposal system operated by Meath County Council. All the waste generated will be subject to the Meath County Council Bye Laws for the Segregation, Storage and Presentation of Household Waste. The impact is likely to be negligible.

13.4.3 Risk of major accidents and/or disasters

The proposed development has been designed and will be constructed in line with best practice and, as such, major accidents and / or natural disasters will be low. The identification, control, and management of risk is an integral part of the design and assessment process throughout all stages of a project lifecycle. Measures to control risks associated with Construction Phase activities are incorporated into the Construction Environmental Management Plan.

Excavation works coming into contact with live electricity lines could potentially give rise to a serious incident putting people at risk. This risk is not significant as all ESB services will be constructed below ground and main lines will be diverted prior to commencement of the works.

There will be no risk of gas explosion within the site since there is no gas network inside site boundary.

A flood risk assessment has been carried out to confirm that the site is not at risk from flooding. The control of storm water runoff to green field rates will help reduce the risk of flooding in the Tolka Catchment and its discharge to this catchment will reduce the potential flood risk.

The risk of flooding due to attenuation failure is low due to design considerations of catchment areas and flow controls. The proposed infrastructure is designed in accordance with the relevant regulations, codes of practice and guidelines to provide sufficient flow capacity.

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In case of obstruction of outflow in the overground storage structures a drawing was produced to show an overland flow route which ensures no dwelling is at risk from flooding. (refer to drawing number 2024-114-030400).

The risk of soil pollution and ground water contamination caused by spillage or leaks is deemed low as the Foul network will be constructed to the required Uisce Eireann Standards and monitored during the works.

The collapse of soil from an exposed excavation is considered low due to design measures once stockpile heights and their locations are managed and any steep excavations are properly supported either with temporary works or by permanent retaining wall structures. All temporary works should they be required will be designed in accordance relevant codes of practice.

13.4.4 Potential Cumulative Impacts

The cumulative effects of the development on material assets have been assessed taking into account other planned, existing and permitted developments in the surrounding area.

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 environment.

The cumulative effects of the development on the foul, surface water, watermain and waste management systems are anticipated to be short term, neutral, and imperceptible. No significant impacts are anticipated.

13.5 Mitigation Measures

All possible measures will be taken to avoid unplanned disruptions to any services within the site during construction of the proposed development. It should be noted that a number of mitigation measures are proposed in other chapters of this EIAR.

It should be noted that a number of mitigation measures are proposed in other chapters of this EIAR. Mitigation measures proposed in respect to Material Assets are as follows:

13.5.1 Construction Stage

The following mitigation measures are proposed for the construction phase of the development with respect to Material Assets:

- The proposed development will comply with the provisions of the Construction Waste Management Plan with respect to construction waste.
- The proposed development will comply with the provisions of the Construction Environmental Management Plan.
- Water metering will be provided during the construction phase to record consumption.
- All new services will be constructed and provided in strict accordance with the relevant codes of practice.

13.5.2 Operation Stage

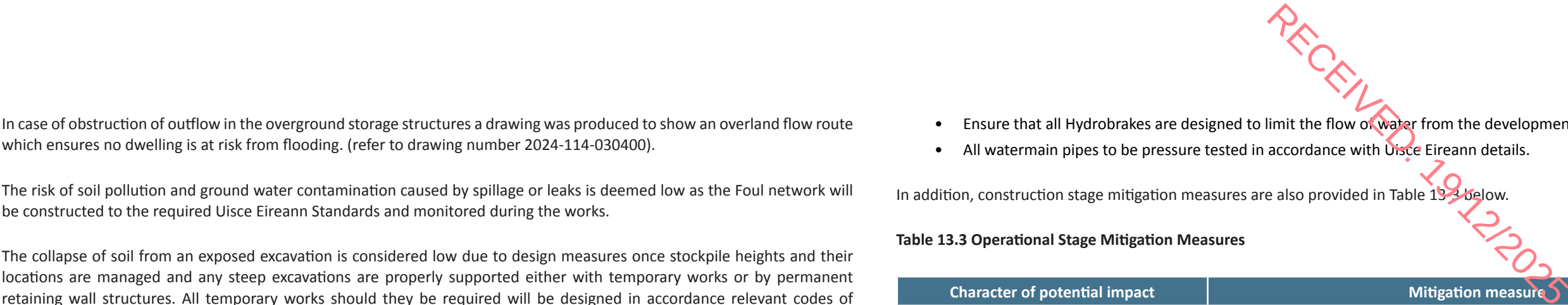
- All new foul and surface water drainage pipes to be pressure tested and CCTV to identify any possible defects.
- Water conservation measures to be implemented, which include water metering, recycling vehicle wash waters, rainwater capture, low flush, waterless urinals, spray taps, efficiency attachments.

- Ensure that all Hydrobrakes are designed to limit the flow of water from the development to the greenfield run off.
- All watermain pipes to be pressure tested in accordance with Uisce Eireann details.

In addition, construction stage mitigation measures are also provided in Table 13.3 below.

Table 13.3 Operational Stage Mitigation Measures

Character of potential impact	Mitigation measure
Construction Phase	
Damage to existing utilities	Contractor will prepare Method Statement detailing the proposals for works in the vicinity of existing utilities (method statement to be agreed with Project Supervisor Design Process (PSDP))
Contamination of surface water runoff due to construction activities	Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
Improper discharge of foul drainage from contractor's compound	Foul drainage discharge from the construction compound will be transported off site to a licensed facility until a connection to the public foul drainage network has been established.
Cross contamination of potable water supply to construction compound	The construction compound's potable water supply shall be located where it is protected from contamination by any construction activities or materials.
Damage to existing underground and overground infrastructure and possible contamination of the existing systems with construction related materials.	A site-specific Construction & Environmental Management Plan will be developed and implemented during the construction phase. Please refer to Construction & Environmental Management Plan by Paul Mc Grail Consulting Engineers.
Potential loss of connection to the telecommunications infrastructure while carrying out works to provide service connections	Connections to the existing telecommunications networks will be coordinated with the relevant utility provider and carried out by approved contractors.
Operational Phase	
Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff	Please refer to Chapter 6.0 – Water Hydrogeology and Hydrology for mitigation measures associated with the surface water treatment.
Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas).	Please refer to Chapter 6.0 – Water Hydrogeology and Hydrology for mitigation measures associated with the surface water treatment.
Increased discharge to foul drainage network	Water conservation measures such as dual flush water cisterns and low flow taps will be included in the design.
Increased potable water consumption	Water conservation measures such as dual flush water cisterns and low flow taps will be included in the design.
Contamination of surface water runoff from foul sewer leaks.	All new foul drainage lines will be pressure tested and will be subject to a CCTV survey in order to identify any possible defects prior to being made operational.



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13.6 Residual Impacts

13.6.1 Construction Phase

The construction stage of the proposed development will comprise of site clearance and preparation, excavation and the construction of the proposed development over two phases of development. The potential impacts associated with the construction stage of the proposed development on material assets are likely to be temporary and will cause minor disturbance. Provided mitigation measures are adhered to the construction phase of the proposed development will likely have a neutral, short-term, moderate impact.

13.6.2 Operational Phase

The proposed development will have a positive impact on the surrounding environment by providing much needed housing in the area and meeting the needs of the growing population.

The loading on the wastewater and watermains from the proposed development will be adequately accommodated in the foul and watermain network.

In compliance with the SUDS manual the runoff from the development will mimic the existing greenfield run off therefore, it will likely have a neutral, permanent, imperceptible impact.

13.7 Monitoring

The only monitoring proposed is of water usage. Once operational water usage will be monitored by a bulk water meter and compared to anticipated usage. This will allow Uisce Eireann to monitor any potential leaks.

13.8 Significant Interactions

13.8.1 Soils and Geology

13.8.1.1 Construction phase

Trench excavations to facilitate site service installation will result in exposure of subsoils and bedrock to potential erosion and subsequent sediment generation. Exposed soil during the construction phase of the proposed development may give rise to increased dust emissions. However, the implementation of the dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.

Quality of Effect: Negative.

Significance of Effect: Slight.

13.8.1.2 Operational Phase

Interactions between soils/geology will be limited to the construction phase due to material excavation.

Implementation of the mitigation measures described in Chapter 5 – Soil and Geology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Neutral.

Significance of Effect: Imperceptible.

13.8.2 Water Quality

13.8.2.1 Construction Phase

A deterioration in water quality in nearby watercourses could occur during the construction phase of the proposed development due to rainwater run-off containing sediments, concrete and hydrocarbon spillages.

Implementation of the mitigation measures described in Chapter 6 – Water: Hydrology and Hydrogeology will prevent and minimize the potential impacts of this interaction.

13.8.2.2 Quality of Effect: Neutral.

Significance of Effect: Not significant.

Operational Phase

As all wastewater from the site is to be discharged to the existing 450mm Uisce Eireann Pipe and it is not anticipated that there will be any impacts on water quality during the operational phase of the development.

Implementation of the mitigation measures described in Chapter 6 – Water Hydrogeology and Hydrology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Neutral.

Significance of Effect: Not significant.

13.8.3 Human Health

13.8.3.1 Construction Phase

Mismanagement or failure of the potable water supply drainage could lead to contamination during the construction phase. Working in trenches and in close proximity with live services could pose a risk to human health if mitigation measures are not put in place. The exposure of bedrock could, cause the risk of Radon exposure to human health during the construction phase. The use of Radon barriers in construction will mitigate this risk.

Quality of Effect: Negative.

Significance of Effect: Slight.

13.8.3.2 Operational Phase

The completed development will generate additional emissions to the atmosphere due to traffic associated with the development, and due to plant equipment within the development. However, air quality in the region of the site is expected to be within the limits set by the air quality standard.

Implementation of the mitigation measures described in this chapter and in Chapter 6 – Water Hydrogeology and Hydrology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Negative.

Significance of Effect: Slight.

13.9 References and Sources

CIRIA (October 2023) Environmental good practice on site guide (fifth edition)

EPA (May 2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports

EPA (September 2003) Advice notes on current practice in the preparation of Environmental Impact Statements

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CHAPTER FOURTEEN

BIODIVERSITY



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CHAPTER FOURTEEN

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CHAPTER 14 | Biodiversity

14.1 Introduction

DNV was commissioned by Marina Quarter Ltd., to prepare the Biodiversity Chapter of an Environmental Impact Assessment Report (EIAR) for a Proposed Large-scale Residential Development (LRD) (hereafter referred to as the 'Proposed Development') at lands at Bennetstown Phase 3, Dunboyne, Co. Meath (hereafter referred to as the 'Site').

This chapter of the EIAR (the 'Chapter') details the Ecological Impact Assessment (EclA) of the Proposed Development, which assesses the potential significant effects of the same on habitats and species; particularly those protected by national and international legislation or considered to be of particular nature conservation importance on or adjacent to the Site. This Chapter will describe the ecology of the Site, with emphasis on habitats, flora and fauna, and will assesses the potential effects of the Construction and Operational Phases of the Proposed Development on these ecological receptors. The chapter follows the *Guidelines for Ecological Impact Assessment in the UK and Ireland*, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2024) and supplemented by the National Roads Authority (2009) *Guidelines for Assessment of Ecological Impacts of National Road Schemes*. The purpose of this EclA is to:

- Set out the methodologies used to inform the assessment.
- Identify Key Ecological Receptors (KERs) within the Zone of Influence (ZOI).
- Assess the impacts from the Proposed Development on the KERs and the resulting significant effects.
- Set out measures to avoid or mitigate negative impacts.
- Assess the residual effects after the incorporation of agreed avoidance or mitigation measures to ensure legal compliance.
- Set out agreed measures to offset significant residual effects.
- Set out opportunities for ecological enhancement.

This Chapter should be read in conjunction with the Appropriate Assessment (AA) Screening (DNV, 2025a) and Natura Impact Statement (NIS) (DNV, 2025b) that accompany this planning application under separate cover.

14.2 Expertise & Qualifications

This EIAR Chapter has been prepared by Liam Gaffney (LG) DNV Senior Ecologist. With 6 years of experience working in ecological consultancy, LG has a B.Sc. in Zoology (Hons) and a M.Sc. (Hons) in Wildlife Conservation and Management from University College Dublin. LG has completed best practise guidance courses on bat survey and mitigation techniques such as: 'Bat Ecology & Survey' and 'Bat Impacts and Mitigation' both held by the Chartered Institute of Ecology and Environmental Management (CIEEM). He is highly experienced in desktop research, literature scoping-review, and report writing, as well as practical field skills (Bats, habitats, invasive species, bird surveys). LG is experienced in compiling Biodiversity Chapters of EIARs, EclAs, AA screenings and NIS reports, and in the overall assessment of potential impacts to ecological receptors from a range of developments. He is a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM) with Full membership application pending.

LG has been involved in the preparation of numerous EclAs and EIARs including for the following projects:

- Bennetstown Dunboyne, Co. Meath Phases 1-2 LRDs (on behalf of Marina Quarter Ltd., 2022-2025).
- An LRD at Smurfit Paper Mills, Clonskeagh Road, Milltown, Co. Dublin (On behalf of Harley Issuer DAC in 2025).

- An LRD at lands to the south of Bóthar Maol and to the west of Blackrock Road at Haggardstown, Dundalk, Co. Louth (on behalf of Marina Quarter Ltd., in 2023).
- An LRD at lands at Milltown Park, Sandford Road, Dublin 6 (on behalf of Sandford Living Ltd., in 2023).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. LG undertook the habitat, fauna, bat and flora surveys and desktop research in 2023 and 2024 for this Report. The various bird surveys were carried out by LG and Nicola Byrne (NB), DNV Senior Ecologist, and Brian McCloskey (BMcC), Ecologist and Ornithologist with DNV. Yumi Mihara (YM), former DNV Ecologist/botanist undertook the Hedgerow Appraisal at the Site. LG and Shane Connolly (SC), former DNV Ecologist, carried out the analysis of the bat survey data collected as part of this assessment.

NB is a Senior Ecologist with DNV, with a B. Sc. (Hons) in Microbiology, an M. Sc. (Hons) in Environmental Microbiology from NUI, Galway and an M. Sc. (Hons) in Biodiversity and Conservation from Trinity College, Dublin. Her experience includes coordinating phytoplankton and zooplankton surveys in the Aquaculture Industry and coordinating research in Teagasc Food Research Centre. She has experience in laboratory management and university teaching, having coordinated and delivered material to a master's Microbiology course in University College Dublin. NB has extensive experience completing mammal, habitat, and invasive species surveys, as well as in desktop research, including the production of peer reviewed publications, grant proposals, literature reviews and ecological/environmental reports.

YM has a B.Sc. in Botany from Tokyo University of Agriculture and a M.Sc. in Botany from Hokkaido University, and has experience in desktop research, reporting and GIS work, as well as practical field experience including flora surveys, rare and protected plant species surveys, phytosociological vegetation surveys, habitat mapping and invasive species surveys. YM has prepared several AA screening reports, Botanical Reports and Hedgerow Appraisal Reports and is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

BMcC is an experienced Ornithologist with a BSc in Planning and Environmental management from the Technological University of Dublin (TUD) and 13 years of bird survey experience, including four years of professional Ornithology work. BMcC is a longstanding and active member of Bird Watch Ireland and is also the author of several articles in UK birding publication *Birdwatch Magazine*. BMcC is highly experienced in all survey methodologies and with surveying all species groups of Irish birds and migrants, having provided a range of ornithology survey work for ecological consultancies, e.g., vantage points surveys of gulls, terns, raptors, waders and wildfowl; hinterland surveys of the above as well as riverine species; and breeding waders and country birds.

SC is an experienced Ecologist with a B.Sc. (Hons) in Botany from the University of Galway. He has experience in surveying bats, birds, mammals, plants, habitats, and invasive species. Shane's experience in ecological report writing extends from AA Screenings and NIS to EclAs, Constraints Reports, and supporting submissions in EIAR chapters. SC has abundant experience in bat survey and data analysis; ranging from windfarms to housing developments.

14.3 Proposed Development

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

Permission for 356 no. residential units and all associated ancillary development works. The unit mix consists of 2, 3 and 4 bedroom houses plus 1 and 3 bedroom duplex apartments. The mix of units is presented in 2 and 3 storey terraced houses and semi-detached houses, 3/4 storey duplex apartments. Please see the Site notice for a full description of the Proposed Development. The Site of the Proposed Development is shown in Figure 141. The layout of the Proposed Development is shown in Figure 142. Please see JFA Drawing no: DBN3-SP-00-DR-JFA-AR-P1000 for the full Site context plan.

The Proposed Development (Phase 3) also includes infrastructure that overlaps with previously granted Phase 1 and Phase 2 LRDs at the Bennetstown lands (granted under planning ref: 23/60290 (An Coimisiún Pleanála ref. 320049-24) and 24/60805), primarily consisting of a link road and bridge over the River Tolka. As detailed within the DMURS Statement and Engineering Report prepared by AtkinsRéalis (2025) for an amendment application (granted under planning ref: 25/61001) to the previously permitted Phase 1 LRD, there will be a realignment of the permitted southern link road between the R157 and the Old Navan Road. It is approximately 760m long with access road junctions and a bridge. For completeness, this amended road design is also included within the Proposed Development (Phase 3) application.

The road layout changes granted under planning ref: 25/61001 are summarised as follows:

- The Southern Link Road will now be approximately 760m long.
- Minor changes to horizontal and vertical alignment between chainages 230 and 400.
- All side road junctions designed in accordance with Cycle Design Manual (CDM) (same as layouts submitted for Phase 2 application).
- Provision of additional priority junction to CDM details at chainage 415.
- Significant changes to horizontal and vertical alignment from chainage 400 onwards including realignment of Old Navan Road to tie-into proposed road directly rather than at a T-junction.
- Rationalisation of access to local road serving residential properties with new CDM compliant priority junction onto realigned road and new priority junction to tie-into existing Old Navan Road travelling northwards.
- Provision of two-way cycle track on eastern side of road from chainage 650 onwards to tie-into proposed MCC scheme to connect to Dunboyne village including new parallel zebra crossing at chainage 650.
- Redesign of proposed bridge to cater for new road alignment with new more equal spans and relocated abutments and piers while overall length remains similar to currently granted bridge.
- Redesigned bridge no longer impacts on existing berm due to increase in clearance height and relocation of easternmost abutment.

14.3.1 Aspects Relevant to this Assessment

14.3.1.1 Site Location

The Site of the Proposed Development has a total area of 17.22Ha and a net developable area of 7.13Ha (See Figure 141).

The Site of the Proposed Development comprises a greenfield site containing agricultural buildings and prefabricated structures/ storage containers associated with a local GAA club, and is located on the northern outskirts of Dunboyne, in the townland of Bennetstown. The Site currently comprises several agricultural fields and associated vegetated boundaries. The M3 Parkway is located adjacent to the northeast of the main body of the Proposed Development. The R157 Dunboyne Bypass runs adjacent to the east of the main body of the Site, with services and link-road sections of the Site boundary located in agricultural fields on the east side of the R157. The River Tolka and its flood plain interact with these eastern extensions of the Site redline boundary. The main body of the Site is bound to the south by Kennedy Road, a farmyard within the Site lands and agricultural fields to the southeast.



Figure 14.1 Site Location



Figure 14.2 Overall Site Layout Context (Extracted from JFA Drwg: DBN3-SP-00-DR-JFA-AR-P1000).

14.3.1.2 Construction Phase Description

As per the Construction Environmental Management Plan (CEMP) prepared by Paul McGrail Consulting Engineers (PMG) (2025a), the assumed programme presented below is indicative of how the Proposed Development will be constructed. At each stage of the Development some or all of the following activities will be required.

- Archaeological watching brief.
- Geotechnical Investigation.
- Ecology Prep. and establishment of tree protection measures and ecological mitigation measures.
- Site clearance and enabling works.
- External Infrastructure works including new roads, junctions, bridges and flood alleviation works.
- Internal Service infrastructure works.
- Sub-Structure works.
- Super-Structure works.
- External works and finishes.

The Phasing included in the CEMP is indicative to allow for flexibility in terms of the development. In terms of the Delivery and Phasing of Development the following as detailed in the CEMP (PMG, 2025a) will be the key stages:

Phase 1a - Site Set Up

This task will take up to ca.3 months to complete with approximately up to 20 staff employed and will involve consultation with the Project Arborist, Archaeologist and Ecologist, Site clearance, set up Site offices and contractor’s compound and secure the construction Site and erection of signage for Site security purposes.

The enabling works will entail:

- Securing of site boundary and erecting of fencing or hoarding as required.
- Wheel wash facilities.
- Gate man for daytime activities and security man for nighttime.
- Service terminations and positive identification of any services on the site by the utility providers.
- Establishment of tree protection and archaeological protection measure.
- Provision of temporary power, lighting and water services.
- Set up of site accommodation and welfare facilities.
- Identification of the trees that are required to be removed and the removal of these along with scrub and vegetation, in consultation with the appointed Arborist.

Phase 1b - Setting out of sites and provision of services

Given the significant work involved in the provision of drainage services, this stage is estimated to take between 4-5 months and will involve up to 40 construction staff. This will involve the laying of sewers within the Site, the installation of attenuation tanks, the provision of footpaths, lighting and roadways. As part of any works (i.e. provision of services) along the public areas/ roads in the vicinity of the site, it will be ensured that the surface of the roads/areas will be re-instated to a high standard. Due to the catchment areas the site services associated with the phasing will be constructed as and when required to ensure that all surface water is attenuated prior to discharging to the existing surface water network.

Phase 1c - Construction of Residential Units

The construction of the residential units will, to a certain degree respond to the demand/sale of the units involved, however, as noted in the CEMP (PMG, 2025a), the applicant has already had a significant number of enquiries from prospective purchasers, and it is anticipated that the construction progress will reflect this strong demand and will involve up to 150 no. construction staff (depending on the number of units being constructed at any one time). The Proposed Development is expected to take up to three (3) years to complete (subject to planning and market demand).

14.3.1.2.1 Bridge Construction

The Proposed Development entails the installation of a bridge across the River Tolka in the south-east of the Site. The proposed bridge has a clear span of 32.712m and traverses a section of the river (See Figure 143 and Figure 145). As advised by AtkinsRéalis, consultant engineers for the Proposed Development, the bridge will be constructed using conventional construction methods as outlined below:

- Construct/cast precast beams at an established precast yard in Ireland.
- Establish piling equipment and install piles (including excavation as required). Assumed maximum piling depth of 20m (conservative assumption).
- Construct the foundation and abutments to beam seat level.
- Transport and place precast beams with appropriately sized crane equipment.
- Cast the top slab and deck diaphragms (with formwork supported off beams).
- Construct wing/return walls.
- Backfill behind abutments and wingwalls.
- Install bridge parapets, kerbs, and footpaths.
- Complete roadworks and implement any necessary scour protection measures.
- Landscaping and finish the road reserve.

According to the Site Specific Flood Risk Assessment (SFRA) prepared by IE Consulting, the proposed bridge does not require the removal of the existing berm located along the eastern bank of the river; the proposed bridge soffit level is above the existing berm crest level and will not interfere with the performance of same. In addition, a section of existing drainage channel/ditch in the south of the Site will be maintained un-culverted once realigned slightly to avoid the western bridge embankments and direct it beneath bridge (See Figure 144).

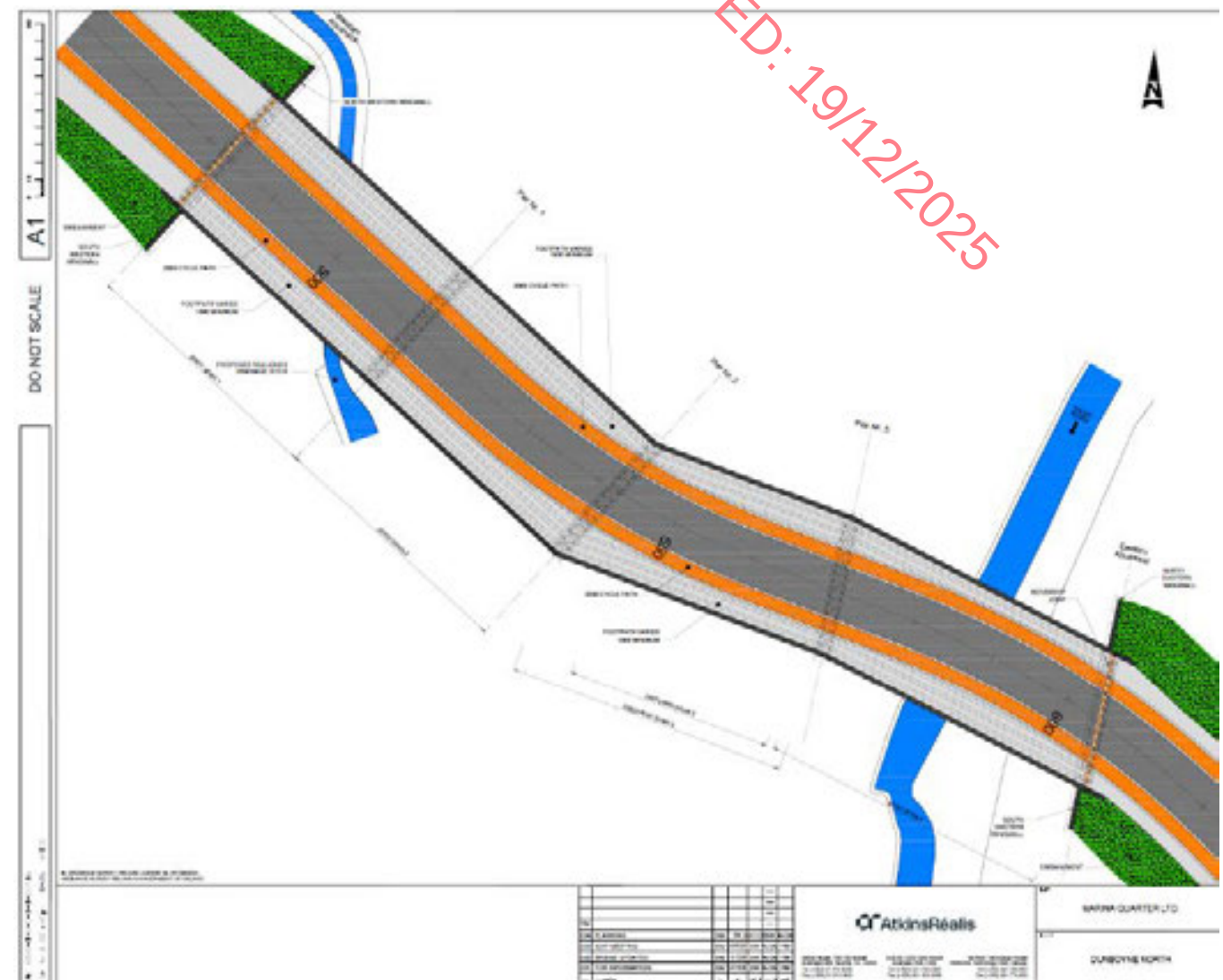


Figure 14.3. Image adapted from AtkinsRéalis Drwg no: 5205505-ATK-XX-XX-SK-CE-001715 showing overall bridge layout across floodplain.

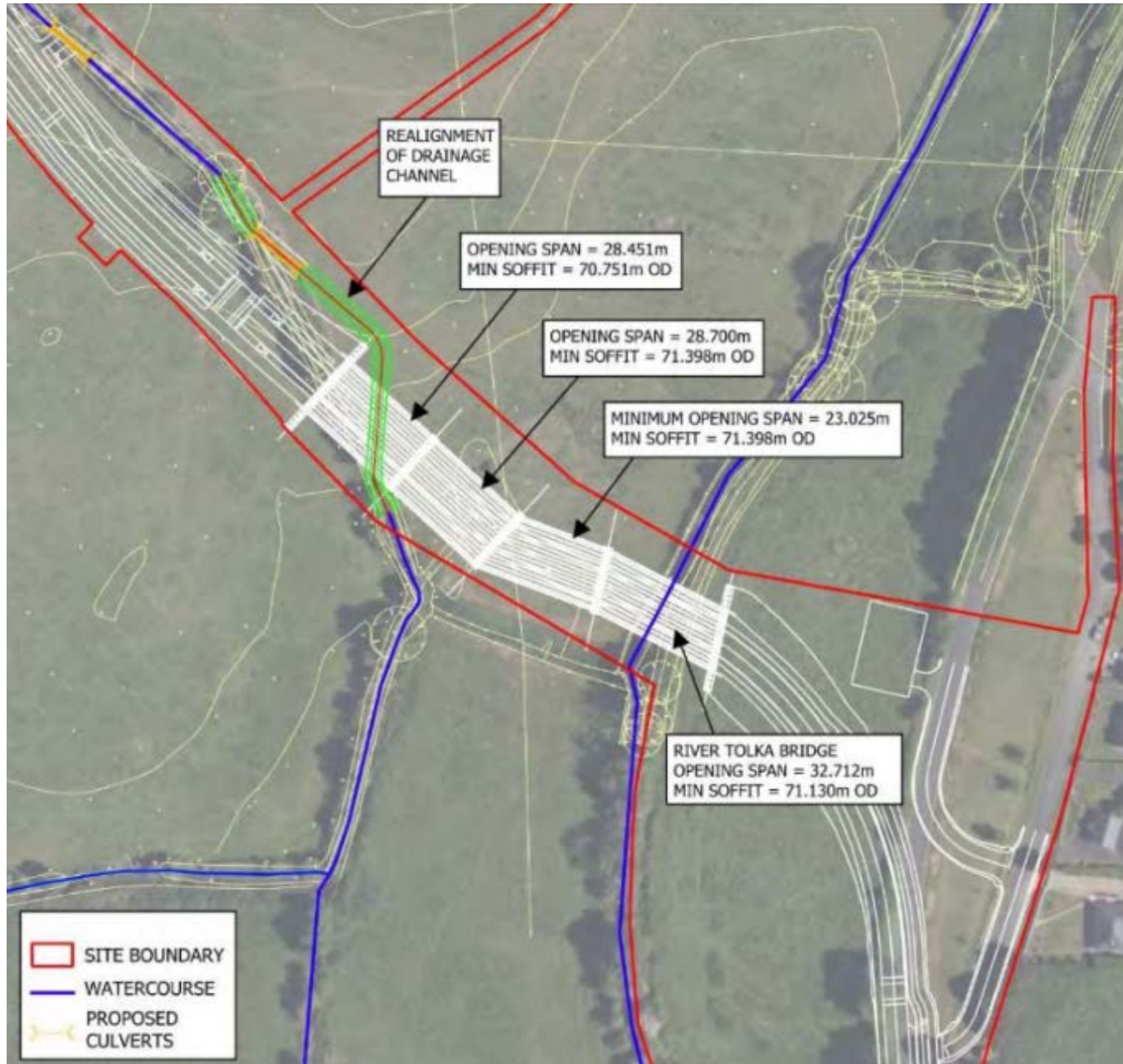


Figure 14.4. Image showing proposed realignment of road/bridge and drainage channel (source: IE Consulting SFRA).

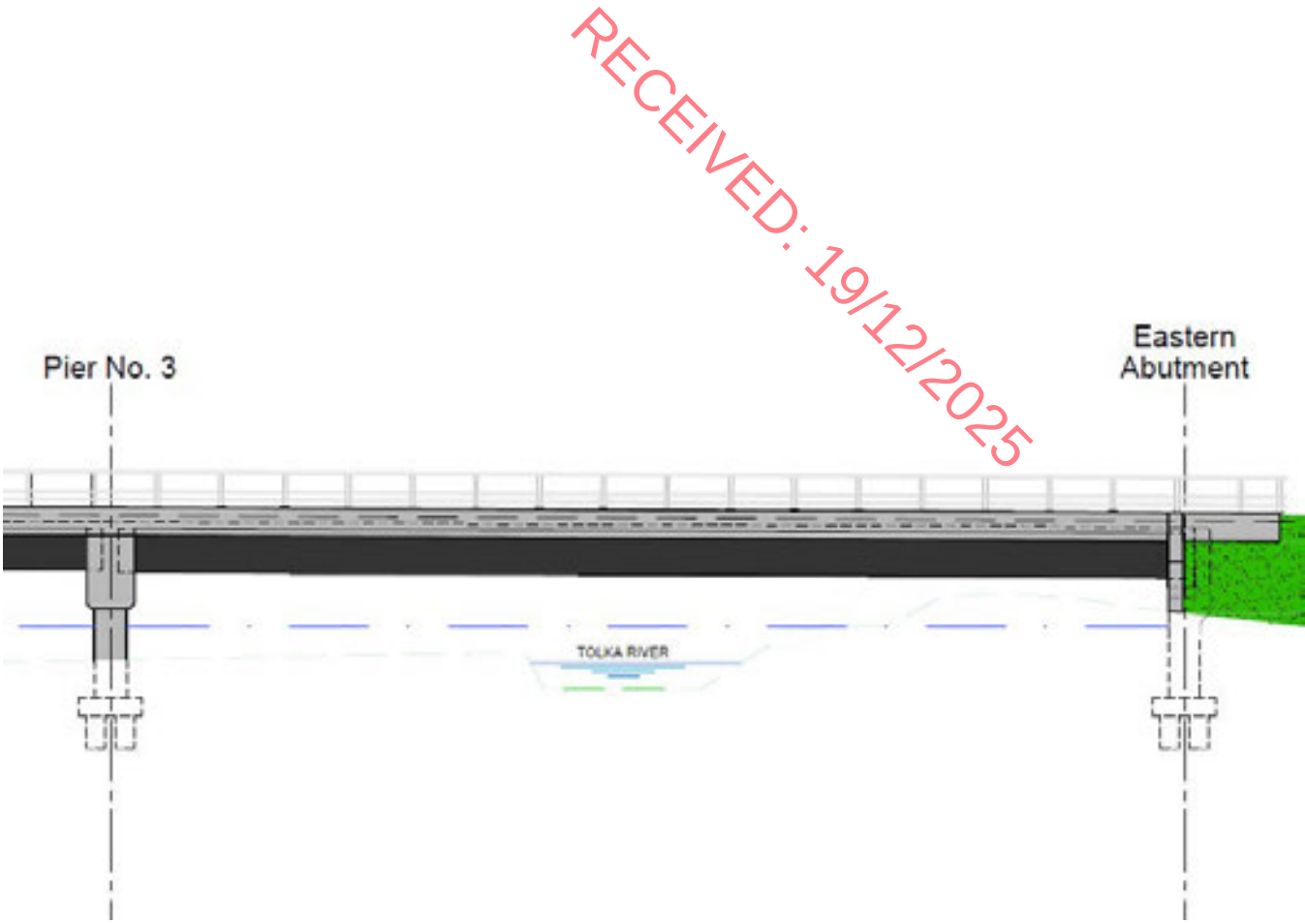


Figure 14.5. Proposed clear span bridge design over the River Tolka (Image adapted from AtkinsRéalis Drng no: 5205505-ATK-ZZ-ZZ-SK-CE-001718).

14.3.1.3 Proposed Drainage

14.3.1.3.1 Surface Water

Storm and surface water arising from the Site will ultimately discharge to the River Tolka. The proposed surface water network consists of three catchment areas; Catchment 1 will be attenuated to the greenfield runoff rate at the hydrobrake located on outfall of the combined detention basin and underground stormtech system, and will connect to an existing 900mm diameter pipe which runs under the R157 road. Catchments 2 and 3 will be attenuated before connecting to Catchment 1.

Although not included within the Proposed Development design specifically for the protection of downstream European Sites, a Sustainable Drainage System (SuDS) system has been included as per best practice and the guidance of the Greater Dublin Strategic Drainage Study (GSDSDS).

The proposed SuDS will manage and treat surface water generated at the Site for the duration of its operational lifetime. The SuDS system has been designed to collect and attenuate storm/surface water arising from the Site and discharge same at the allowable greenfield runoff rate to detention basins and the existing drainage ditch network. Maximum discharges are limited to pre-development greenfield runoff rates, further reduced and diffused through the various nature-based solution measures designed into the SuDS system. As detailed in the Engineering Report prepared by PMG (2025b), the suite of SuDS measures included in the design are as follows:

- **Modular Permeable Paving:** Porous surfacing (paving block or open graded material) has been designed on private parking spaces and driveways.

- **Swales:** shallow, flat bottomed, vegetated open channels have been included e.g., within the proposed road layout along the kerb line.
- **Detention Basins:** Detention basins are proposed in the west and south of the Site to cater for excess flows during periods of heavy rainfall. The proposed detention basins will provide the 1:100-year Return Period plus 20% Climate Change required storage volume for the Site's catchment areas.
- **Stormtech Underground:** An Arch structure with a maintenance/inspection tunnel for providing underground surface water attenuation storage that can infiltrate runoff to the ground where the subgrade is suitable. This will be the primary attenuation system for the Site and will be located under the detention basin in the southern open space area. The Isolator row of the Stormtech is a filter strip that provides enhanced suspended solids and pollutant removal while providing surface area for infiltration and run off reduction. The storage structure has been designed to achieve online treatment.
- **Petrol Interceptors:** A treatment feature offering a suitable means of treatment and oil separation which may be present due to minor leaks from vehicles and accidental spillage. Petrol interceptors have been designed before the inlet chamber of each attenuation feature and have sufficient capacity to cater for each catchment area.
- **Hydrobrake Flow Control:** The Hydro-Brake® Flow Control is a self-activating vortex flow control device that reduce the stormwater runoff to greenfield flow rates. The hydrobrakes have been proposed on the outlet chamber of each attenuation system.
- **Tree pits:** Included along the various roads within the Proposed Development.
- **Bioretention Areas:** Areas of planting located along the various roads and areas of car parking within the Proposed Development.
- **Filter Drains:** Included along areas of permeable paving and grassy swales within the Proposed Development.

The SuDS design includes silt removal traps and petrol interceptors within the drainage network. These are the primary mechanisms for preventing contaminated surface water run-off entering the River Tolka during the Operational Phase.

The traps and separators have been designed specifically to the capacity/flow for each part of the Site's drainage network with a minimum retention time to allow immiscible hydrocarbon pollutants to accumulate on the surface and suspended solids to sink to the bottom of the unit.

The most likely sources of contamination of the surface and storm runoff are general grit and silt arising from gardens and hard surfaces, hydrocarbons from vehicle exhausts and fuels or oil spills and leaks, vehicle tyre wear, burning plastics, wastewater from washing cars, pesticides etc., used for gardening and materials used in home maintenance. While these forms of contamination do pose potential risks to the water quality of the River Tolka, the likely volumes are expected to be low and to remain within the design capacity of the traps and interceptors, maintained and cleaned in line with the manufacturer's recommendations. This, along with the significant distance downstream between the Proposed Development and Dublin Bay makes the likelihood of potential impacts on downstream receptors as a result of the Operational Phase of the Proposed Development negligible.

14.3.1.3.2 Foul Drainage

As per the Engineering Report prepared by PMG (2025b), the proposed foul sewer network will connect to the proposed pumping station located to the east of the main body of the Site, which will discharge to the existing Uisce Éireann (UÉ) foul sewer network and eventually be treated at Ringsend WwTP. This pumping station was included in the permitted 2025 application submission for amendments to the granted Phase 1 LRD application; planning ref: 23602901 (ACP reference LH17.320049), and is included as part of this Phase 3 LRD application also for completeness.

The foul water drainage system for the Proposed Development has been designed in accordance with the Irish Water (now UÉ) Code of Practice and will be separate to the surface water drainage system. The foul water from the development will discharge via soil vent pipes within the buildings by gravity flow before connecting into the proposed foul sewer pumping station. The foul sewerage for each house will have a separate connection to the proposed 150mm and 225mm diameter foul sewer along the roads and will connect to a proposed 375mm pipe to the proposed pumping station. A pre-Connection Enquiry has been submitted to UÉ and the Confirmation of Feasibility has been granted.

As per the Pumping Station Design Report prepared by PMG (2025c), the primary objective of the proposed pumping station is to facilitate the decommissioning of the existing septic tank system serving existing dwellings along the Old Navan Road. The pumping station is designed to serve 8no. residential units. The new infrastructure will ensure proper collection and conveyance of wastewater, thereby eliminating reliance on individual septic tanks. This upgrade aligns with environmental best practices and regulatory standards.

Following discussions with UÉ, it has been agreed that the rising main from the new pumping station will connect to the existing 150mm rising main associated with the adjacent permitted residential development to the west. Each of the 8no. residential units will have its own internal foul water drainage system. Separate applications will be submitted to UÉ for the foul drainage systems of individual units.

As per the SFRA (IE Consulting, 2025), PMG (2025c) note that the area of the pumping is not subject to costal or pluvial flooding. The 100yr+CC flood level is 69.22m, therefore the chosen ground level for the pumping station of 70.10m is 0.88m above the 100yr Flood Level.

The storage volume has been designed in accordance with section 5.11 of the Irish Water Wastewater Code of Practice and the proposed pumping station will provide 24-hour emergency storage. This will allow continued service to the catchment in the event that operation of the pumps is interrupted. The 24-hrs-storage required volume is calculated at 3.56m³. The storage will be provided in a chamber immediately adjacent to the main pump chamber. A gate valve on the connecting pipe will allow for isolation of the storage chamber to facilitate repair or maintenance of the pumps. The storage chamber will be fitted with a tipping bucket mechanism to facilitate cleaning following use and mains water supply will be used to fill the tipping bucket. The top water level of the emergency storage has been determined with reference to the lowest floor/ground level in the catchment. The storage chamber will be provided with high level vents.

Please refer to the Pumping Station Design Report prepared by PMG (2025c) for further details.

14.3.1.4 Landscape Plan

The landscape plan has been prepared by Ilsa Rutgers Landscape Architecture (IRLA) and has focused on the retention of the existing field boundary hedgerows, treelines, woodland and drainage ditches within the proposed design. The existing hedgerows and the wide band of semi-mature mixed trees on either side of the R157 provide valuable ecological corridors at the Site and so their retention and incorporation into the landscaping has been a priority. The layout of the public open space is informed by this retention of the existing field pattern of hedgerows and drainage ditches. The public open space is well distributed across the site and is centrally located to form a series of 'village greens' around which the houses are organised. In all cases, the proposed housing units are orientated to address the public open spaces, to ensure that they are well overlooked.

Where hedgerows cross a public space, they will be thinned out in places to achieve better visual connection and permeability. Larger individual trees within the existing hedgerows that transverse public space will be identified, retained and allowed to grow into mature trees. Ash trees suffering from ash dieback will be removed and new more disease tolerant, native trees will

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be planted in dense drifts to create mini forests with paths cut through them. The IRLA planting plan (Drw no: 5000) details the considerable level of tree planting that is proposed at the Site, the majority of which is comprised of native species. Gaps in the existing hedgerows will be planted with species such as Hawthorn (*Crataegus monogyna*), Alder (*Alnus glutinosa*), Silver birch (*Betula pendula*), Downy birch (*B. pubescens*), Sessile oak (*Quercus petraea*), Pedunculate or common oak (*Q. robur*) and Pin oak (*Q. palustris*), significantly increasing the quality and diversity of tree species present along these linear features. In addition, the Miyawaki Method will be adopted in sections of the site, consisting of the creation of small, dense forests within urban settings and allowing the grass beneath the new trees to grow wild and self-seed. This approach creates diverse planted islands of biodiversity that are easily managed within an urban setting.

The existing hedgerows form the green infrastructure upon which public open space is hung. These hedgerows and drainage ditches create a continuous chain of green and linear parks which transverse the Site. The continuity of green infrastructure allows for pedestrian and cycle routes to cross the site in a safe and attractive setting, while also maintaining vegetated wildlife corridors throughout the Site and connecting it with the surrounding lands. A new green corridor its proposed in the south of the Site, where linear parkland and tree and vegetation planting forms a connection between the existing east-west hedgerow in the centre of the Site, with the woodland belt running along the R157 to the south-east (see Figure 146). This green corridor comprises extensive tree planting across what is currently open grassland. Oaks (*Quercus petraea* & *Q. robur*) and Birches (*Betula pendula* & *B. pubescens*) make up the majority of the tree planting along this corridor, with Scot's pine (*Pinus sylvestris*) dotted throughout. The understorey of this green corridor will be managed using a low intervention approach and maintained as a mix of high sward meadow/ hedgerow understorey to provide variety of habitats for local wildlife e.g., birds, bats, pollinators. This corridor will connect the linear woodland and hedgerows in the south and central sections of the Site and is intended to support a new bat foraging and commuting route through the Site.



Figure 14.6 Extract from the IRLA Primary Planting Plan (Drw no: 5000) showing the proposed southern/eastern treeline corridor (in blue) connecting the existing hedgerows with the R157 woodland belt.

14.3.1.5 Public Lighting Plan

The public lighting plan for the Proposed Development has been designed by ENX with input from DNV’s ecologist.

In order to minimise disturbance to bats commuting/foraging in the vicinity of the Site, lighting has been designed to minimise light-spill onto any hedgerows or treelines to be retained or planted at the Site. This can be achieved by ensuring that the design of lighting adheres to the guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers ‘Bats and Lighting in the UK - Bats and Built Environment Series’, (ILP, 2024) 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’.

For the most part light spill onto retained and proposed hedgerows, treelines and woodland has been minimised. Breaks in the existing retained hedgerows to allow for vehicle and pedestrian access between the various parts of the Site will entail higher levels of public lighting, but where possible this has been minimised to account for bats utilising these habitat features to forage and commute through the Site. The R157 junction and access road proposed along the eastern boundary will entail the required level of lighting to ensure public safety.

Through coordination between DNV and ENX the lighting consultants, the Phase 3 LRD lighting scheme will include the following:

- The minimisation of night-time lighting emitted during both the Construction and Operational Phases of the Proposed Development (once health and safety requirements are met).
- The avoidance of direct lighting of existing treelines and hedgerows and those to be planted at the Site, as much as is practicable.
- Dark corridors to be provided at night for movement of bats along the eastern external boundaries of the Site, the retained central east-west hedgerow linear parkland corridor, and a new southern connecting parkland corridor linking up with the woodland belt in the south-east of the main site area.
- The avoidance of light spill onto the Tolka River from the proposed bridge.
- Planting will provide areas of darkness suitable for bats to feed and commute.
- Lighting to be directed downwards away from the treetops i.e., no spotlighting.
- The public lighting will have photocell/timer control to minimise lighting during the hours of darkness.
- Unnecessary light spill on to areas of retained/planted hedgerow controlled through a combination of directional lighting and hooded / shielded luminaires where required.
- All luminaires shall lack UV elements when manufactured and shall be LED.
- A warm white spectrum (2700-3000 Kelvin) will be used to reduce blue light component.

Please refer to ENX drawing 3282-ENX-XXXX-XX-DR-E01-006001 for further details on lux levels across the main Site area.

14.4 Relevant Legislation & Guidance

An EclA is a process of identifying, quantifying, and evaluating potential effects of development-related or other actions on habitats, species and ecosystems (CIEEM, 2024). When an EclA is undertaken as part of an EIA process it is subject to the EIA Regulations (under the Planning and Development Regulations 2001 as amended).

This EIAR Biodiversity Chapter details the EclA of the Proposed Development and has been prepared to assist the Competent Authority with its decision making in respect of the Proposed Development.

There is a number of pieces of legislation, regulations and policies specific to ecology which underpin this assessment. These may be applicable at a European, National or Local level. Legislation at the International level relevant to the Proposed Development are listed below:

- *Council Directive 92/43/EEC* on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter the 'Habitats Directive'.
- *Directive 2009/147/EEC*, hereafter the 'Birds Directive'.
- *Directive 2011/92/EU*, hereafter the 'EIA Directive'.
- EU Regulation 1143/2014, on Invasive Alien Species.
- European Union (Invasive Alien Species) Regulations 2024 (SI 374/2024).
- *Convention on the Conservation of European Wildlife and Natural Habitats 1982*, hereafter the 'Bern Convention'.
- *The Convention on the Conservation of Migratory Species of Wild Animals 1983*, hereafter the 'Bonn Convention'.
- *Ramsar Convention on Wetlands 1971*, hereafter referred to as 'Ramsar'.
- *Water Framework Directive 2000/60/EC*, hereafter the 'WFD'.

National legislation and policy relevant to the Proposed Development are listed below:

- Wildlife Act 1976, as amended.
- Flora (Protection) Order 2022.
- The Planning and Development Act 2000 as amended.
- National Biodiversity Plan 2023-2030.
- All Ireland Pollinator Plan (2021-2025).

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 SPAs. It is the responsibility of each member state to designate Special Protection Areas (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.

Additionally, Natural 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.

Other International and National designated Sites were searched for within the ZOI, such as Ramsar Sites, Irish Wetland Bird Survey (I-WeBS) Areas, and Important Bird Areas (IBA'S). All of which are recognised as important areas for the protection of wintering and migratory wildfowl.

Local plans relevant to the Proposed Development are listed below:

- Meath County Development Plan 2021 – 2027.
- County Meath Biodiversity Action Plan (BAP) 2015-2020 (the 2025-2030 BAP is currently open for public consultation at time of writing this Chapter).

Further details on legislation and policy relevant to the Proposed Development are detailed in Appendix 14.1.

14.5 Consultation

An email response to a request for consultation by McCutcheon Halley Planning Consultants with regard to the Phase 2 application which overlaps with the Site of the proposed development was received from Roisín O'Callaghan Senior Fisheries Environmental Officer with Inland Fisheries Ireland (IFI) on the 3rd of May 2024.

IFI also provided comment as part of the Bennetstown Phase 1 application in August 2023. Phase 1 overlaps with the Phase 2 and Phase 3 sites as discussed previously in this Chapter in terms of the link road and bridge over the River Tolka and so IFI's comments from the previous phases are also relevant to the Proposed Development.

IFI's comments were largely concerning the inclusion of SuDS and nature-based solutions at the Site, along with the protection of the River Tolka in both the Construction and Operational Phases. IFI noted that the Tolka is a salmonid river system and supports lamprey species (Habitats Directive Annex II species) and brown trout (*Salmo trutta*) populations. It was recommended that the bridge proposed be a clear span design with the existing bank vegetation retained as a riparian buffer along the Tolka.

IFI's comments and recommendations are in line with those that have been considered and incorporated into the design of the Phase 3 proposed project design. A range of SuDS measures are proposed at the Site along with a suite of mitigation measures focused on protecting the River Tolka during the Construction Phase. The bridge proposed is of a clear span design and is set back from the banks so that they are retained along either side of the channel. The river floodplain of the Tolka will be left as a riparian buffer either side of the river; with native tree and hedgerow planting proposed to increase wildlife connectivity with the river corridor. The works along the Tolka, such as the bridge construction, will also be timed so as to avoid the salmon spawning season.

14.6 Methodology

14.6.1 Scope of Assessment

The specific aims and objectives of this Biodiversity Chapter were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site;
- Identify and assess the direct, indirect and cumulative ecological implications or impacts of the Proposed Development during its lifetime; and
- Where possible, propose mitigation and enhancement measures to remove or reduce those impacts at the appropriate stage of the development and increase the biodiversity value of the Site.

14.6.2 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the Site’s natural environment. The desk study, completed in December 2025, relied on the following sources:

- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at maps.biodiversityireland.ie;
- Information on Floral Protection Order (FPO) Bryophytes database at dahg.maps.arcgis.com;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at 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 designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;
- Information on the existence of permitted development, or developments awaiting decision, in the vicinity of the Proposed Development from the National Planning Application Database (DHLGH, 2025); and
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.

A comprehensive list of all the specific documents and information sources consulted in the completion of this Chapter is provided in Section 14.18, References & Sources.

14.6.3 Zone of Influence (Zol)

The Zol 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, 2024). The Zol will vary with different ecological features, depending on their sensitivities to an environmental change.

Furthermore, Zol in relation to European sites is described as follows in the ‘OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management’ (OPR, 2021):

“The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km).”

Please refer to the AA Screening (DNV, 2025a) that accompanies this application under separate cover for more details regarding assessment of European sites.

14.6.4 Identification of Relevant Designated Sites

To determine the Zol 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 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 EclA reports such as this to identify all relevant designated sites potentially linked to the proposed development.

As noted above, the most recent guidance advises against the use of arbitrary distances that serve as precautionary Zol (e.g., 15km), and instead recommends the application of the Source-Pathway-Receptor (S-P-R) model in the identification of designated sites, stating that “This should avoid lengthy descriptions of European sites, regardless of whether they are relevant to the proposed development, and a lack of focus on the relevant European sites and issues of importance”. Although this statement refers to European sites, it is also applicable to other designated sites.

Thus, the methodology used to identify relevant designated sites comprised the following:

- Identification of potential sources of effects based on the Proposed Development description and details;
- Identification of potential pathways between the Site of the Proposed Development and any designated sites within the Zol of any of the identified sources of effects:
 - » Water catchment data from the EPA (www.epa.ie) were used to establish or discount potential hydrological connectivity between the Proposed Development and any designated sites.
 - » Groundwater and bedrock information used to establish or discount potential hydrogeological connectivity between the Proposed Development and any designated sites.
 - » Air and land connectivity assessed based on Proposed Development details and proximity to designated sites.
 - » Consideration of potential indirect pathways, e.g., impacts to flight paths, *ex-situ* habitats, etc.
- Review of Ireland’s designated sites to identify those sites which could potentially be affected by the Proposed Development in view of the identified pathways, using the following sources:
 - » European sites and nationally designated sites (e.g., NHAs and pNHAs) from the NPWS (www.npws.ie);
 - » Ramsar sites from the Irish Ramsar Wetland Committee (<https://irishwetlands.ie/irish-sites/>);
 - » Other internationally designated sites e.g., UNESCO Biosphere’s; and
 - » Regional development plans to identify any remaining sites or areas designated for nature conservation at a local level.

14.6.5 Field Surveys

A range of surveys have been carried out across the application site since 2023, including habitat and flora surveys, bat surveys, bird surveys and mammal surveys. Survey data is typically considered to be valid for 3 years at the most depending on the mobility and nature of the ecological feature being assessed (CIEEM, 2019), and so a suite of original survey data used to inform this assessment has been supplemented with updated site visits, ground truthing surveys and dedicated species surveys where relevant to ensure a robust up-to-date impact assessment. As such, field survey dates from 2023 to 2025 are summarised in Table 141.

Table 141. Field surveys undertaken at the Proposed Development Site between 2021 and 2025.

Survey Type	Date of Survey	Surveyor
Ecological Site Walkover	13 th December 2023	LG
Amphibian Survey	24 th July 2024	
	14 th February 2025	
Habitat & Flora Survey	24 th July 2024	LG
Invasive Flora Survey	14 th February 2025	
Mammal Survey	13 th December 2023	
	24 th July 2024	BMcC, LG
	4 th December 2025	
Breeding Bird Surveys	29 th May 2024	
	11 th June 2024	
	3 rd July 2024	
	18 th June 2025 (Link-road & Bridge route)	
Winter Bird Surveys	13 th December 2023	LG, NB, BMcC
	31 st January 2024	
	1 st March 2024	
	27 th March 2024	

	15 th of November 2024	
	29 th of November 2024	
	10 th January 2025	
Preliminary Bat Roost Assessment (PBRA) & Habitat Suitability Assessment	12 th February 2025	LG
	13 th December 2023	
	14 th February 2025	
Dusk Bat transect surveys	18 th June 2025 (Link-road & Bridge route)	LG, BMcC
	13 th June 2024	
	1 st July 2024	
	23 rd June 2025 (Link-road & Bridge route)	
	1 st October 2025	

Survey Type	Date of Survey	Surveyor
Static Bat Detector Survey of proposed bridge crossing of River Tolka (5 days)	16 th August – 21 st August 2023 18 th – 23 rd June 2025	LG
Otter (<i>Lutra lutra</i>) and Kingfisher (<i>Alcedo atthis</i>) Survey of stretch of River Tolka adjacent the Site (150m upstream and downstream)	16 th August 2023 23 rd June 2025	LG
Hedgerow Appraisal of hedgerows	16 th August 2023 (Phase 1 lands) 17 th June 2024 (Phase 2 & 3 lands)	YM, NB

The following sections outline the methodology employed by DNV for each survey carried out.

14.6.5.1 Habitat and Flora Surveys

Habitat and flora surveys of the Site were conducted by DNV on the 24th July 2024 and 14th February 2025. Habitats were categorised according to the Heritage Council’s ‘A Guide to Habitats in Ireland’ (Fossitt, 2000) to level 3. 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. The habitats at the Site were also assessed for their potential to support protected and/or notable fauna.

In addition, the Site was searched for invasive flora with a particular focus on those listed on the Third Schedule of SI No. 477/2011, and their location and extent recorded if recorded on Site.

14.6.5.2 Hedgerow Appraisal Survey

Hedgerow appraisals of the Site were conducted by DNV (then ‘Enviroguide’) on 16th August 2023 (Phase 1 lands) and 17th June 2024 (Phase 2 & 3 lands). Hedgerows were categorised on their ecological value as ascertained from current research from Hedgerow Appraisal System (HAS) (Foulkes et al, 2013) and the Hedgerow Evaluation and Grading System (HEGS) (Clements and Toft, 1993). These systems follow a standardised methodology that grades hedgerows based on their overall structure, connectivity, botanical diversity and the presence of hedgerow features such as banks and ditches. Each hedgerow is then assigned a grade based on the results.

For full details on the methodology applied during the Hedgerow Appraisal please see Appendix 14.5.

14.6.5.3 Mammal Surveys

Mammal surveys of the Site were carried out on 13th December 2023, 24th July 2024 and 4th December 2025. The mammal surveys conducted as part of this assessment had regard to the survey guidelines contained in Guidelines for the Assessment of Ecological Impacts of National Road schemes (NRA, 2009) and associated guidance Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009). The site was searched for signs of mammals within the area, such as burrows, scatt, foraging signs, and tracks.

14.6.5.4 Otter and Kingfisher Survey

Surveys of the stretch of the River Tolka that interacts with the Proposed Development Site’s eastern extent (i.e., the proposed bridge crossing) were conducted on 16th August 2023 and 23rd June 2025, with a specific focus on the potential for Otter and/or Kingfisher to occur. The survey methodology comprised a walk of the river channel covering 150m upstream and 150m downstream of the proposed bridge crossing of the Tolka.

The river channel and banks of the Tolka were searched from within the river, and from along the banks, for signs of Otter presence e.g., holts, couches, slides, prints, spraints and food remains; that might indicate otter usage of this stretch of the Tolka. The banks of the river were assessed for their suitability for nesting/feeding Kingfisher (e.g., slow moving sections of watercourse with overhanging branches) and a search for suitable perches and nest holes was conducted along the stretch 150m upstream and 150m downstream of the proposed bridge crossing.

The surveys were carried out with cognisance of the NRA (2009a) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* and no limitations were encountered during these surveys. This guidance document (NRA, 2009a) states in relation to both Otter and Kingfisher that the survey effort/extent of watercourse to be surveyed should be proportionate to the nature and scale of the proposed works and the associated potential for disturbance to these species. The survey distance of 150m upstream and downstream of the proposed bridge was deemed appropriate based on the nature of the works i.e., a singular bridge crossing, and the general set-back of the main Site works and Proposed Development from the Tolka. The main source of potential impacts to Otter and Kingfisher was deemed to be the bridge’s construction and operation.

14.6.5.5 Bird Surveys

14.6.5.5.1 Breeding Bird Surveys

To inform an evaluation of the on-site habitats for bird species, three breeding bird surveys were undertaken on the 29th of May 2024, 11th June 2024 and 3rd July 2024, with a further survey of the proposed link-road and bridge route conducted on 18th June 2025. Transects were walked through the Site with all the species present recorded. Each transect was divided up into four parts (all a similar distance), with each transect walked and all species noted at each side of the ecologist. A final zig-zag transect through the Site was walked at the end of the survey. Distance brackets were also used, however, the majority of species were recorded within the site boundary and within 50 meters each side of the surveyor on each transect. The survey methodology employed was based on that recommended in standard literature used by for example the British Trust for Ornithology (BTO) (Gillings et al, 2007; Bibby et al, 1992 and Gilbert et al, 1998), which has subsequently been adapted into guidelines for ecological consultants by the Bird Survey & Assessment Steering Group (2022).

14.6.5.5.2 Non-breeding Bird Surveys

To inform an evaluation of the on-site habitats for wintering bird species, a suite of winter bird survey visits were carried out at the Site and nearby lands over the 2024/2025 winter (15th of November and 29th of November 2024, 10th January and 12th February 2025). Winter Bird Surveys were also conducted at the Phase 2 lands adjacent to and overlapping with the Site (to the north and east) over the 2023/2024 winter. The Site was walked on each date and viewed for use by wintering birds, with a special emphasis on waterbirds.

The main area of the Site is comprised of sections agricultural fields and a playing pitch, along with their associated hedgerows and treelined boundaries. The Site was walked on each date and viewed for use by wintering birds, with a special emphasis on waterbirds.

The objective of these surveys was:

- To assess the potential usage of the Site and lands adjacent to it by waterbirds associated with SPAs during the winter months as an *ex-situ* site; and
- To determine the composition, numbers, frequency, and heights of species in flight over the Site of the Proposed Development, if any, in order to inform decisions on potential disturbance to flight-lines of birds commuting to/from roost sites and/or between feeding sites as a result of the construction of the proposed buildings.

The survey methodology follows the non-breeding bird survey guidance published by the Bird Survey & Assessment Steering Group (2022) *‘Bird Survey Guidelines for assessing ecological impacts’*. Each survey consists 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. The flight-line survey component consists of vantage point observation by a surveyor using binoculars and identification guides where necessary to identify all target species in flight over the Site.

All surveys were undertaken using:

- Opticron 8x42 binoculars (or equivalent).
- Opticron 20x Telescope (or equivalent).
- Agreed survey methodology as per best practice guidance.
- A4 map of the survey area.

14.6.5.6 Bat Surveys

14.6.5.6.1 Preliminary Bat Roost Assessment

Preliminary bat roost assessments (PBRA) of Potential Roost Features (PRFs) within trees and structures at the Site were conducted on 13th December 2023, 14th February 2025 and 18th June 2025. The structures present on Site comprised of a small pumphouse structure in the south-west of the Site, farm buildings in the south of the Site and ‘pre-fab’/ storage container structures associated with the GAA club located in the south-west of the Site. The PBRA was conducted in adherence to best practice guidelines (Collins, 2023 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.

Collins (2023) recommends that structures and trees are assessed for their ability to support roosting bats under separate categorizations using professional judgement.

A structure with roosting potential can be further divided into one of four sub-categories as presented in Table 4.1 (Collins, 2023):

- Negligible – No suitable features observed, however, a small element of uncertainty remain;
- Low – A structure with one or more roost features as used by individual bats opportunistically at any time of year;
- Moderate – A structure with one or more roost features that could be used by bats on a regular basis or by a larger number of bats; or
- High – A structure 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 of time. These features have the potential to support high conservation status roosts.

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Trees are categorized separately according to Table 4.2 of the guidance outlined in Collins (2023). The classifications for trees are as follows:

- NONE – Either no PRFs in the tree or highly unlikely to be any;
- FAR – Further assessment required to establish if PRFs are present in the tree; or
- PRF – A tree with at least one PRF present.

Where a tree contains at least one PRF, each PRF is further assessed according to Table 6.2 of the Bat Conversation Trust guidelines (Collins, 2023). PRFs are scored as either one of the following:

- PRF-I – PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats; or,
- PRF-M – PRF is suitable for multiple bats and may therefore be used by a maternity colony.

For trees with PRF-Is only, no further surveys may be required, but appropriate compensation for all PRF-Is must be designed and incorporated in advance of impacts, along with a Precautionary Working Method Statement (PWMS).

As a Site increases in suitability for roosting bats e.g., a PRF-M being present, the survey effort increases accordingly. A PRF-M would require a PRF inspection which can entail an aerial inspection, conducted over three survey visits, a minimum of three weeks apart, which should be carried out between May and September with at least two in the period May to August.

Where features are inaccessible by ladder, climbing, or MEWP, or too extensive for a PRF inspection, an emergence survey should be carried out in summer with a Night Vision Aid (NVA) or otherwise surveyed using Advanced Licence Bat Survey Techniques (ALBST), such as trapping, tagging, and radio-tracking to inform of the importance of a roost.

14.6.5.6.2 Bat Habitat Suitability Assessment

Bat Habitat Suitability Assessments were carried out in conjunction with the roost assessments conducted in 2023 and 2025. These assessments evaluated the habitats present on Site and in the wider area for bat foraging and commuting suitability. Habitat suitability is assessed qualitatively from Negligible to High as per Collins (2023):

- None - No habitat features on site likely to be used by any roosting bats at any time of the year (i.e., a complete absence of crevices/suitable shelter at all ground/underground levels);
- Negligible – No suitable foraging or commuting habitats on-Site;
- Low – Suitable but isolated habitats that could be used by small numbers of commuting and/or foraging bats, such as poorly connected gappy hedgerows, lone trees, unvegetated streams, etc.;
- Moderate – Suitable continuous habitat connected to the wider landscape that could be used by commuting and/or foraging bats, such as treelines, scrub, grassland, water, etc.; or,
- High – Continuous high-quality habitat that is well-connected to the wider landscape, and is likely used regularly by commuting and/or foraging bats, such as river valleys, broadleaved woodland, woodland edge, grazed parkland, etc.

All survey methodologies followed those of the Bat Conservation Trust *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2023).

14.6.5.6.3 Bat Activity Transect Surveys

The Site was assessed by an experienced ecologist (LG) in relation to the potential bat foraging habitat and commuting routes. Dusk activity transect surveys were conducted on the following dates: 13th June 2024, 1st July 2024, 23rd June 2025 (Link-road & Bridge route) and 1st October 2025, during favourable weather conditions.

All survey methodologies follow those of the Bat Conservation Trust *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2023) and have been undertaken within the recommended survey period. Collins (2023) notes that October surveys are acceptable subject to suitable conditions for bats being present, as was the case in 2025. The surveyors were equipped with a Elekon Batlogger M2 or M1 detectors and powerful L.E.D. torch and head torches. To comply with best practice guidelines, dusk transect surveys began between 15 minutes before sunrise and sunrise and were sustained for a minimum of 2 hours. The aim of the activity surveys was to determine if bats were present on Site, and if so, to monitor their behaviours such as feeding, commuting, or roosting.

Each survey design comprised of a walked transect around the Site focusing on linear features within the Site, with open field habitat also sampled. The set of transect routes also included a number of predetermined stopping points where the surveyors spent a standardised period stationary and recording activity (See Figure 147). This combination of stopping points and walked transects allows any hotspots in bat activity along the various field boundaries at the Site to be captured and compared and may reveal areas of particular importance to the local bat population. Slight variation between the 2024 and 2025 transect designs are due to the 2024 surveys focusing on the Phase 2 LRD redline boundary which overlaps with the Site of the Proposed Development. The Proposed Development (Phase 3 LRD) redline boundary is the only redline included within Figure 147 for clarity and consistency.

Weather conditions (Collins, 2023) and the time of year (Marnell et al., 2022) were suitable for bat surveys. The weather conditions for are described fully in Table 142.

Table 14.2. Summary of weather conditions during dusk transect surveys

Survey Date	Weather	Start Temp	End Temp
13/06/2024	Light breeze, dry, calm. Light precipitation at end of survey.	13°C	13°C
01/07/2024	Light breeze, dry, calm.	14°C	11°C
23/06/2025	Dry with Intermittent drizzle towards end of survey, light breeze, full cloud cover.	16°C	16°C
01/10/2025	Dry, light breeze, 60-75% cloud cover, good visibility.	17°C	15°C

14.6.5.6.4 Static Bat Detector Deployment

One (1 No.) Song Meter SM4BAT FS Ultrasonic static bat detector was deployed on two occasions over the course of 2023 and 2025 at the point of the proposed bridge crossing over the river Tolka (See Figure 147). The SM4 unit was set up to record from 20 minutes prior to sunset each night and it was deployed at this location for a period of 5 nights on both occasions (16th – 21st August 2023 and 18th – 23rd June 2025).

14.6.5.6.5 Bat Data Analysis

Species were identified from recordings using Elekon's BatExplorer software (Version 2.1.10.1) for transect data collecting using the BatLogger M2 and using Kaleidoscope Version 5.6.0c for the SM4 static data. BatExplorer and Kaleidoscope allows bat calls to be observed both audibly and on a sonograph to determine species identification. 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.

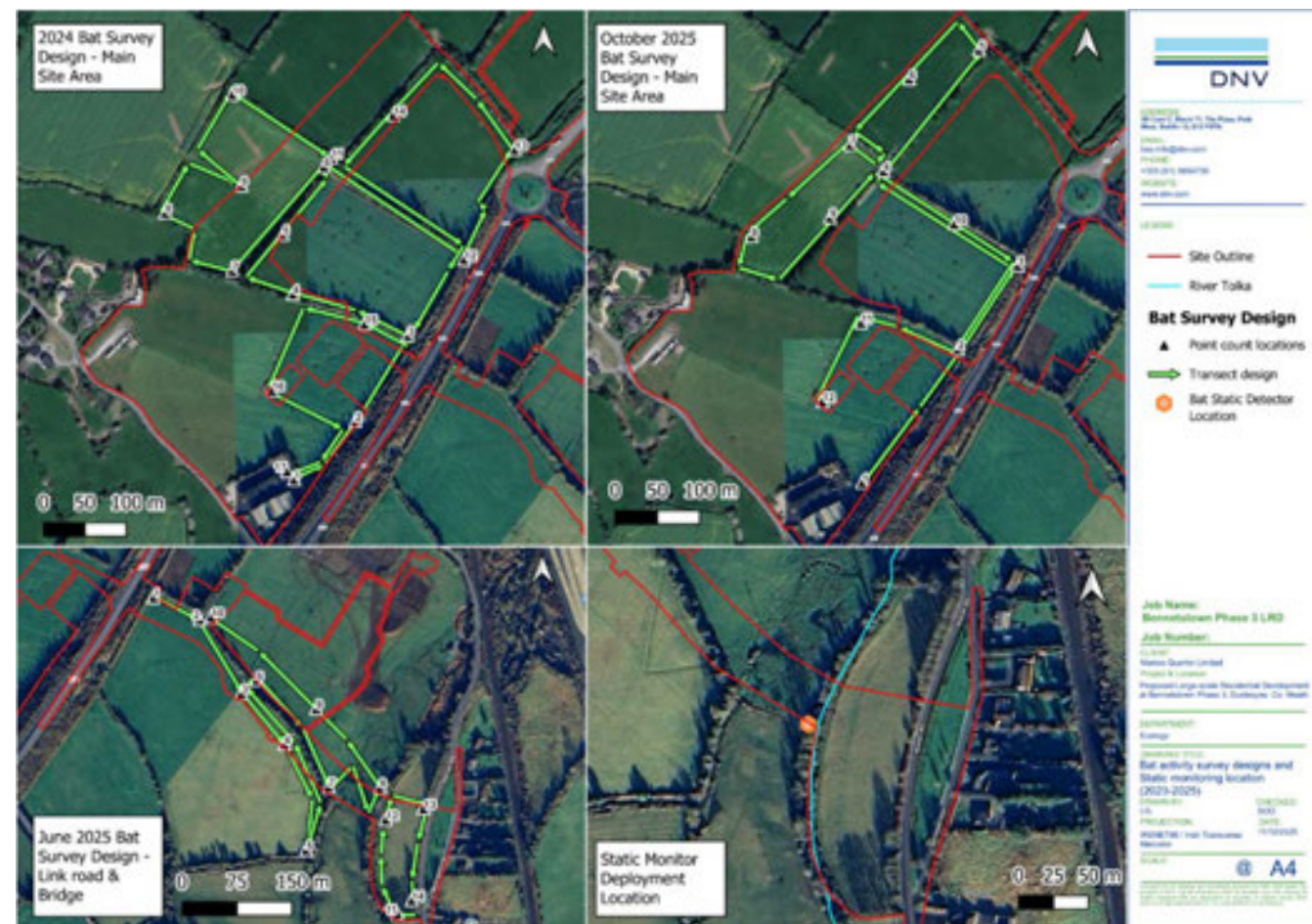


Figure 14.7. Bat activity designs and static monitoring locations (2023-2025).

14.6.6 Ecological Assessment

This Biodiversity Chapter was prepared following the methodology set out in *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2024) and with reference to the National Roads Authority 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009c), the Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022) and BS 42020:2013 *Biodiversity: Code of practice for planning and development* (BSI, 2013).

The evaluation of significant effects should be based on available scientific evidence. Based on the precautionary principle, if the available information is not sufficient, then a significant effect may be assumed likely to occur.

14.6.6.1 Evaluation of Ecological Features

The value of the ecological features, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation at different geographical scales (NRA, 2009c), presented in Appendix 14.2. 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. Based on best practice (CIEEM, 2024), any features considered to be less than of local value are not assessed within this Chapter.

14.6.6.2 Impact Assessment

As per the NRA guidelines, impact assessment is only undertaken of Key Ecological Receptors (KERs). The assessment of the potential impact of the Proposed Development on the identified KERs was carried out with regard to the criteria outlined in the EPA Guidelines (EPA, 2022), presented in Appendix 14.3. These guidelines set out a number of parameters that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts. These include:

- Positive, neutral or negative effect;
- Significance;
- Extent;
- Probability;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or feature, e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to an adverse effect of a sensitive habitat.

14.6.6.3 Assessment of Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a 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.

Relevant plans and policies (see Appendix 14.1) were reviewed to identify any potential for negative cumulative impacts with the Proposed Development. Additionally, existing planning permissions from the past five years (from 2020 onwards) within the ZOI of the Proposed Development were reviewed, with particular focus on potential cumulative impacts on the identified KERs. Long-term developments were also considered where applicable.

14.6.6.4 Avoidance, Mitigation, Compensation and Enhancement Measures

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement. When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

It is important for the EclA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- **Avoidance** is used where an impact has been avoided, e.g., through changes in scheme design. In practice, avoidance measures are typically implemented during the design stage via discussions and re-design (e.g., avoiding a sensitive habitat by relocating a building). Avoidance measures are therefore rarely reported within an EclA, which focuses on assessing the final design.
- **Mitigation** is used to refer to measures to reduce or remedy a specific negative impact in situ.
- **Compensation** describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible.
- **Enhancement** is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

14.7 Difficulties Encountered

Every effort has been made to provide a comprehensive description of the ecology of the Site, and an extensive search of available datasets for records of rare and protected species within proximity of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

In terms of the ecological surveys conducted at the Site the following limitations are noted.

As discussed in Section 14.8.4.5.1, potential tufa habitat was identified within the River Tolka during the otter and kingfisher survey conducted in 2025. In the absence of detailed data on the condition and conservation score of this section of habitat, the presence of a potential Annex 1 priority habitat '*Petrifying springs with tufa formation (Cratoneurion)*' [7220] has been assumed following the precautionary principle and has been assessed to be of National Significance as a result. The design of the bridge (clear span, set back from the river) and the targeted mitigation measures included in this Chapter for the protection of the River Tolka and associated aquatic receptors, are deemed sufficient to ensure that no significant adverse effects occur to this habitat and that it continues to exist *in-situ* into the future. As such, and based on the above approach taken, the absence of detailed condition and conservation status data is not deemed a significant limitation in this assessment.

With regard to survey timings, the surveys have largely been conducted within the optimal survey period for each specific species/species group. The Invasive species survey conducted in February 2025 is outside of the flowering season, however, it acted as a ground truthing survey for the July 2024 floral survey conducted at the height of the optimal survey season. Given the surveyor's in depth understanding of the Site and the habitats and flora therein (low ecological value, intensively managed agri-grassland), the potential for any additional high-impact invasive flora species being present in February 2025 and missed is deemed very unlikely. Furthermore, vigorous species such as Butterfly-bush, Japanese knotweed etc., are still readily identifiable in February when woody growth and canes are characteristically present.

No significant limitations of the field surveys and desk-based work completed to date were therefore encountered which would prevent robust conclusions being drawn as to the potential impacts of the Proposed Development.

14.8 Baseline Environment

14.8.1 Hydrology, Geology and Hydrogeology

The application Site is located in the Liffey and Dublin Bay Catchment (Catchment I.D 09) and in the Tolka_SC_010 Sub-catchment (Sub-catchment ID 09_10) (EPA, 2025).

The River Tolka flows to the north and east of the Site of the Proposed Development. The Naulswood and another watercourse; the Bennetstown, flow to the south-east of the main Site area, flowing in a south-easterly direction before joining with the Tolka approx. 1.1km to the south-east of the Site's south-eastern extent. These rivers flow as the main Tolka channel due south-east through Blanchardstown and central Dublin, before outflowing into Dublin Bay approx. 20km downstream of the Site (EPA, 2025). Another watercourse, the Lustown, also runs to the north of the main Site area and intersects with the northern services arm of the Proposed Development as it flows south-east before joining the Tolka.

These waterbodies are identified with the same EU code (IE_EA_09T010600) and are assessed as a single entity under the Water Framework Directive (WFD) ID TOLKA_020. The WFD status of these waterbodies is "*Moderate*", and they have been projected to be "*At Risk*" of not achieving their WFD objectives (EPA, 2025). The reported 2022 Q-value results from station 'Dunboyne Rd Br u/s Clonee' (located approx. 1.6km south-east of the Site) of 3-4 in 2022 indicate that water quality in the TOLKA_020 is "*Moderate*" downstream the Site.

The Site of the Proposed Development is situated on the Dublin (IE_EA_G_008) groundwater body that has been assessed as having *Good* WFD status for the period 2019-2024. The bedrock aquifer identified beneath the Site is mapped as "Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones" (LI) (EPA, 2025). The Groundwater Vulnerability Rating assigned to groundwater beneath the Site ranges from largely *Low (L)* for most of the Site to *Moderate (M)* along the Tolka (EPA, 2025).

14.8.2 Site Drainage

The main Site area is crossed with hedgerows and agricultural drainage ditches, some of which were observed to carry water during site visits as recently as December 2025. Flows were noted to be due east towards the R157 and associated drainage network. Surface water is directed via ditches on the east side of the road towards the River Tolka to the east of the Site. A site visit on 24th of July 2024 noted that the ditches were either dry, damp or with puddles, with no discernible flows present, however, during the winter flows were recorded to be regularly present. The ditches on Site appear to hold transient flows during periods of high rainfall and direct them to the River Tolka to the south-east.

14.8.3 Designated Sites

All European sites potentially linked to the Proposed Development have been identified and fully assessed in the AA Screening Report (DNV, 2025a) and NIS (DNV, 2025b) accompanying this submission under separate cover. A summary of the AA conclusions is given below.

Other nationally or internationally designated sites potentially linked to the Proposed Development are identified in Section 14.8.3.2.

14.8.3.1 European sites – Appropriate Assessment

The AA Screening Report concluded that a degree of uncertainty exists in whether the Proposed Development could give rise to potentially significant effects on the following European sites, namely:

- North Dublin Bay SAC (000206).
- South Dublin Bay SAC (000210).
- South Dublin Bay and River Tolka Estuary SPA (004024).
- North Bull Island SPA (004006).
- North-west Irish Sea SPA (004236).

Therefore, a NIS (DNV, 2025b) has been prepared for the Proposed Development, the conclusions of which are as follows:

“This NIS details the findings of the Stage 2 AA conducted to further examine the potential direct and indirect impacts of the Proposed Development at lands at Bennetstown Phase 3, Dunboyne, Co. Meath, on the following European Sites:

- North Dublin Bay SAC (000206).
- South Dublin Bay SAC (000210).
- South Dublin Bay and River Tolka Estuary SPA (004024).
- North Bull Island SPA (004006).
- North-west Irish Sea SPA (004236).

The above sites were 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 NIS investigated the likely direct and indirect effects of the proposed works, both during construction and operation, on the integrity and qualifying interests of the five above European Sites, alone and in combination with other plans and projects, taking into account the site’s structure, function and conservation objectives, and having regard to best scientific knowledge.

Where potentially significant effects were identified, a range of mitigation and avoidance measures have been suggested 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 sites, individually or in combination with other plans and projects. Where applicable, a suite of monitoring measures have been proposed to confirm the efficacy of said mitigation in relation to ensuring no adverse effects on the habitats or 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 adverse effects on the integrity and extent of North Dublin Bay SAC (000206), South Dublin Bay SAC (000210), South Dublin Bay and River Tolka Estuary SPA (004024), North Bull

Island SPA (004006) and North-west Irish Sea SPA (004236). Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European site”.

As such, European sites are not considered further in this Chapter as they have been assessed in full in the aforementioned AA and NIS.

14.8.3.2 Other Designated Sites

14.8.3.2.1 S-P-R Links to Designated Sites

Potential impact pathways are discussed in the following sections in the context of the Proposed Development, as it is described in Chapter 2 of this EIAR.

14.8.3.2.1.1 Direct Pathways

Hydrological pathways

The Site is located adjacent to the River Tolka, which is linked to the main Proposed Development area via a network of drainage ditches. The Tolka eventually flows into Dublin Bay over 20km downstream, which is designated as a UNESCO Biosphere¹. In addition, Dublin Bay hosts the following additional designated sites:

- Two Ramsar sites:
 - » Sandymount Strand/Tolka Estuary (832)
 - » North Bull Island (406)
- Three pNHAs:
 - » South Dublin Bay pNHA (000210)
 - » Dolphins, Dublin Docks pNHA (000201)
 - » North Dublin Bay pNHA (000206)

In the event of heavy and persistent rainfall, surface water discharges from the Site likely flow into the Tolka via the existing drainage ditch network. The Proposed Development includes the construction of a bridge over the Tolka and works within its floodplain. Therefore, in a worst-case scenario, construction related pollution events at the Site could contribute to a reduction in water quality at downstream designated sites. The precautionary approach is therefore adopted and also considers the largely unquantifiable number of developments underway along the River Tolka between the Site of the Proposed Development and Dublin Bay; which could act synergistically to contribute to an overall reduction in water quality through pollution events, in the absence of mitigation measures.

As such, this hydrological pathway to the above listed designated sites is considered further in this Chapter.

Hydrogeological pathways

During groundworks and other construction activities, the ground will be exposed and any potential accidental discharges to ground could potentially migrate vertically downward to the underlying bedrock aquifer and laterally within the aquifer to the Tolka.

¹ A biosphere is a special designation awarded by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) but managed in partnership by communities, NGOs and local and national governments (<https://www.dublinbaybiosphere.ie/>).

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According to the GSI Summary of Initial Characterisation for the Dublin groundwater body (GWB) (GSI, 2025b), most groundwater flow in the Dublin GWB is close to the surface with additional isolated flow along fractures and fissures located at depths up to 50 m.b.g.l. The general groundwater flow direction in this aquifer is towards the east coast and the River Liffey and Dublin City. Due to the generally low permeability of the aquifers within this GWB, a high proportion of the recharge from rainfall percolating through the soil will discharge rapidly to surface watercourses via the upper layers of the aquifer. This aquifer is therefore not expected to maintain regional groundwater flow paths and groundwater circulation from recharge to discharge points will more commonly take place over a distance of less than a kilometre. The GSI note that there will be highly varied groundwater and surface water interactions occurring within the large area of this groundwater body, and that the nature of these interactions will be determined by local factors e.g., depths and permeability of subsoil, slope, local permeability of the rock etc. It is noted that the Groundwater Vulnerability Rating assigned to groundwater beneath the Site ranges from *Low (L)* to *Moderate (M)*; low across the majority of the Site with moderate vulnerability along the course of the Tolka in the east of the Site (EPA, 2025).

There are no QI groundwater dependent habitats within designated sites downstream of the Proposed Development, located within the Dublin GWB. The Rye Water Valley/Carton pNHA (001398) is located approximately 6km southwest of the Site at its closest point within the Dublin GWB. This pNHA overlaps with the SAC of the same name designated for groundwater-dependent habitats, namely 'Petrifying springs with tufa formation (*Cratoneurion*) [7220]'.

Given the limited flow distance within the Dublin GWB of less than a kilometre, the generally eastwards direction of groundwater flow, the presence of numerous intercepting watercourses between the Site and Rye Water Valley/Carton pNHA (001398), and the location of this site *ca.* 6km to the southwest of the Site in the opposite general direction of groundwater flow, it is deemed that there is no potential for groundwater contaminants from the Site to reach this pNHA, let alone cause likely significant effects.

Due to the proximity of the Site to the River Tolka, any discharges to ground would likely contribute to the hydrological pathway provided by the Tolka River. As such, it is considered that the likely ZOI via hydrogeological pathways is limited to the local area of the Site and the River Tolka.

As such, a hydrogeological impact pathway in relation to designated sites is not considered further in this Chapter.

Air and land pathways

The Construction Phase of the Proposed Development could introduce dust and noise disturbance impacts transferable via air and land pathways, as well as increased lighting and human activity at the Site and in the vicinity of the Site during the Construction and Operational Phases. As discussed in the following sections in more detail, the likely ZOI via air and land pathways is considered to be limited to surrounding areas within a maximum of approx. 400m (dust) and 300m (noise) from the Site boundary for any noise and dust sources, depending on prevailing weather conditions. Additionally, light spill and disturbance from human activity are considered to be limited to areas within the Site and habitats immediately adjacent to the Site's boundaries. As detailed below, no designated sites are therefore located within the potential ZOI for land and air impact pathways.

Construction Phase Dust

According to Institute of Air Quality Management (IAQM) *Guidance on the Assessment of Mineral Dust Impacts for Planning* (IAQM, 2016), experience of the Working Group together with published studies and anecdotal evidence on the change in both airborne concentrations and the rate of deposition with distance, suggests that dust impacts will occur mainly within 400m of the operation, even at the dustiest of mineral sites. Adverse dust impacts from sand and gravel sites are uncommon

beyond 250m, and beyond 400m from hard rock quarries measured from the nearest dust generating activities. IAQM (2016) note that it is commonly accepted that the greatest impacts will be within 100m of a source, and this can include both large (>30µm) and small dust particles. The greatest potential for high rates of dust deposition and elevated particulate matter (PM10) concentrations occurs within this 100m distance.

IAQM note that their 2016 guidance applies to the operational phases of minerals developments e.g., quarries. Whilst these share some common features with construction activities, minerals sites can be on a significantly larger scale. The IAQM's 2014 *Guidance on the assessment of dust from Demolition and Construction* (Holman *et al.*, 2014) deals with construction dust assessment specifically and does not provide specific dust impact distances as such but assesses sensitivity to dust impacts at <20m and <50m ranges for ecological features; impact zones far smaller than that of mineral sites detailed in IAQM (2016).

Even if taking a precautionary approach, i.e., using the larger 400m, 250m, and 100m impact zones recommended for minerals operations to assess the potential for construction dust related impacts on European sites, the nearest designated sites to the Proposed Development are the *Royal Canal pNHA (002103)*, located approx. 4.9km southeast of the Site and the *Rye Water Valley/Carton pNHA (001398)*, located approx. 6km to the southwest. As such there is no potential for Construction Phase dust related effects to occur at this or any other designated site.

As such, a dust impact pathway in relation to designated sites is not considered further in this Chapter.

Construction Phase Noise

The disturbance effects associated with construction activities at the Site would not be expected to extend beyond a distance of c. 300m, as noise levels associated with general construction activities would attenuate to close to background levels at that distance (Cutts *et al.*, 2009). No designated sites are located within this distance and no significant usage of the Site or adjacent lands by SCI waterbird species was recorded over the course of the 2023/24 and 2024/25 winter seasons (please refer to Section 14.8.5.3.2.3 of this Chapter and the AA Screening that accompanies this application under separate cover for further details).

As such, a noise impact pathway in relation to designated sites is not considered further in this Chapter.

Bird-Building Collisions and Flight-line Obstruction

No notable flightlines for SCI bird species were recorded over the Site. The Site due to its location is a significant distance inland and is not deemed to be a significant *ex-situ* resource for SCI species associated with any designated sites (e.g., Ramsar sites), and this was also reflected in the lack of usage of the Site over the course of the 2023/24 and 2024/25 winters. The results of these surveys align with those bird surveys undertaken on the Bennetstown Phase 1 LRD lands during the 2022 winter where a similar wintering assemblage was recorded.

With respect to SCI bird species from designated sites which regularly use or travel over inland areas (i.e. geese, gull species, duck species and a number of waders), these species navigate the urban environment with built structures daily. To put some context on some of their avoidance capabilities, in a different setting and for use in collision risk modelling for onshore wind turbines, an avoidance rate of 99.5% is applied for large gull species and an avoidance rate of 99.2% is applied for small gull species (Furness, 2019), which essentially means that 99.5% and 99.2% of gull flights, respectively, will avoid collision with a moving turbine. For curlew the avoidance rate applied is 98% (SNH, 2018). The risk of collision is even less with a static, clearly detectable building.

The buildings proposed are comprised of low-rise residential with a max height of four storeys and so further reduce the

collision risk. As such, an impact pathway in relation to bird-building collisions and/or flight-line obstruction, with species linked to designated sites is not considered further in this Chapter.

Construction or Operational Phase Traffic/ Air Pollution

Due to the considerable distances between the Proposed Development and the nearest designated sites, there is no potential for likely significant effects to occur relating to Construction or Operational Phase traffic/ air pollution. As such, a traffic/air pollution impact pathway in relation to designated sites is not considered further in this Chapter.

14.8.3.2.1.2 Indirect Pathways

Foul Water Treatment

During the Construction Phase, appropriate welfare facilities will be provided for Site personnel. As noted in the CEMP (PMG, 2025a), the principal welfare facilities will comprise of site offices, toilets, canteen and drying rooms and will be maintained by the main contractor. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby ditches/ drains.

During the Operational Phase, the Proposed Development will be served by separate foul water and surface water sewers during its Operational Phase. It is noted that there is a weak indirect hydrological pathway between the Site and the designated sites in Dublin Bay via this sewerage network, which will eventually be processed and treated at Ringsend Wastewater Treatment Plant (WwTP) prior to discharge to Dublin Bay. The main area of dispersal of the treated effluent from Ringsend WwTP is in the Tolka Basin and around North Bull Island.

The potential for foul waters generated at the Site of the Proposed Development to reach the designated sites within Dublin Bay and cause significant effects, during the Construction and Operational Phases, is deemed to be negligible. Significant effects on marine biodiversity and the European sites within Dublin Bay from the current operation of Ringsend WwTP are unlikely, as detailed within the EIAR prepared for the WwTP upgrades (Irish Water, 2018). Furthermore, the increase of the population equivalent (PE) load at the facility as a result of the Proposed Development, assuming each PE unit was not previously supported by the WwTP, is considered to be an insignificant increase in terms of the overall scale of the facility. The increased load as a result of the Proposed Development does not have the capacity to alter the effluent released from the WwTP to such an extent as to result in likely significant effects on designated sites in Dublin Bay. It is also noted that, although not being relied upon to screen out likely significant effects, the ongoing upgrade works to Ringsend WwTP due to be completed by the end of 2025 (Irish Water website: <https://www.water.ie/projects/local-projects/ringsend/>) will increase the capacity of the facility from 1.6 million PE to 2.4 million PE, further reducing any effect the WwTP has on Dublin Bay. This plant upgrade will result in an overall reduction in the final effluent discharge of several parameters from the facility including biochemical oxygen demand (BOD), suspended solids, ammonia, dissolved inorganic nitrogen (DIN) and molybdate reactive phosphate (MRP).

As such, a foul water impact pathway in relation to designated sites is not considered further in this Chapter.

Operational Phase Recreational Pressure

There is approx. 4.9km and 6km between the nearest designated sites and the Proposed Development (the Royal Canal pNHA (002103) and the Rye Water Valley pNHA (001398) respectively). The likelihood of all residents from the Proposed Development once operational attending a designated site at the same time, located at such distances away is extremely unlikely. Even still, the nearest designated sites are a canal and a river valley respectively, and due to their wet, often inaccessible and dangerous natures, it is highly unlikely residents will disturb protected habitats or interfere with them in any significant manner. Therefore,

the likelihood of recreational pressures occurring at any designated site as a result of the Proposed Development is unlikely.

As such, an Operational Phase recreational pressure impact pathway in relation to designated sites is not considered further in this Chapter.

14.8.3.3 Relevant Designated Sites

A designated site will only be at risk from likely significant effects where an S-P-R link of note exists between the Proposed Development and the designated site. All designated sites considered as part of the S-P-R method (excl. European sites) are listed in Table 143.

Table 143. Designated sites considered with the Source-Pathway-Receptor (S-P-R) method to establish notable links between the sources of effects arising from the Proposed Development, and any relevant designated sites. Those sites with notable S-P-R links that are further assessed in this report are highlighted in green (if any).

Site Name & Site Code	Designation Rationale / Qualifying Interests	Potential Pathways
Internationally Designated Sites		
Sandymount Strand/ Tolka Estuary (832) Ramsar Site	An intertidal system supporting a large bed of eelgrass (Zostera noltii) with extensive areas of sandflats. The site is important for various species of waterbirds, supporting internationally important numbers of Brent Geese and large numbers of roosting gulls and terns. Various species of annalids, bivalves and small gastropods occur. Bait-digging is a regular activity on the sandy flats.	These Dublin Bay sites share a tenuous direct hydrological pathway via the surface water network and the River Tolka.
North Bull Island (406) Ramsar Site	A small island built up over 200 years against a harbour wall and the adjoining foreshore of sandy beaches, saltmarshes and mudflats. The site is unique in Ireland because it supports well-developed saltmarsh and dune systems displaying all stages of development from the earliest phase of colonization to full maturity. The site supports five protected or threatened plant species and nationally important populations of three insect species. The area is important for nesting Sterna albifrons (80 pairs, or about 30% of the Irish population) and for numerous species of wintering waterbirds. Human activities include bait digging.	These sites also share an indirect pathway via foul water treatment at Ringsend WwTP, deemed insignificant due to upgrade works at WwTP and scale of Proposed Development.
Dublin Bay UNESCO Biosphere	In 1981, UNESCO recognised the importance of Dublin Bay by designating North Bull Island as a Biosphere because of its rare and internationally important habitats and species of wildlife. To support sustainable development, UNESCO's concept of a Biosphere has evolved to include not just areas of ecological value but also the areas around them and the communities that live and work within these areas. There have since been additional international and national designations, covering much of Dublin Bay, to ensure the protection of its water quality and biodiversity. To fulfil these broader management aims for the ecosystem, the Biosphere was expanded in 2015. The Biosphere now covers Dublin Bay, reflecting its significant environmental, economic, cultural and tourism importance, and extends to over 300km². Over 300,000 people live within the newly enlarged Biosphere.	

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Site Name & Site Code	Designation Rationale / Qualifying Interests	Potential Pathways
Nationally Designated Sites		
South Dublin Bay pNHA (000210)	None available, but pNHA overlaps with South Dublin Bay SAC and is designated for similar reasons.	These Dublin Bay sites share a tenuous direct hydrological pathway via the surface water network and the River Tolka.
Linear Distance to Proposed Development: approx. 19.8km ESE		
North Dublin Bay pNHA (000206).	None available, but pNHA overlaps with North Dublin Bay SAC and is designated for similar reasons.	
Linear Distance to Proposed Development: approx. 17.5km ESE		These sites also share an indirect pathway via foul water treatment at Ringsend WwTP, deemed insignificant due to upgrade works at WwTP and scale of Proposed Development.
Dolphins, Dublin Docks pNHA (000201)	None available, but pNHA overlaps with South Dublin and River Tolka Estuary SPA and is designated for waterbird species, particularly terns.	
Linear Distance to Proposed Development: approx. 20km ESE		
Royal Canal pNHA (002103)	A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The hedgerow, although diverse, is dominated by Hawthorn (<i>Crataegus monogyna</i>). Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. The rare and legally protected Opposite-leaved Pondweed (<i>Groenlandia densa</i>) (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. <i>Tolypella intricata</i> (a stonewort listed in the Red Data Book as being vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	No S-P-R linkage links the Proposed Development to this Site.
Linear Distance to Proposed Development: approx. 4.9km SE		

Site Name & Site Code	Designation Rationale / Qualifying Interests	Potential Pathways
Rye Water Valley/Carton pNHA (001398)	None available, but pNHA overlaps with Rye Water Valley/Carton SAC and is designated for similar reasons.	No direct connectivity to the pNHA. Dust impact pathway was screened out by proxy in AA Screening and therefore no likelihood of significant effects exists for this designated site.
Linear Distance to Proposed Development: approx. 6km SW		

The following designated sites have been identified as being connected to the Proposed Development by S-P-R linkages:

- Sandymount Strand/Tolka Estuary Ramsar Site (832).
- North Bull Island Ramsar Site (406).
- Dublin Bay UNESCO Biosphere.
- North Dublin Bay pNHA (000206).
- South Dublin Bay pNHA (000210).
- Dolphins, Dublin Docks pNHA (000201).

The above sites are all linked to the Site via a hydrological pathway during the Construction Phase; via works in proximity to and over the River Tolka. A detailed assessment of potential impacts relating to Dublin Bay European sites is provided in the AA Screening Report (DNV, 2025a) and NIS (DNV, 2025b) that accompany this application under separate cover. The AA Screening Report concluded that the potential for likely significant effects to downstream Dublin Bay European sites could not be ruled out and an NIS was therefore prepared.

The NIS details the mitigation measures required to negate any likely significant effects on downstream Dublin Bay European sites and concludes that the Proposed Development will have no adverse effects on the integrity and extent of any European site once the recommended mitigation is put in place. This conclusion also applies by proxy to the South Dublin Bay pNHA (000210), Dolphins, Dublin Docks pNHA (000201), North Dublin Bay pNHA, the Dublin Bay UNESCO Biosphere and the two named RAMSAR sites, which overlap with South Dublin Bay and River Tolka Estuary SPA (004024) and North Bull Island SPA (004006), and are designated for similar reasons. This is due to the tenuous and singular nature of the hydrological impact pathway that connects them to the Proposed Development (i.e., being located ca. 20km downstream along the River Tolka).

As these designated sites have been assessed (and any potential significant effects addressed through mitigation) in the AA Screening and NIS Reports that accompany this application under separate cover, they will not be assessed or discussed specifically in this Chapter. General mentions in this Chapter of the receiving aquatic environment e.g., the Tolka and its habitats and species, and associated mitigation measures to protect same, are analogous with those proposed in the NIS to protect the above protected sites.

The distances and lack of S-P-R impact pathways between the Site and any further designated sites are sufficient to exclude the possibility of significant effects arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.

14.8.4 Habitats

It is noted that at time of writing (December 2025) works have begun on Phase 1 and 2 of the Bennetstown LRDs which overlap with the Site of the Proposed Development (Phase 3) to the north and east. As such, earth works including infrastructure enabling works and archaeological assessments are currently underway and some vegetation removal has been conducted as part of these permitted developments i.e., removal of ash dieback afflicted trees and sections of hedgerows as proposed as part of these planning applications. For the purposes of this assessment and to avoid confusion with the ongoing Phase 1 & 2 works, the pre-works condition of the habitats at the Site is described in this Chapter.

The majority of the Site is comprised of agricultural grassland (Fossitt code: GA1) known to have supported sheep and cattle in the recent past. Linear stretches of treeline (Fossitt code: WL2) and hedgerow (Fossitt code: WL1) criss-cross the Site, following the field boundaries. Drainage ditches (FW4) mirror the hedgerows and treelines at the Site. A small section of arable crop field (Fossitt code: BC1) is included within the western section of the Site. Mixed broadleaved woodland (Fossitt code: WD1) is present in the form of a planted band of trees approx. 15-20m wide running along the western berm of R157. This feature makes up the eastern boundary of the main Site area. The River Tolka represents lowland depositing river habitat (Fossitt code: FW2). A small section of wet grassland (Fossitt code: GS4) is present in the east of the Site along the route of the proposed link-road and bridge as it crosses the Tolka’s floodplain. The various sections of road and farmyard included within the Site constitute buildings and artificial surfaces (Fossitt code: BL3) habitat.

Overall, the grassland habitats are agriculturally influenced and are species poor, with grasses such as perennial ryegrass (*Lolium perenne*) dominating. Cattle and sheep were recorded grazing the lands within and to the south of the Site and the swards were short during the July 2024 Site visit.

No rare or high-impact invasive flora species were recorded at the Site during any of the Site visits.

14.8.4.1 Grassland habitats

Overall, the grassland habitats are highly agricultural and species poor, with perennial ryegrass (*Lolium perenne*) dominating the GA1 sward throughout the Site. Other grass species recorded in this habitat included Yorkshire fog (*Holcus lanatus*); with forb species comprising white clover (*Trifolium repens*), dandelion (*Taraxacum officinale*), common mouse-ear (*Cerastium fontanum*), creeping buttercup (*Ranunculus repens*), meadow buttercup (*Ranunculus acris*), broadleaved dock (*Rumex obtusifolius*), and spear thistle (*Cirsium vulgare*). Cattle and sheep were recorded grazing the lands within the Site and the swards were notably short during Site visits. A sports pitch of Amenity grassland (GA2) lies in the west of the Site.

GS4 wet grassland habitat within the Tolka’s flood plain is waterlogged in places and was observed to be flooded during winter visits to this part of the Site. Species were similar to GA1 in nature but with more aquatic tolerant species such as silverweed (*Potentilla anserina*) present within the sward. The less managed GS4 margin along the river consisted of species such as great willowherb (*Epilobium hirsutum*), meadowsweet (*Filipendula ulmaria*), nettle (*Urtica dioica*), false oatgrass (*Arrhenatherum elatius*), hedge bindweed (*Calystegia sepium*) and field bindweed (*Convolvulus arvensis*).

The grassland habitats at the Site are intensively managed as cattle and sheep pasture, evidenced by the low species diversity they support and the dominance of agricultural species present. These habitats are deemed to be of overall **local importance (lower value)**.

14.8.4.2 Built land/artificial habitats

Artificial surfaces (BL3) habitat occur at the Site in the form of the stretches of tarmac road and pavement included within the redline boundary, along with the farmyard in the south of the Site and the prefabricated structures in the south-west of the

Site. The fields directly west of the main Site area supported arable crops (BC1) at the time of the 2024 surveys. These habitats are highly anthropogenic and are of **negligible ecological** value.

14.8.4.3 Hedgerows, Treelines and Ditches

Please refer to the Hedgerow Appraisal Report (HAR) prepared by Enviroguide (2024c) and provided in Appendix 14.5, for further details on the various hedgerows and treelines at the Phase 2 LRD lands which overlap with and include those at the Site of the Proposed Development. Please see Figure 148 which shows the hedgerows assessed in the HAR for reference.



Figure 14.8. Overview of the Hedgerows assessed as part of the Hedgerow Appraisal of the lands containing the Site, as part of the Phase 2 LRD (extracted from Enviroguide (2024)).

Hedgerows (WL1) and treelines (WL2) are present throughout the Site. These hedgerows and treelines contained drainage ditches (FW4) running along the various field margins. Hedgerows and treelines mostly comprised of combinations of elder (*Sambucus nigra*), hawthorn, blackthorn, ash (*Fraxinus excelsior*), sycamore (*Acer pseudoplatanus*), bramble (*Rubus fruticosus*), spindle (*Euonymus europaeus*), wild cherry (*Prunus avium*), dog rose (*Rosa canina*), and willow species (*Salix* spp.).

The ditches at the Site vary in how overgrown or open they are, with the ditch running through the woodland along the berm of the R157 Road observed to be overgrown with species such as great willowherb (*Epilobium hirsutum*), rushes (*Juncus*

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sp.), bramble and grasses. Meadow buttercup and dandelion were also present along the edges of the ditch. The ditches running along the hedgerows and treelines throughout the Site were often overgrown with brambles or more open with ivy cover being the dominant understorey species in more shaded sections. Hart’s tongue fern (*Asplenium scolopendrium*), meadowsweet and great willowherb were also present along with other hedgerow understorey species such as nettle, false oat grass, wood avens (*Geum urbanum*), cleavers (*Galium aparine*).

14.8.4.3.1 Summary of Hedgerow Appraisal

Table 144 below is extracted from the HAR prepared by Enviroguide (2024c) and shows the condition and ecology scores for each hedgerow.

Table 14.4. Collated Hedgerow Scores from HAR (Enviroguide, 2024c)

Hedge row	Condition Score			Mean	Significance in Ecology Score				Mean
	Structural	Continuity	Negative Indicator		Species Diversity	Ground Flora	Structure	Connectivity	
H1	3	3	2	Highly Favourable	2	2	2	2	Moderately Significant
H2	3	3	2	Highly Favourable	3	1	1	2	Moderately Significant
H3	3	3	1	Favourable	2	1	2	2	Moderately Significant
H4	2	2	2	Favourable	2	2	1	2	Moderately Significant
H5	2	3	2	Favourable	2	1	1	2	Moderately Significant
H6	2	2	2	Highly Favourable	2	2	1	2	Moderately Significant

The HAR made the following conclusions with regard the condition and ecological value of the hedgerows and treelines present at the Site of the Proposed Development:

“The condition of the hedgerows at the Site are ranked on a scale of 0 to 3, where 0 is Unfavourable, 1 is Adequate, 2 is Favourable and 3 is Highly Favourable. The significance in ecology of the hedgerows at the Site are ranked on a scale of 0 to 4, where 0 is Low Significance, 1 is Slightly Significance, 2 is Moderately Significance, 3 is Significance and 4 is Highly Significance. The higher the score, the more favourable the condition of the hedgerow in question. A score of 0 in any category is indicative of a hedgerow that is in an unfavourable condition and low significance in ecology overall at present (Foulkes et al., 2013). ...

As can be seen, median scores of the six hedgerows have been allocated to Highly Favourable to Favourable condition assessment and Moderately Significant in ecology as per the HAS.

The structure and condition of the hedgerows were scored as higher than favourable in terms of over-grown profiles with adequate height and width, continuity, small coverage of common ivy in the canopies and the presence of internal drainage ditches, although there was no margin for most hedgerows. The significance in ecology of the hedgerows was scored as moderate reflecting small-medium numbers of woodland species among components of hedgerows, no connectivity with

woodlands and internal drainage ditches lacking in significant water presence.”

Overall, the scores for the hedgerows at the Site show that they are in good condition, with moderate ecological value. Please see the Hedgerow Appraisal Report in Appendix 14.5 for further detail.

Due to their favourable condition, their provision of wildlife corridors through a biodiversity poor agricultural landscape, and their connectivity to the River Tolka downstream, these hedgerows, treelines and drainage ditches are considered to be of **local importance (higher value)**.

14.8.4.4 Mixed Broadleaf Woodland (WD1)

Mixed broadleaved woodland (WD1) is present in the form of a planted band of trees approx. 15-20m wide running along the western berm of R157. Species of tree present include field maple (*Acer campestre*), willow, beech (*Fagus sylvatica*), oak (*Quercus sp.*), hawthorn, hazel (*Corylus avellana*). The understorey was GS2 in nature in breaks in the young tree canopy with false oat grass, cock’s foot (*Dactylus glomerata*), Yorkshire fog, and dandelion noted. This woodland belt provides a wildlife corridor that links with other habitats to the north and south of the Site along the road, as well as the hedgerows running east and west of the R157. The section of this habitat within the Site is therefore considered to be of **local importance (higher value)**.

14.8.4.5 The River Tolka (FW2)

The river depth on the in June 2025 varied from approx. 30-100cm and the width of the river varied from approx. 2-3m in width. The banks of the river varied in their degree of vegetation cover; from open grass verge and fencing along the west bank upstream of the proposed bridge crossing, where agricultural fields directly abut the channel, to shaded treelined banks downstream of same (See Figure 1421 and Figure 1422). The riverbed was noted to comprise of both silts an cobbles, with areas of sediment build-up noted where livestock access to the river was possible (particularly at the proposed bridge location) (Figure 149). The Tolka is a salmonid river system, and this particular stretch was observed to support both kingfisher and otter, indicating sufficient fish stocks are supported by the river in the vicinity of the Site. This stretch also provides a wildlife corridor through an intensively managed agricultural landscape and, as such, is considered to be of **County Importance**.



Figure 14.9. Images showing the riverbed (left) and areas of livestock access and poaching at the location of the proposed bridge crossing (right).

14.8.4.5.1 Potential Annex 1 Tufa Habitat

During the otter and kingfisher survey conducted of the stretch of the River Tolka that passes through the Site in June 2025, the surveyor noted the presence of possible tufa formations along part of the riverbed. These features could indicate the presence of ‘*Petrifying springs with tufa formation (Cratoneurion)*’ [7220], an Annex I priority habitat listed under the Habitats Directive.

Based on the significant level of water present (i.e., a full flowing section of the Tolka River), and the descriptions provided in the NPWS ‘*Monitoring guidelines for the assessment of petrifying springs in Ireland*’ (Lyons & Kelly, 2016), this habitat may possibly align with ‘Group 3 *Brachythecium rivulare-Platyhypnidium riparioides* Tufaceous Streams and Flushes’ tufa community type.

Lyons and Kelly (2016) describe Group 3 tufa communities as being characterised by the presence of trickling water in tufa-forming streams, waterfalls, flushes and seepage zones, and notes that bare, unvegetated tufa is characteristic, especially beneath flowing water. The authors note that:

“This community forms in both semi-natural and anthropogenically modified habitats. In some cases, spring waters contain high levels of macro-nutrients and/or other pollutants. Many modified examples are strongly tufa-forming (but often species-poor).”

The above description fits that of the potential tufa habitats present along this stretch of the Tolka, with what appears to be a layer of paludal tufa along part of the riverbed, with calcareous deposits on cobbles and rocks present and little vegetation cover (See Figure 1410). The DNV surveyor also noted the possible presence of Endive Pellia (*Pellia endiviifolia*) a positive indicator species for Annex I 7220 tufa habitat, growing on the riverbed (See Figure 1411). In the absence of detailed data on the condition and conservation score of this section of habitat should it represent ‘*Petrifying springs with tufa formation (Cratoneurion)*’ [7220], the presence of a potential Annex 1 priority habitat is considered to be of **National Significance**, following the precautionary principle.



Figure 1410. Possible paludal tufa deposits on the riverbed (A) and close up of calcareous deposits on a stone from the riverbed.



Figure 14.11. Possible presence of *P. endiviifolia* on the riverbed.



Figure 14.12. Habitats present at the Site of the Proposed Development.

14.8.5 Species and Species Groups

14.8.5.1 Flora

14.8.5.1.1 Rare and Protected

The Site of the Proposed Development is located within the NBDC Ordinance Survey 10km (O04) and 2 km (O04B and O04C) grid squares. Species records from the NBDC online database were studied for the presence of rare and/or protected species within these grid squares within the last 20 years. This database contained no records of protected flora within the last 20 years, however, one near threatened plant species, namely corn marigold (*Glebionis segetum*), was recorded on 22/09/2013 in the 'Irish Vascular Plant Data - Paul Green' database and occurred within the 10km (O04) grid square.

The Floral Protection Order (FPO) Bryophytes database was also checked for rare and protected flora records within the vicinity of the Proposed Development. No rare and/or protected bryophytes exist within the immediate vicinity of the Proposed Development, where the nearest record of a protected bryophyte was many-seasoned thread-moss (*Bryum intermedium*) occurring approximately 8.2km southeast of the Proposed Development.

14.8.5.1.2 Invasive species

There are records for four species of flora considered to be invasive within the grid squares which encompasses the Site of the Proposed Development. Details of these records are listed in Table 145.

Table 145. Records of invasive species of flowering plant for the surrounding 2km (O04B & O04C) and 10km (O04) grid squares associated with the Site from the National Biodiversity Data Centre.

Species	Grid Square	Date of Last Record	Source	Designations
Butterfly-bush (<i>Buddleja davidii</i>)	O04 (10km) O04B (2km)	21/09/2013	Irish Vascular Plant Data - Paul Green	Medium Impact Invasive Species
Sycamore (<i>Acer pseudo-platanus</i>)	O04 (10km) O04B (2km)	31/05/2022 21/09/2013	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards Irish Vascular Plant Data - Paul Green	Medium Impact Invasive Species
Himalayan Honeysuckle (<i>Leycesteria formosa</i>)	O04 (10km)	13/06/2022	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	Medium Impact Invasive Species
Japanese Knotweed (<i>Reynoutria japonica</i>)	O04 (10km)	30/06/2009	National Invasive Species Database	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477/2011 (Ireland) Regulation S.I. 374/2024 (Ireland) The Wildlife (Northern Ireland) Order 1985

14.8.5.1.3 Field Survey Results

No rare/protected plant species were recorded during field surveys of the Site and their presence is highly unlikely given the highly managed agricultural nature of the lands. The only invasive plant species recorded at the Site during field surveys was sycamore, located along hedgerows and treelines. Despite being classified as a *Medium* impact invasive species, sycamore has recently been nominated as a potential structural replacement for Ash due to the similar ecological requirements and ability to support similar species (Short and Hawe, 2018). It is noted that Ash die-back is present on Site and affects most of the Ash trees therein, so Sycamore may prove a suitable replacement if present already at the Site. Sycamore is 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. However, sycamore’s invasiveness is considered to be more of an issue in some sensitive native woodland settings (Leslie, 2005). As such, Sycamore is not considered to pose any risk of impacts at the Site of the Proposed Development and will be removed where required as per the Arborist’s Tree Impact Plan.

14.8.5.2 Non-volant Mammals

14.8.5.2.1 Desk Study Results

Records for terrestrial mammals were obtained from the NBDC online database. Table 146 lists these species, their date of last record and summarises their protected status/designation. In total, 14 mammal species (ten native and four non-native/invasive) were recorded within the 10km (O04) and 2 km (O04B and O04C) grid squares which encompass the Proposed Development Site.

Table 146. Records of mammals for the surrounding 2km (O04B & O04C) and 10km (O04) grid squares associated with the Site from the National Biodiversity Data Centre.

Species	Grid Square	Date of Last Record	Source	Designations
Native Mammals				
West European Hedgehog <i>(Erinaceus europaeus)</i>	O04 (10km)	09/11/2023	Hedgehogs of Ireland	Wildlife Act 1976 (as amended)
	O04B (2km)	20/08/2023	Road Kill Survey	
	O04C (2km)	21/05/2010		
Eurasian Badger <i>(Meles meles)</i>	O04 (10km)	31/03/2023	Mammals of Ireland 2016-2025	Wildlife Act 1976 (as amended)
	O04C (2km)	31/12/2016	Badger Setts of Ireland Database	
European Otter <i>(Lutra lutra)</i>	O04 (10km)	16/09/2004	Otter survey of Ireland 2004 & 2005	Wildlife Act 1976 (as amended)
	O04C (2km)			EU Habitats Directive Annex II & IV.
Pine Marten <i>(Martes martes)</i>	O04 (10km)	04/06/2017	Mammals of Ireland 2016-2025	Wildlife Act 1976 (as amended) EU Habitats Directive Annex V.
Pygmy Shrew <i>(Sorex minutus)</i>	O04 (10km)	11/04/2017	Mammals of Ireland 2016-2025	Wildlife Act 1976 (as amended)
Red Deer <i>(Cervus elaphus)</i>	O04 (10km)	31/12/2008	Deer of Ireland Database	Wildlife Act 1976 (as amended)
Irish Hare <i>(Lepus timidus subsp. hibernicus)</i>	O04 (10km)	12/05/2016	Mammals of Ireland 2016-2025	Wildlife Act 1976 (as amended) EU Habitats Directive Annex V.
Red Fox <i>(Vulpes vulpes)</i>	O04 (10km)	24/01/2016	Atlas of Mammals in Ireland 2010-2015	Not legally protected
	O04C (2km)	12/11/2013		
Wood Mouse <i>(Apodemus sylvaticus)</i>	O04 (10km)	22/11/2017	Mammals of Ireland 2016-2025	Not legally protected
Irish Stoat <i>(Mustela erminea subsp. hibernica)</i>	O04 (10km)	22/06/2015	Atlas of Mammals in Ireland 2010-2015	Not legally protected

Non-native Mammals				
Sika Deer (<i>Cervus nippon</i>)	O04 (10km)	31/12/2008	Deer of Ireland Database	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477/2011 (Ireland) Regulation S.I. 374/2024 (Ireland)
European Rabbit (<i>Oryctolagus cuniculus</i>)	O04 (10km) O04C (2km)	16/11/2017 20/06/2014	Mammals of Ireland 2016-2025 Atlas of Mammals in Ireland 2010-2015	Medium Impact Invasive Species
Grey Squirrel (<i>Sciurus carolinensis</i>)	O04B (2km)	20/09/2012	Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species EU Regulation No. 1143/2014 Regulation S.I. 477/2011 (Ireland) Regulation S.I. 374/2024 (Ireland)
Brown Rat (<i>Rattus norvegicus</i>)	O04 (10km)	16/06/2013	Atlas of Mammals in Ireland 2010-2015	High Impact Invasive Species

14.8.5.2.2 Field Survey Results

A group of six badger latrines were recorded in the east of the main Site area, by the wooded boundary that runs along the R157 road (Figure 1413 and Figure 1420) during the July 2024 site visit. The latrines were recent and contained fresh dung, some of which was composed of grain. Signs of snuffle holes (foraging marks) were located in the vicinity of the latrines. Mammal trails led from the latrines to what appeared to be a manufactured gap in the fencing (a combination of wooden post and rail and mesh fencing) at ground level (see Figure 1415 and Figure 1416). The farmland on the far side (eastern side) of the R157 was accessed and another manufactured gap was observed in the woodland buffer fencing (Figure 1417). A view west into the woodland undergrowth revealed a culvert pipe leading under the road (Figure 1418). This is likely to be the 600m pipe shown on the JFA Site Survey drawing (Figure 1419). The combination of this pipe culvert, running parallel but separate to the surface water culvert, along with the presence of what appear to be manufactured gaps in the fencing, may represent a mammal underpass created during the building of the R157. The presence of the latrines and mammal trails would indicate that it is being actively used as such by local badgers.



Figure 14.13. The group of badger latrines, two can be seen highlighted in red.

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Figure 14.14. One of the badger latrines



Figure 14.15. Mammal trail leading to the gap in the fence.

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Figure 14.16. Manufactured gap in fence at ground level (western side of R157).



Figure 14.17. Manufactured gap in fencing located on the eastern side of the R157



Figure 14.18. View of the 600m culvert (possible mammal underpass) taken from the eastern side of the R157 near the gap in the fence.

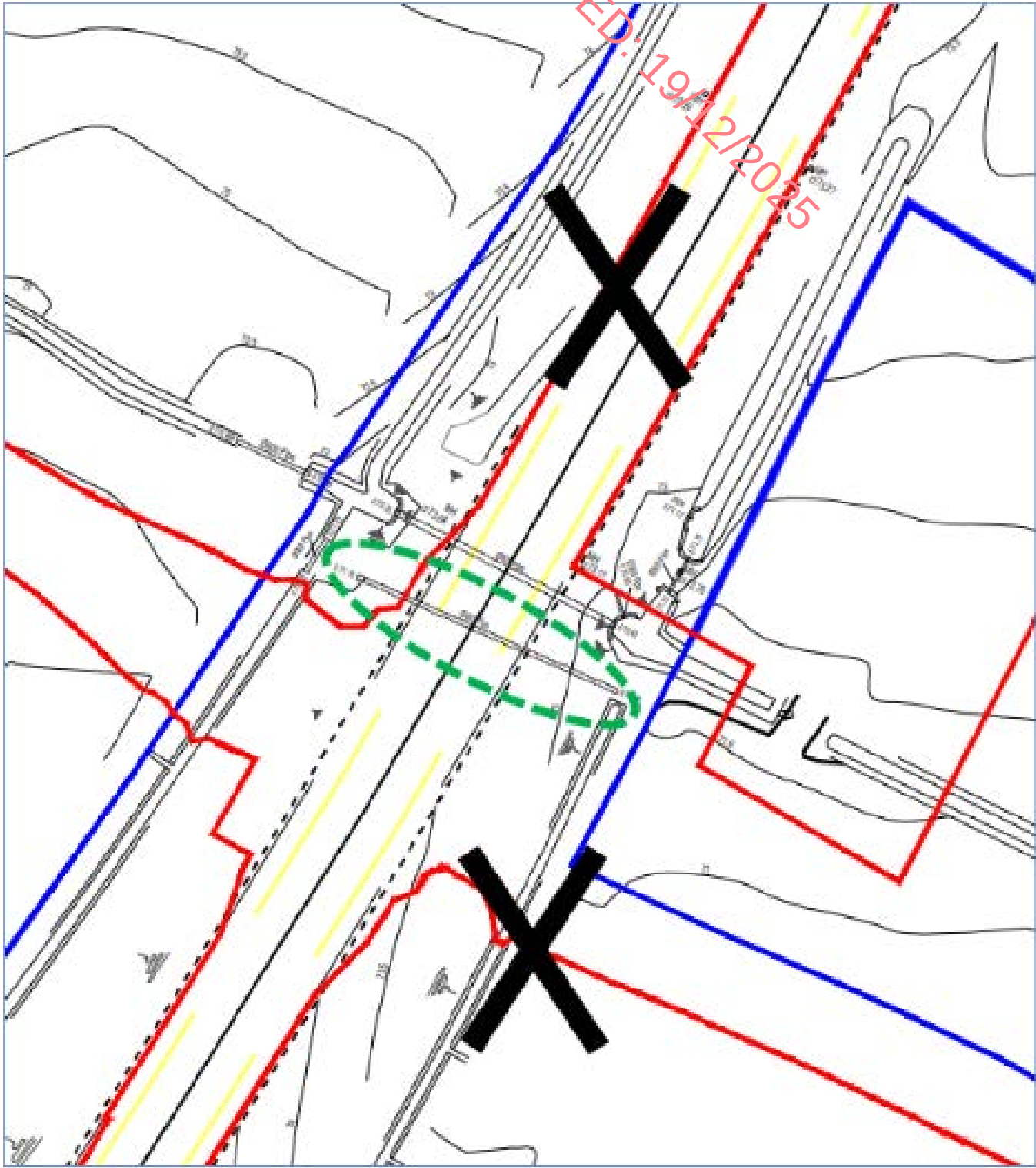


Figure 14.19. Image extracted from JFA Site Survey Drawing showing 600m pipe culvert in green dashed circle (JFA Drwg no: DBN3-SUR-00-DR-JFA-AR-P1000).



Figure 14.22. Typical Tolka channel south of the proposed bridge crossing. Banks were more wooded and shaded by trees along this stretch.

2024 Otter Survey

One confirmed otter sign and three potential signs were recorded during the 2024 survey (see Figure 14.27). A confirmed spraint was present approx. 150m downstream of the proposed bridge crossing (Figure 14.23 and Figure 14.24), located on the eastern bank along a concrete weir structure located within the river. The spraint contained small crustacean remains and fish skeletal material. Four potential slides were also recorded along the eastern bank; three upstream of the proposed bridge, and one near the spraint downstream, with flattened vegetation and faint trails leading into the undergrowth. These possibly could be as a result of otter accessing the channel (Figure 14.25).



Figure 14.23. Otter Spraint recorded in 2024 downstream of the proposed bridge on a weir structure.



Figure 14.24. Location of spraint in red, recorded along a concrete weir structure.



Figure 14.25. Potential slides recorded along the upstream section of the eastern bank.

2025 Otter Survey

One confirmed otter sign and eight potential signs were recorded during the survey (Figure 1427). A confirmed otter print was present at the water's edge on the western riverbank approx. 10m downstream of the proposed bridge crossing (Figure 1423).

Eight potential slides were also recorded along the eastern and western riverbanks; four upstream of the proposed bridge, and four downstream, with flattened vegetation and faint trails leading into the undergrowth. These possibly could be as a result of otter accessing the channel (Figure 1425).

No spraints were recorded at the location previously used by otter ca.150m downstream of the proposed bridge crossing (a small cement weir).



Figure 14.26. Otter prints recorded along the western riverbank just south of the proposed bridge crossing.



Figure 14.27. Results of the Otter survey conducted 150m upstream and downstream of the proposed bridge crossing.

14.8.5.2.4 Evaluation

The Site could potentially support resident and regularly occurring and locally important populations of some of the smaller native mammals, such as hedgehog. This species is less likely to be recorded during walkover surveys due to its nocturnal nature and small size.

Evidence of badger usage of the Site was recorded, and it likely forms part of a badger’s territory, although no active setts were recorded. Otter usage of the Tolka downstream and possibly upstream of the proposed bridge was observed, although no couches or holts were recorded, however, the riverbanks along this stretch could be used in future. The Site is therefore considered to be of **local importance (higher value)** to hedgehog, badger and otter.

14.8.5.3 Birds

14.8.5.3.1 Desk study Results

A total of 81 bird species have been recorded within the 10 km (O04) grid square. Of these, 24 are amber listed birds and 14 are red listed birds as identified on the ‘Birds of Conservational Concern in Ireland 4’ (BoCCI 4) (Gilbert et al. 2021). The remaining bird species are green listed as per BOCCI 4, as well as three unclassified bird species. Details of amber and red listed species are given in Table 147.

Table 147. Bird species recorded within the 10km grid (O04) square containing the Site of the Proposed Development from the National Biodiversity Data Centre.

Species	Scientific name	Date of record	BOCCI status
Barn Owl	<i>Tyto alba</i>	31/12/2011	Red
Black-headed Gull	<i>Larus ridibundus</i>	31/12/2011	Amber
Brambling	<i>Fringilla montifringilla</i>	31/12/2011	Amber
Carrion Crow	<i>Corvus corone</i>	31/12/2011	Unclassified
Common Gull	<i>Larus canus</i>	18/02/2021	Amber
Common Coot	<i>Fulica atra</i>	31/12/2011	Amber
Curlew	<i>Numenius arquata</i>	31/12/2011	Red
Goldcrest	<i>Regulus regulus</i>	31/12/2011	Amber
Golden Plover	<i>Pluvialis apricaria</i>	03/01/2021	Red
Greenfinch	<i>Chloris chloris</i>	31/03/2023	Amber
Grey Wagtail	<i>Motacilla cinerea</i>	31/12/2011	Red
Herring Gull	<i>Larus argentatus</i>	05/03/2019	Amber
House Martin	<i>Delichon urbicum</i>	25/04/2023	Amber
House Sparrow	<i>Passer domesticus</i>	15/05/2021	Amber
Kestrel	<i>Falco tinnunculus</i>	02/02/2023	Red
Kingfisher	<i>Alcedo atthis</i>	31/12/2011	Amber
Lapwing	<i>Vanellus vanellus</i>	01/09/2021	Red

Species	Scientific name	Date of record	BOCCI status
Lesser Black-backed Gull	<i>Larus fuscus</i>	31/12/2011	Amber
Linnet	<i>Linaria cannabina</i>	30/01/2019	Amber
Mallard	<i>Anas platyrhynchos</i>	17/04/2023	Amber
Meadow Pipit	<i>Anthus pratensis</i>	26/11/2023	Red
Merlin	<i>Falco columbarius</i>	31/12/2011	Amber
Mute Swan	<i>Cygnus olor</i>	06/04/2019	Amber
Pheasant	<i>Phasianus colchicus</i>	18/02/2021	Unclassified
Red Kite	<i>Milvus milvus</i>	18/09/2024	Red
Red-legged Partridge	<i>Alectoris rufa</i>	31/12/2011	Unclassified
Redwing	<i>Turdus iliacus</i>	04/04/2023	Red
Sky Lark	<i>Alauda arvensis</i>	06/04/2019	Amber
Snipe	<i>Gallinago gallinago</i>	31/12/2011	Red
Spotted Flycatcher	<i>Muscicapa striata</i>	31/12/2011	Amber
Starling	<i>Sturnus vulgaris</i>	03/03/2022	Amber
Stock Dove	<i>Columba oenas</i>	31/12/2011	Red
Swallow	<i>Hirundo rustica</i>	07/04/2023	Amber
Swift	<i>Apus apus</i>	24/06/2025	Red
Teal	<i>Anas crecca</i>	31/12/2011	Amber
Tree Sparrow	<i>Passer montanus</i>	07/01/2018	Amber
Tufted Duck	<i>Aythya fuligula</i>	31/12/2011	Amber
Wheatear	<i>Oenanthe oenanthe</i>	31/12/2011	Amber
Willow Warbler	<i>Phylloscopus trochilus</i>	31/12/2011	Amber
Woodcock	<i>Scolopax rusticola</i>	31/12/2011	Red
Yellowhammer	<i>Emberiza citrinella</i>	08/12/2022	Red

14.8.5.3.2 Field Survey Results

14.8.5.3.2.1 Kingfisher Survey

The kingfisher survey conducted on the 16th August 2023 assessed the habitat suitability of the stretch of the Tolka along the Site for kingfisher. The banks for the most part were overgrown in the upstream section, with little exposed bank to be seen and overall low bank-heights observed (approx. 1m). Some suitable perching habitat was observed in the form of fence posts along the western bank side and some overhanging trees along the western bank. No potential nest holes were recorded along either bank along the upstream stretch walked.

The downstream stretch of river supported potential perching habitat due to the higher level of overhanging tree cover along either side of the channel. The banks were approx.1m-1.5m high in places but supported little suitable nesting habitat and no nest holes were recorded despite thorough checks undertaken.

A single kingfisher was flushed by the surveyor at 15:20 on 16th August, 2023; from a fence post perch approx. 50m upstream of the proposed bridge crossing; the bird calling and then flying due north along the river and out of sight. A subsequent record of kingfisher was made at 17:24 as a bird called and flew south and over the head of the surveyor, along the river channel.

No records of kingfisher were recorded during the survey on the 23rd of June 2025.

14.8.5.3.2.2 Breeding Birds

The breeding bird surveys commenced on the mornings of the 29th of May 2024, 11th June 2024, 3rd July 2024 and 18th June 2025. Transects were walked through the Site to record all the species present. A total of 27 no. species were recorded during the surveys, as shown in Table 148.

One red-listed species was recorded: yellowhammer (*Emberiza citrinella*) which was noted as a probable breeder at the Site. Singing males were observed on all visits to the Site, with a pair also observed. The east-west hedgerows running across the main Site area were noted to support the most breeding bird activity.

Table 14.8. Breeding bird survey results: 2024 & 2025.

Species	Scientific name	BoCCI Status	Dates recorded	Breeding Activity
Blackbird	<i>Turdus merula</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Confirmed (Recently fledged young)
Blackcap	<i>Sylvia atricapilla</i>	Green	11 th June 2024 3 rd July 2024 18 th June 2025	Possible breeder. Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Blue Tit	<i>Cyanistes caeruleus</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Confirmed (Recently fledged young)
Bullfinch	<i>Pyrrhula pyrrhula</i>	Green	11 th June 2024 3 rd July 2024 18 th June 2025	Possible breeder. Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Chaffinch	<i>Fringilla coelebs</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Probable breeding. Pair observed in suitable nesting habitat in breeding season
Dunnock	<i>Prunella modularis</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Confirmed (Recently fledged young)

Species	Scientific name	BoCCI Status	Dates recorded	Breeding Activity
Goldcrest	<i>Regulus regulus</i>	Amber	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Possible breeder. Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Goldfinch	<i>Carduelis carduelis</i>	Green	29 th May 2024 3 rd July 2024 18 th June 2025	Possible breeder. Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Great Tit	<i>Parus major</i>	Green	29 th May 2024 11 th June 2024	Confirmed (Recently fledged young)
Heron	<i>Ardea cinerea</i>	Green	18 th June 2025	Juvenile present along riverbank
Herring gull	<i>Larus argentatus</i>	Green	18 th June 2025	In-flight over the Site (non-breeder)
Hooded Crow	<i>Corvus cornix</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Non-breeding. Flyover.
House Martin	<i>Delichon urbicum</i>	Amber	11 th June 2024	Non-breeding. Flyovers and feeding over the Site.
Jackdaw	<i>Corvus monedula</i>	Green	29 th May 2024 3 rd July 2024 18 th June 2025	Non-breeding. Flyover.
Lesser black-backed Gull	<i>Larus fuscus</i>	Amber	18 th June 2025	In-flight over the Site (non-breeder)
Linnet	<i>Carduelis cannabina</i>	Amber	18 th June 2025	Recently fledged young
Long-tailed Tit	<i>Aegithalos caudatus</i>	Green	11 th June 2024 18 th June 2025	Confirmed (Recently fledged young)
Magpie	<i>Pica pica</i>	Green	29 th May 2024 18 th June 2025	Non-breeding. Flyover.
Robin	<i>Erithacus rubecula</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Confirmed (Recently fledged young)
Rook	<i>Corvus frugilegus</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024	Non-breeding. Flyover.

Species	Scientific name	BoCCI Status	Dates recorded	Breeding Activity
Starling	<i>Sturnus vulgaris</i>	Amber	18 th June 2025	Species observed in breeding season in suitable nesting Habitat
Song Thrush	<i>Turdus philomelos</i>	Green	29 th May 2024 11 th June 2024 18 th June 2025	Probable breeding. Pair observed in suitable nesting habitat in breeding season
Swallow	<i>Hirundo rustica</i>	Amber	11 th June 2024 3 rd July 2024	Non-breeding. Flyover.
Willow Warbler	<i>Phylloscopus trochilus</i>	Amber	29 th May 2024	Possible breeder. Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Woodpigeon	<i>Columba palumbus</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Possible breeder. Singing male present (or breeding calls heard) in breeding season in suitable breeding habitat
Wren	<i>Troglodytes troglodytes</i>	Green	29 th May 2024 11 th June 2024 3 rd July 2024 18 th June 2025	Confirmed (Recently fledged young)
Yellowhammer	<i>Emberiza citrinella</i>	Red	29 th May 2024 11 th June 2024 3 rd July 2024	Probable breeding. Pair observed in suitable nesting habitat in breeding season

14.8.5.3.2.3 Winter Bird Survey Results

No Special Conservation Interest (SCI) waterbird usage of the Site was recorded during the two seasons of winter bird surveys conducted between 2023-2025 at the lands containing the Site. The full 2024/2025 wintering bird results are provided here to provide context to the types of common farmland bird species the Site supports during the winter season.

A total of 36 species were recorded during these non-breeding bird surveys as listed in Table 149 below. Five red-listed species were recorded: Grey Wagtail (*Motacilla cinerea*), Snipe (*Gallinago gallinago*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*) and Yellowhammer (*Emberiza citrinella*).

The Redwings occurring on the Site were likely the result of the recent harsh weather. Grey Wagtail was recorded feeding around the sheds in the farmyard to the west of the Site on one date. Meadow Pipits and Yellowhammer were recorded on the Site on one date.

Snipe were regularly observed on the vegetation along the river and in the adjacent field, with a peak count of six birds recorded on the 29th of November 2024 in icy conditions. Grey Heron (*Ardea cinerea*) fed in the marshy field near the river.

Two Mallard (*Anas platyrhynchos*) were recorded on a flooded pool in the same field. Herring Gulls (*Larus argentatus*) flew over occasionally also.

No significant usage of the Site as *ex-situ* roosting/ foraging habitat by waterbird species was observed.

Table 14.9. Bird species recorded during Winter Bird Surveys completed at the Site in 2024/2025

Species	Scientific name	BoCCI Status	Dates recorded	Activity
Blackbird	<i>Turdus merula</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common throughout the Site.
Blue Tit	<i>Cyanistes caeruleus</i>	Green	15 th Nov 2024 12 th Feb 2025	Recorded on two dates.
Bullfinch	<i>Pyrrhula pyrrhula</i>	Green	15 th Nov 2024 29 th Nov 2024	Recorded and heard multiple times on the November surveys but not after that.
Buzzard	<i>Buteo buteo</i>	Green	29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Recorded on all but one survey.
Chaffinch	<i>Fringilla coelebs</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.
Dunnock	<i>Prunella modularis</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.
Goldcrest	<i>Regulus regulus</i>	Amber	29 th Nov 2024 12 th Feb 2025	Recorded feeding in the hedgerows 53.432667, -6.476444 and 53.434750, -6.477944
Goldfinch	<i>Carduelis carduelis</i>	Green	15 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common
Great Tit	<i>Parus major</i>	Green	15 th Nov 2024	Feeding in the hedgerows on one date here 53.432667, -6.476444

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Species	Scientific name	BoCCI Status	Dates recorded	Activity
Greenfinch	<i>Chloris chloris</i>	Amber	29 th Nov 2024	A small flock of four birds, which showed well before flying off.
Grey Heron	<i>Ardea cinerea</i>	Green	29 th Nov 2024	One bird feeding near river.
Grey Wagtail	<i>Motacilla cinerea</i>	Red	15 th Nov 2024	Recorded around the buildings here 53.431778, -6.478278
Herring Gull	<i>Larus argentatus</i>	Amber	15 th Nov 2024 29 th Nov 2024	Flyover only.
Hooded Crow	<i>Corvus cornix</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common throughout the Site.
Jackdaw	<i>Corvus monedula</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common throughout the Site.
Lesser Black-backed Gull	<i>Larus fuscus</i>	Amber	10 th Jan 2025	Flyover on one date.
Lesser Redpoll	<i>Acanthis flammea</i>	Green	15 th Nov 2024	Two birds flew over calling.
Linnet	<i>Linaria cannabina</i>	Amber	15 th Nov 2024 29 th Nov 2024	Small flock flying around the Site on two dates.
Long-tailed Tit	<i>Aegithalos caudatus</i>	Green	12 th Feb 2025	Small flock feeding in the hedgerow here 53.432667, -6.476444.
Magpie	<i>Pica pica</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025	Common.
Mallard	<i>Anas platyrhynchos</i>	Amber	29 th Nov 2024	Pair in a pool near the river.
Meadow Pipit	<i>Anthus pratensis</i>	Red	29 th Nov 2024	Four flushed from this field 53.432194, -6.479389.
Mistle Thrush	<i>Turdus viscivorus</i>	Green	10 th Jan 2025 12 th Feb 2025	Flyover only.
Pheasant	<i>Phasianus colchicus</i>	Unclassified	15 th Nov 2024	Heard calling distantly.

Species	Scientific name	BoCCI Status	Dates recorded	Activity
Pied Wagtail	<i>Motacilla alba yarrelli</i>	Green	12 th Feb 2025	Seen around the buildings here 53.431778, -6.478278.
Redwing	<i>Turdus iliacus</i>	Red	10 th Jan 2025	Common on one date only. Presumably the recent harsh weather caused a small influx of the species. Twenty-three were feeding around this hedgerow 53.435417, -6.476694 but were ranging widely around the Site. Peak of 45 birds present on the 10 th of January.
Robin	<i>Erithacus rubecula</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.
Rook	<i>Corvus frugilegus</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.
Snipe	<i>Gallinago gallinago</i>	Red	29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Regularly found on the vegetation along the river and in the adjacent field with a peak count of six recorded in November.
Song Thrush	<i>Turdus philomelos</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.
Sparrowhawk	<i>Accipiter nisus</i>	Green	15 th Nov 2024	Flyover.
Starling	<i>Sturnus vulgaris</i>	Amber	15 th Nov 2024 29 th Nov 2024 12 th Feb 2025	Flyovers on three dates.
Stonechat	<i>Saxicola torquatus</i>	Green	29 th Nov 2024	Only present on one date.
Woodpigeon	<i>Columba palumbus</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.

Species	Scientific name	BoCCI Status	Dates recorded	Activity
Wren	<i>Troglodytes troglodytes</i>	Green	15 th Nov 2024 29 th Nov 2024 10 th Jan 2025 12 th Feb 2025	Common.
Yellowhammer	<i>Emberiza citrinella</i>	Red	12 th Feb 2025	A flock of six, including two males and four females were recorded in the hedgerows here 53.435417, -6.476694 before flying west.

14.8.5.3.3 Evaluation

Considering the variety of bird species recorded during the various field surveys, as well as the evidence of breeding passerines at the Site, it is considered that the Site contains resident and regularly occurring, locally important populations of breeding bird species protected under the Wildlife Act i.e., of **local importance (higher value)**. The wintering bird population is considered to be insignificant in the local context, particularly taking into consideration the availability of resources in the surrounding landscapes, and is therefore deemed to be of **local importance (lower value)**.

14.8.5.4 Bats

14.8.5.4.1 Desk Study Results

A total of six bat species have been recorded within the 10km (O04) grid square which encompasses the Site (Table 1410).

Table 14.10. Records of bats for the surrounding 10km grid square (O04) associated with the Site from the NBDC.

Species	Date of last record	Database	Designation
Brown Long-eared Bat (<i>Plecotus auritus</i>)	02/05/2007	National Bat Database of Ireland	EU Habitats Directive - Annex IV Wildlife Act 1976 (as amended)
Daubenton's Bat (<i>Myotis daubentonii</i>)	07/10/2007	National Bat Database of Ireland	EU Habitats Directive - Annex IV Wildlife Act 1976 (as amended)
Leisler's Bat (<i>Nyctalus leisleri</i>)	30/09/2021	National Bat Database of Ireland	EU Habitats Directive - Annex IV Wildlife Act 1976 (as amended)
Natterer's Bat (<i>Myotis nattereri</i>)	31/12/2007	National Bat Database of Ireland	EU Habitats Directive - Annex IV Wildlife Act 1976 (as amended)
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	30/09/2021	National Bat Database of Ireland	EU Habitats Directive - Annex IV Wildlife Act 1976 (as amended)
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	30/09/2021	National Bat Database of Ireland	EU Habitats Directive - Annex IV Wildlife Act 1976 (as amended)

The Bat Conservation Ireland Landscape Suitability Model (Lundy et al., 2011) provides a habitat suitability index for bat species across Ireland. The model divides the country into grid squares and ranks the habitat within the squares according to its suitability for various bat species. The scores are divided into five qualitative categories of suitability, namely:

- - 13.000000: Low
- 13.000001 - 21.333300: Low – Medium
- 21.333301 - 28.111099: Medium
- 28.111100 - 36.444401: Medium – High
- 36.444402 - 58.555599: High

The Proposed Development Site (as enclosed in the black box in Figure 1428) is located in an area with an overall Medium-High (33.44) suitability for bats in general. The suitability index for specific bat species is presented in Table 14-11. The landscape suitability index is high for six species of bats.

Table 14.11. Landscape Suitability Index for individual bat species (Source: NBDC). Those Species that have been recorded in the NBDC database within the 10km (O04) grid square are highlighted in green.

Bat Species	Suitability Index (2km Grid Square) (Medium-High Suitability)
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	43 (High)
Brown Longed-eared bat (<i>Plecotus auritus</i>)	42 (High)
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	52 (High)
Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)	0 (Low)
Leisler's bat (<i>Nyctalus leisleri</i>)	48 (High)
Whiskered bat (<i>Myotis mystacinus</i>)	20 (Low-Medium)
Daubenton's bat (<i>Myotis daubentonii</i>)	38 (High)
Nathusius' pipistrelle (<i>Pipistrellus nathusii</i>)	16 (Low-Medium)
Natterer's bat (<i>Myotis nattereri</i>)	42 (High)



Figure 14.28. Bat Landscape Suitability Model (all bats) surrounding the Proposed Development Site (adapted from NBDC)

14.8.5.4.2 Field Survey Results

14.8.5.4.2.1 Preliminary Bat Roost Assessment (PBRA) and Habitat Suitability Assessment.

The PBRA assessments conducted at the Site discovered no confirmed roosts within any of the trees or buildings present.

PBRA of Trees

Roost suitability at the Site was largely negligible due to spindly ash trees making up the majority of trees on Site. Ivy cover was largely bushy and cluttered and did not provide the desirable thick ivy lattice-type roost features that bats tend to use. Eight trees/tree groups with low bat roost potential (*PRF-I* as per Collins, 2023) were recorded on Site (See Table 1412). These trees provided some minor roosting opportunities for individual bats but would not be able to support significant numbers of bats e.g., a maternity roost (*PRF-M* as per Collins, 2023).

Table 14.12. Trees assessed as being of Low Bat Roost Potential (*PRF-I*) at the Site.

Tree No. (As per Arborist Drwg)	Species	Potential Roost Features	Bat Roost Potential
G25	Ash	Some thicker Ivy stems but mostly bushy ivy (Cluttered)	PRF-I (Low)
G33	Wild Cherry	Some thicker Ivy stems but mostly bushy ivy (Cluttered)	PRF-I (Low)
G86	Sycamore	Mature trees in fair condition	PRF-I (Low)
G87	Ash	Mature trees in poor condition with Ash dieback present	PRF-I (Low)
31	Ash	Mature. Some thicker Ivy stems but mostly bushy ivy (Cluttered).	PRF-I (Low)
30	Ash	Bush ivy covering tree. Small tear hole on limb	PRF-I (Low)
28	Ash	Some thicker Ivy stems but mostly bushy ivy (Cluttered)	PRF-I (Low)
22	Oak	Some thicker Ivy stems but mostly bushy ivy (Cluttered)	PRF-I (Low)

PBRA of Buildings

The PBRA of the barn structures in the south of the Site and the prefabricated GAA club structures in the west of the Site recorded no bat roosts or evidence of roosting activity. On inspection all structures were assessed as providing negligible bat roost potential (see Table 1413). All of the barn structures were open airy buildings with thin corrugated roofing that would not provide stable temperatures for roosting bats. The structures associated with the GAA club in the west of the Site were either well-sealed prefabricated structures with no PRFs, or corrugated steel containers also supporting no PRFs.

Table 14.13. Results of the building PBRA survey

Building Number	Description	Bat Roost Potential
B1	Storage shed with corrugated metal walls and roof.	Negligible
B2	Steel container.	Negligible
B3	Steel container.	Negligible
B4	Prefabricated structure. Well-sealed.	Negligible
B5	Prefabricated structure. Well-sealed.	Negligible
B6	Open sided cattle barn/ feeding stall with corrugated metal/asbestos roofing. Open to the elements.	Negligible
B7	Tall open barn for hay/silage storage and livestock. Metal corrugated structure, open to the elements.	Negligible
B8	Small pumphouse in the field.	Negligible

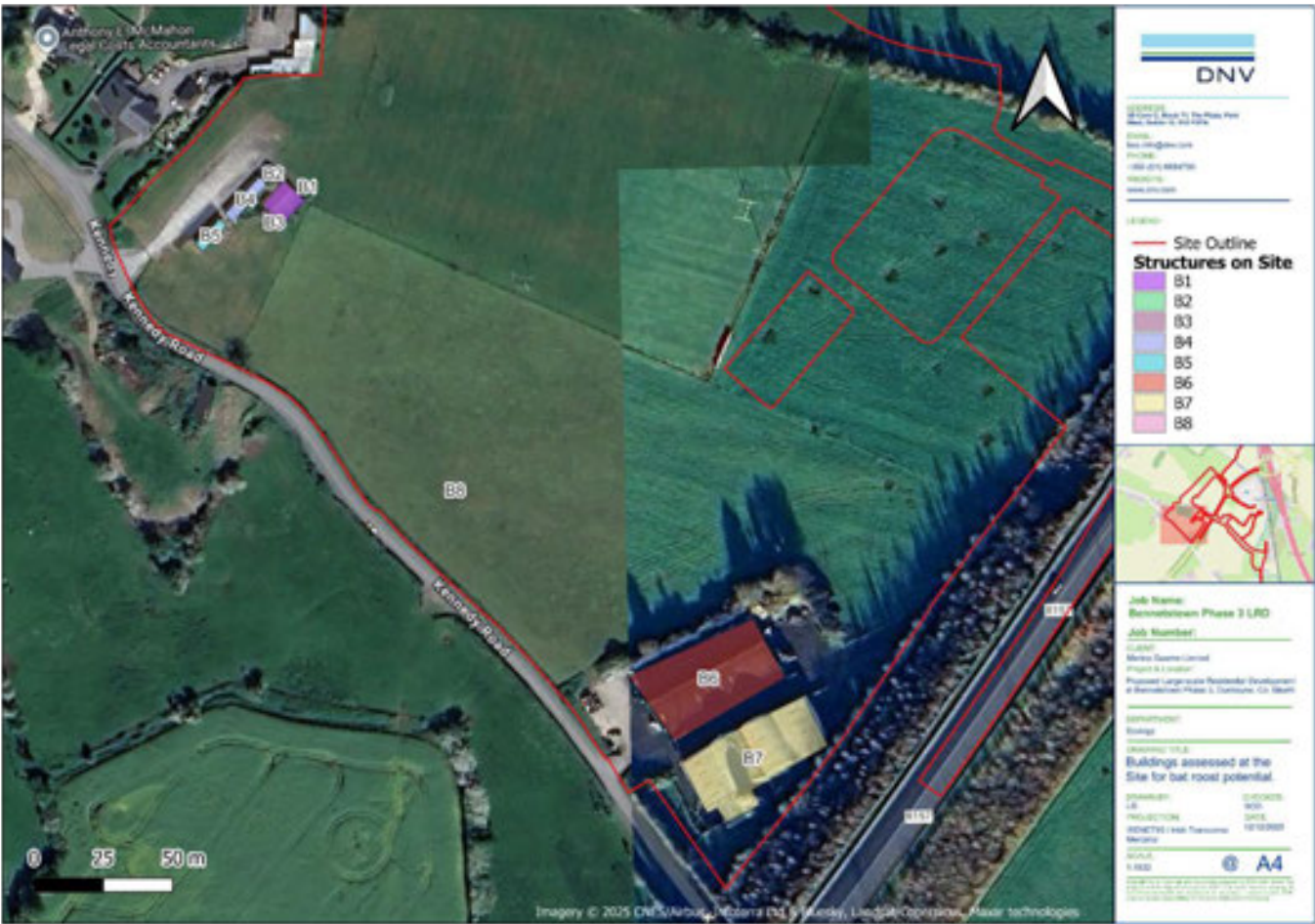


Figure 14.29. Buildings assessed at the Site for bat roost potential.

Habitat Suitability

The Site was assessed as having moderate habitat suitability in the context of the wider landscape; due to the presence of hedgerows and drainage ditches that link the Site with the wider landscape and the River Tolka's riparian corridor. The lands themselves are relatively poor quality agricultural grazed pastureland, however, the presence of insects and livestock/manure was noted during the surveys, which would contribute to the provision of suitable foraging habitat for bats on Site.

14.8.5.4.2.2 Bat Activity Transect Surveys

2024 Survey Results

Phase 2 Lands Dusk Transect Survey – 13th June 2024

Activity was recorded throughout the Site with highest concentrations of bats located to the west and centre of the Site. Bat passes and species composition for this survey are shown in Table 1414 and Figure 1430 respectively. A map of recorded bat activity is displayed in Figure 1431.

The majority of bat activity during the first transect was dominated by Common pipistrelles (*Pipistrellus pipistrellus*), with 159 detections. Leisler's bats (*Nyctalus leisleri*) were also present but in lower numbers, with 11 detections. Soprano pipistrelles (*Pipistrellus pygmaeus*) were minimally active, with only 2 detections. This distribution indicates that Common pipistrelles are the predominant species utilizing the Site during this time. This species was recorded flying back and forth along the east-west hedgerows at the Site, with a peak count of 3 bats observed at one time. Feeding buzzes and flight patterns indicated foraging activity.

Table 14.14. Summary of bat activity recorded during the dusk transect survey on Site (main Site area) – 13th of June 2024.

Common name	Latin name	Bat Passes
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	159
Leisler's bat	<i>Nyctalus leisleri</i>	11
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	2

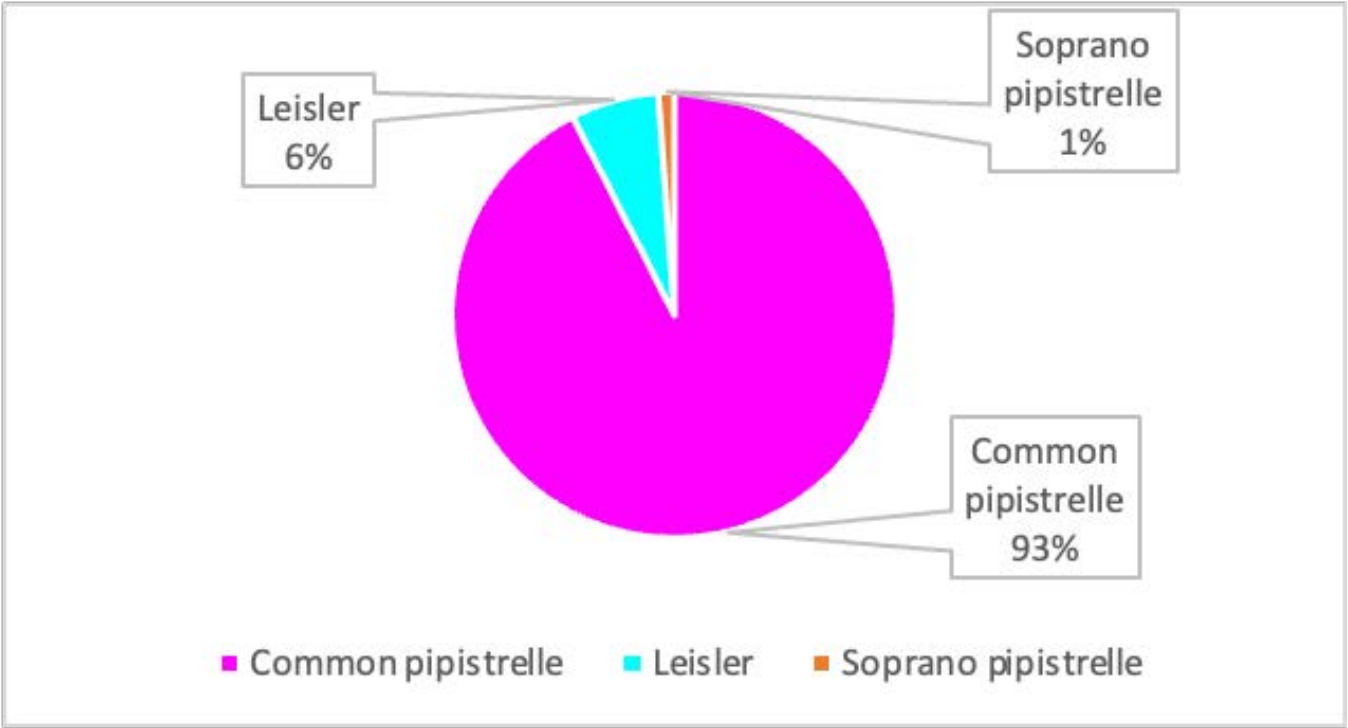


Figure 14.30. Species composition recorded during the dusk transect survey on Site (main Site area) on the 13th of June 2024.



Figure 14.31. Bat activity recorded during the dusk transect survey on Site (main Site area) on the 13th of June 2024.

Phase 2 Lands Dusk Transect Survey – 1st of July 2024

Activity was recorded throughout the Site with concentrations of bats located to the centre and west as with the June transect survey. A peak count of 3no. Common pipistrelles was observed flying along the western boundary treeline at the Site, and within the corner of the field to the south-west. Soprano and Common pipistrelle activity was also noted in the north-east of the main Site area, along the woodland edge of the R157 roundabout.

Table 14.15. Summary of bat activity recorded during the dusk transect survey on Site (main Site area) – 1st of July 2024.

Common name	Latin name	Bat Passes
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	179
Leisler’s bat	<i>Nyctalus leisleri</i>	8
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	39

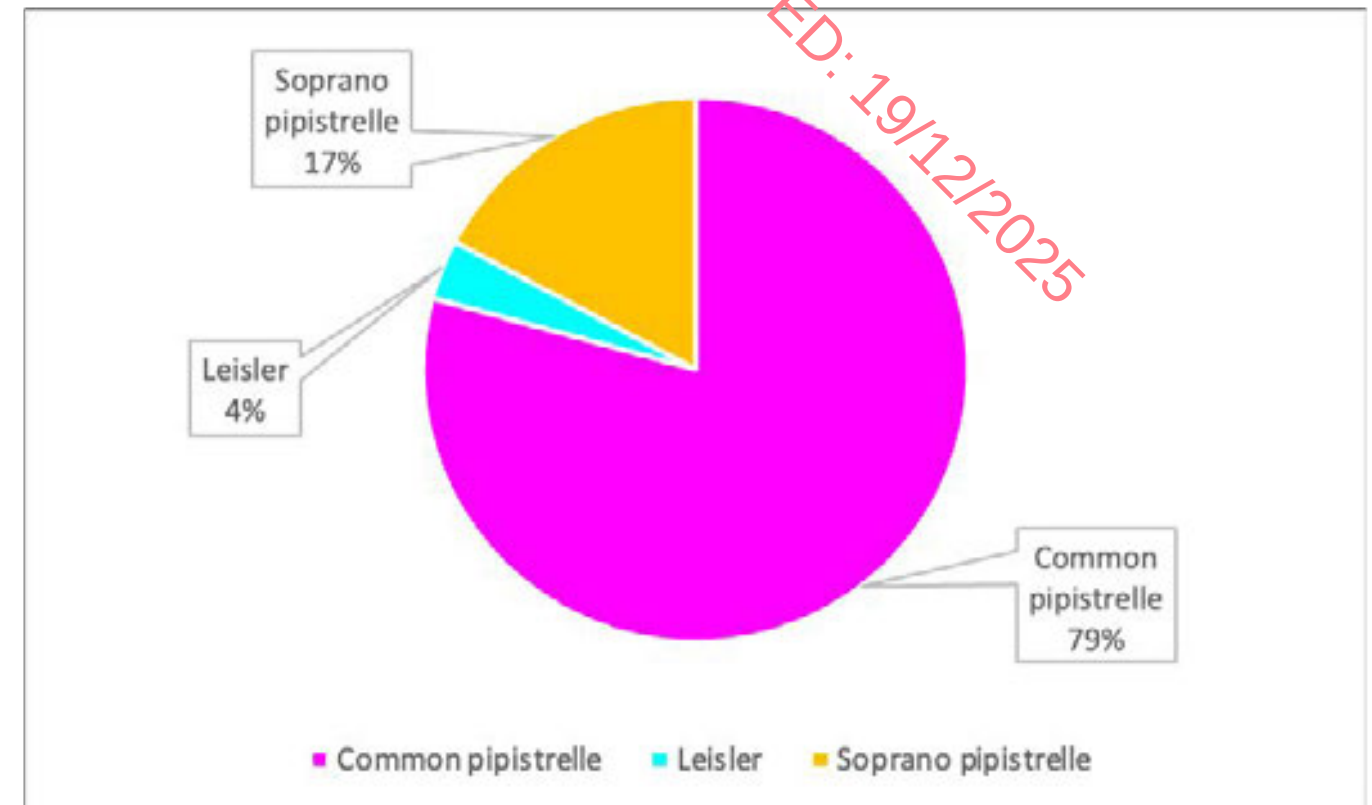


Figure 14.32. Species composition recorded during the dusk transect survey on Site (main Site area) on the 1st of July 2024.

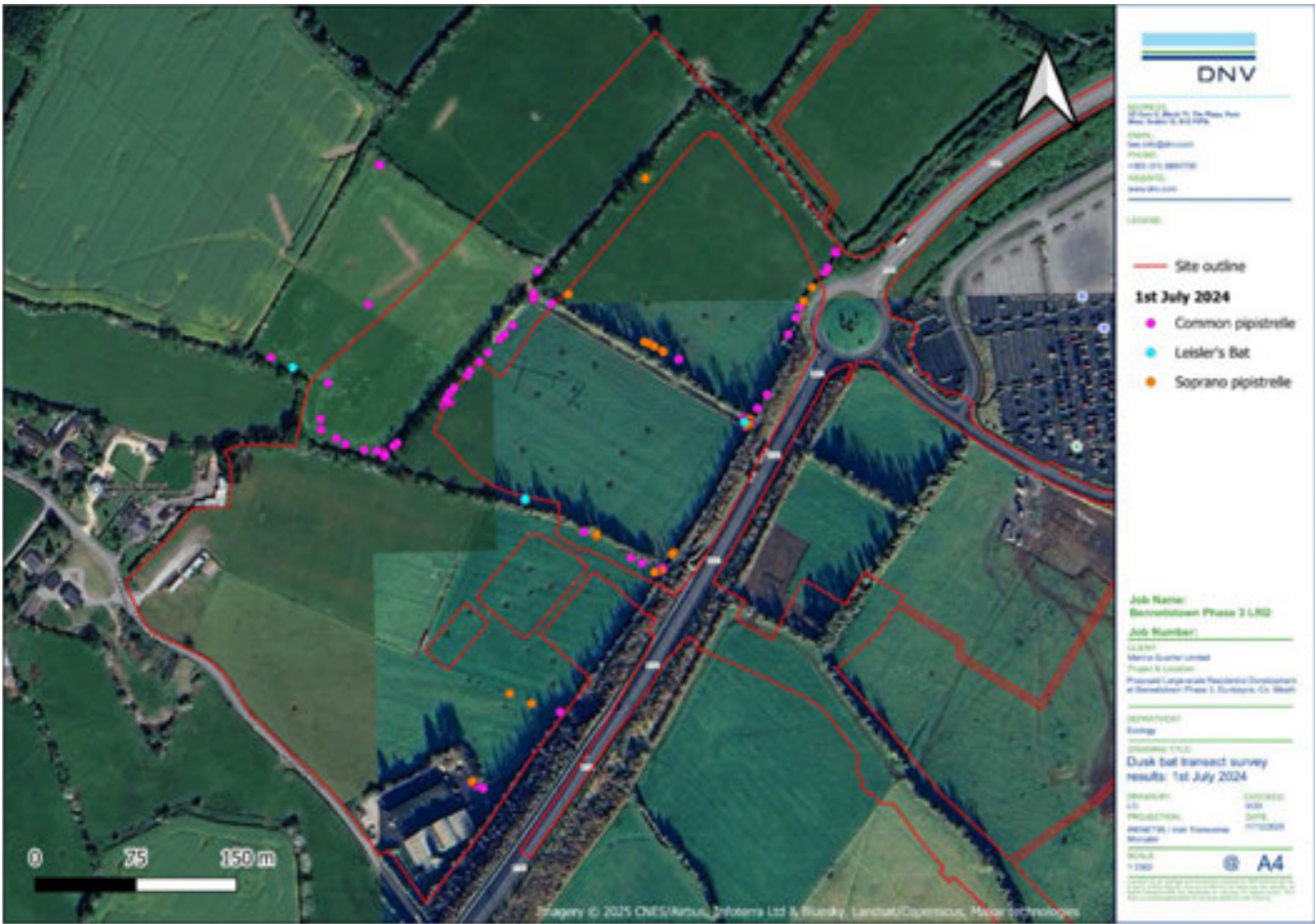


Figure 14.33. Bat activity recorded during the dusk transect survey on Site (main Site area) on the 1st of July 2024.

2025 Surveys

Link Road and bridge route - 23rd June 2025

A total of 267 bat passes were recorded during the dusk activity survey of the link road and bridge route in the east of the Site. Common pipistrelle ($n=187$) was the most frequently recorded bat species accounting for 69% of all bat passes, followed by Soprano pipistrelle ($n=48$) accounting for 18% of all bat passes. Leisler's bat ($n=27$) accounted for 10%, with Nathusius' pipistrelle (*Pipistrellus nathusii*) ($n=3$) and Brown Long-eared bat (*Plecotus auritus*) ($n=2$) making up 2% and 1% of the calls respectively.

Common pipistrelle activity was present throughout and focused along the remaining sections of east-west hedgerow and the treelines in the south-east of the Site, with bats recorded foraging repeatedly along the trees. Leisler activity was largely restricted to the western side of the Site, likely flying overhead. Soprano pipistrelle, Brown Long-eared bat and Nathusius' pipistrelle were all recorded along the central section of hedgerow. Bat activity was focused along the existing hedgerows and treelines at the Site, as was the case in the previous year's surveys.

Table 14.16. Summary of bat species recorded during the dusk transect survey of the link road and bridge route 23rd June 2025.

Common Name	Scientific Name	Bat Passes
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	187
Leisler's Bat	<i>Nyctalus leisleri</i>	27
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	48
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	3
Brown Long-eared Bat	<i>Plecotus auritus</i>	2

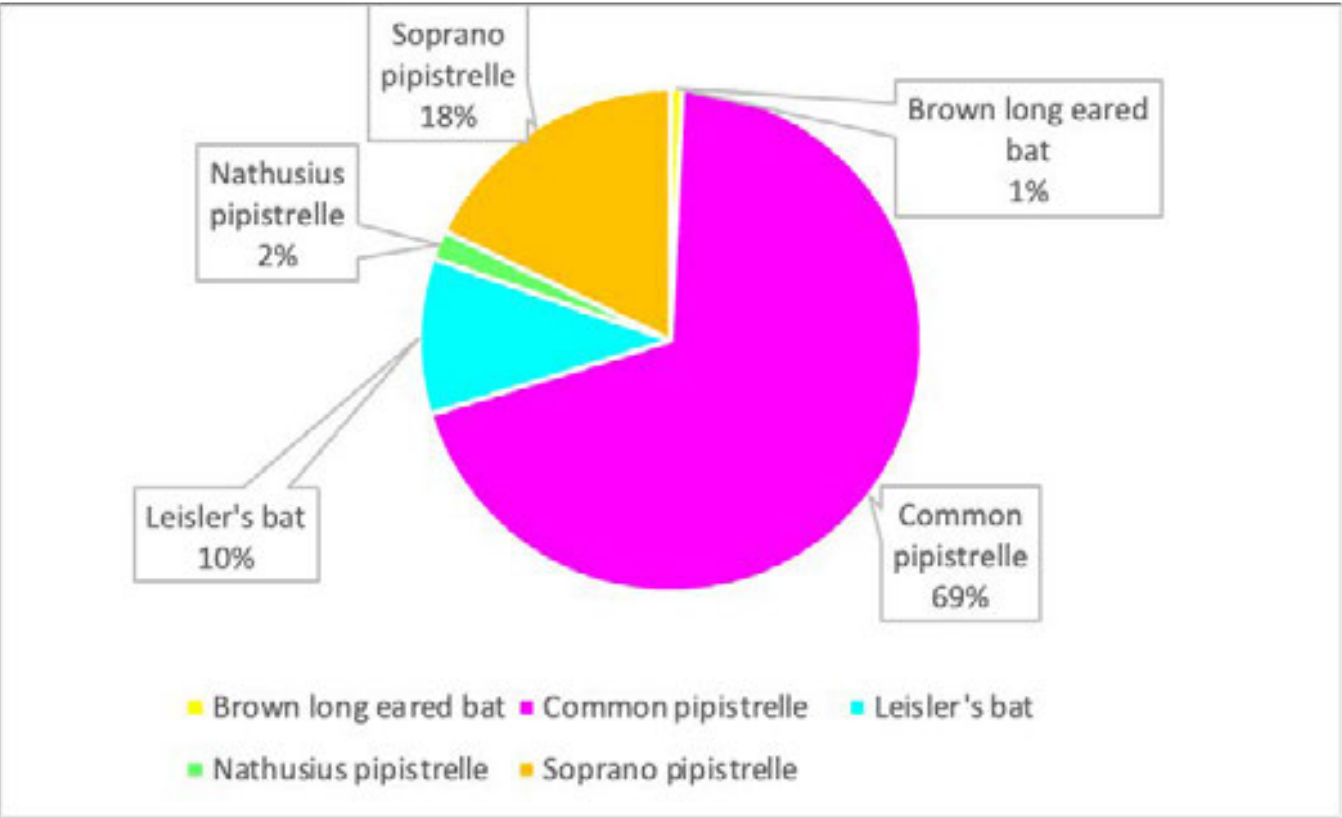


Figure 14.34. The relative compositions of bats recorded during the dusk transect survey of the link road and bridge route – 23rd June 2025.



Figure 14.35. Bat activity recorded during the dusk transect survey of the link road and bridge route – 23rd June 2025.

Dusk Transect Survey – 1st of October 2025

A total of 142 bat passes were recorded during the dusk activity survey of the main Site area. Soprano pipistrelle ($n=73$) was the most frequently recorded bat species accounting for 52% of all bat passes, followed by Common pipistrelle ($n= 60$) accounting for 42% of all bat passes and Leisler’s bat ($n= 9$) accounting for 6%.

Bat activity largely consisted of individual bats observed making repeated passes along hedgerow and treelines in the north and west of the Site. Common pipistrelle activity was present throughout with bats observed flying due south and east along hedgerow and the treelines while foraging. Point 4 is located at an intersection of four hedgerow/treelines in the west of the Site and both Common and Soprano pipistrelle activity was relatively higher, at this location; likely due to a combination of the confluence of multiple commuting routes and the shelter provided to insects by the connecting linear vegetation. Leisler activity was limited to occasional passes of bats likely flying overhead. Soprano pipistrelle activity was largely focused along the treeline laneway at point 5 in the north of the Site and along treelines in the south-west of the Site. Bat activity was focused along the existing hedgerows and treelines at the Site, as was the case in the previous year’s surveys, with little to no activity recorded across the open fields.

Table 14.17. Summary of bat species recorded during the dusk transect survey on Site (main Site area) – 1st of October 2025.

Common Name	Scientific Name	Bat Passes
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	60
Leisler’s Bat	<i>Nyctalus leisleri</i>	9
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	73

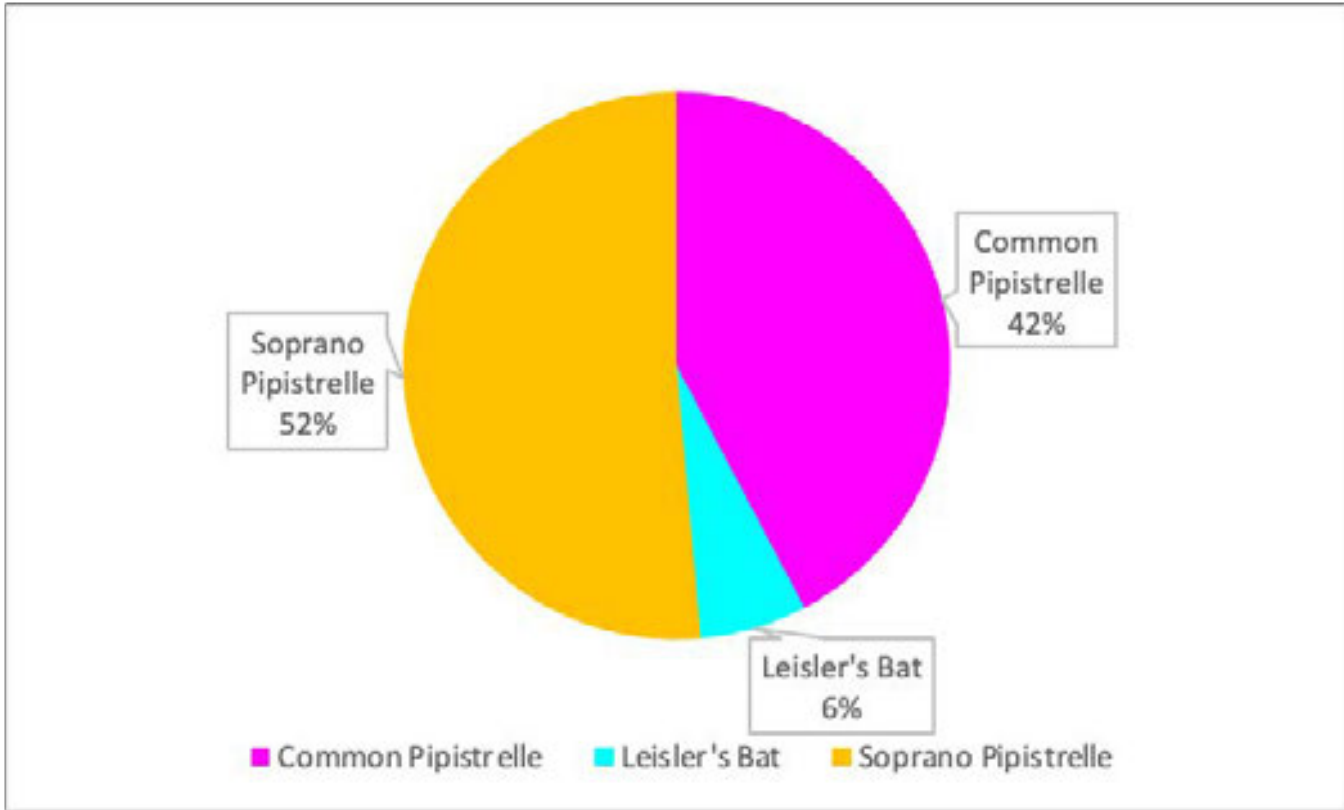


Figure 14.36. Species composition recorded during the dusk transect survey on Site (main Site area) on the 1st of October 2025.



Figure 14.37. Bat activity recorded during the dusk transect survey on Site (main Site area) on the 1st of October 2025.

14.8.5.4.2.3 Static Bat Detector Results

The SM4 static detector was deployed at the same location i.e., at the proposed bridge crossing of the Tolka, in both 2023 and 2025.

In 2023 the static recorded a total of 1,561 bat passes from four species of bat commuting and foraging over the detector during the five-night period. Soprano pipistrelle (n=1,164) was the most active bat species at this location accounting for 74% of all bat passes. This was followed by Common pipistrelle (n=340). Two other species were far less common, namely Leisler's bat (n=41) and *Myotis* sp. (n=16) which accounted for 3% and <1% respectively. Species composition for this detector are shown in Figure 1438.

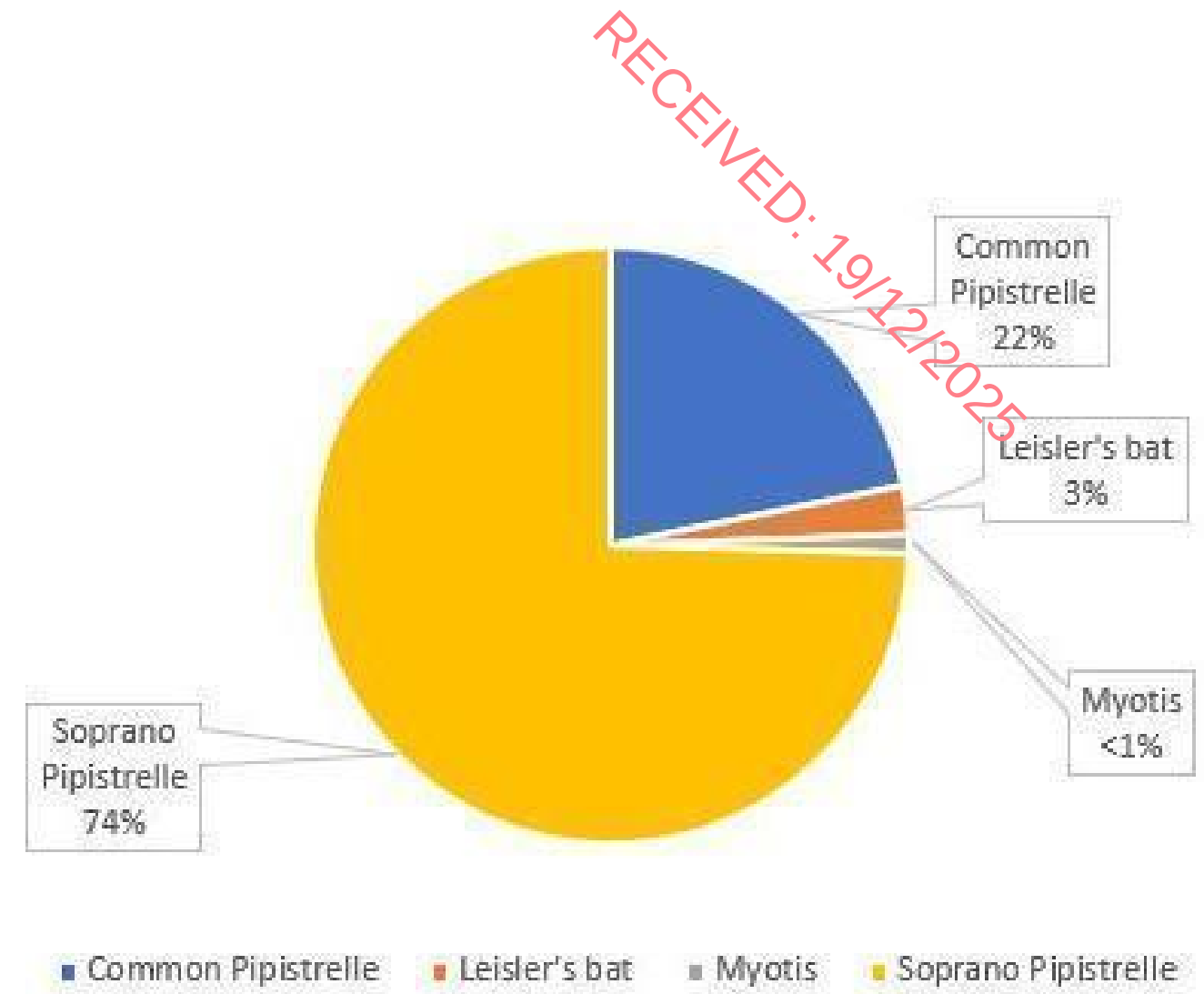


Figure 14.38. Species composition recorded on the Static from the 16th to the 21st of August 2023

In 2025 the SM4 recorded a total of 941 bat passes from four species of bat commuting and foraging over the detector during the five-night period. Common pipistrelle ($n=559$) was the most frequently recorded bat species accounting for 59.4% of all bat passes. Leisler's bat ($n=212$) was the second most recorded species making up 22.5% of recorded bat passes, followed by soprano pipistrelle ($n=167$) which accounted for 17.75%. Only 3 records of Nathusius' pipistrelle were recorded, accounting for 0.3% of all records. This species was recorded twice on the 18th June at 22:25 and 22:29, and once on the 19th of June at 23:17. Species composition for this detector are shown in Figure 1439.

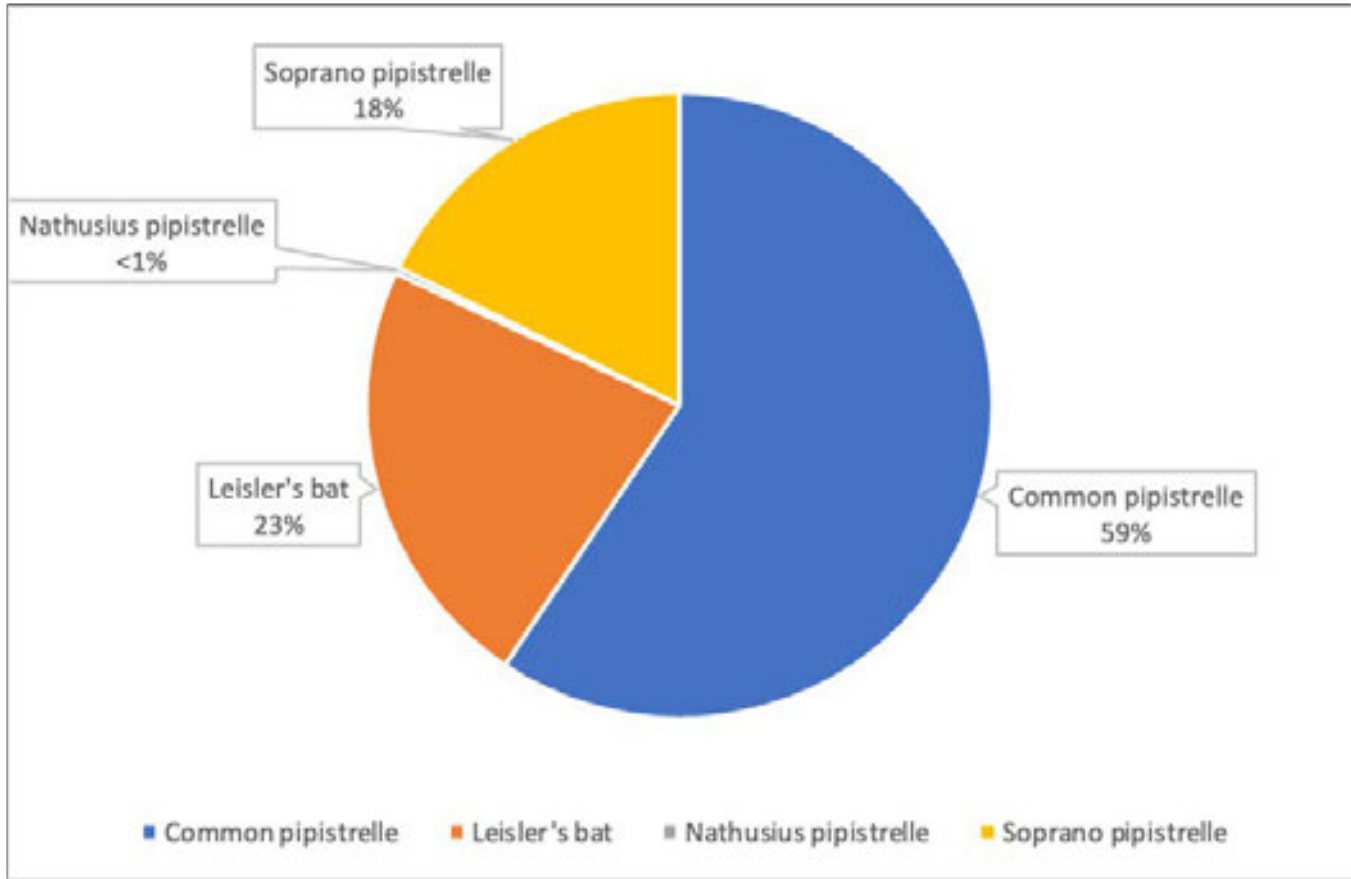


Figure 14.39. Species composition recorded on the Static from the 18th to the 23rd of June 2025

14.8.5.4.3 Evaluation

The static monitoring and bat activity surveys conducted at the Site between 2023 and 2025 indicate that the hedgerows, treelines and section of river corridor within and around the Site provide a commuting and foraging route for six species of local bats. Bats were recorded flying back and forth along the various vegetative boundaries, with little activity recorded out in the open; as would be expected as the hedgerows support higher levels of insect prey compared to grazed agricultural grassland and also provide insect prey (and the bats themselves) shelter from the elements. Similarly, the smaller bat species e.g., the pipistrelles etc., will commute along these structures to evade predation from birds of prey, while also using them as echolocation guides to move between roosts to feeding grounds. Bats were also recorded along the Tolka River during both the transect surveys and by the SM4 static monitoring and likely use this linear feature as a commuting and foraging route as well as a link to the various agricultural fields and their hedgerow/treeline networks together.

The bat population at the Site largely consisted of the three species commonly recorded in agricultural settings; Common pipistrelle, Soprano pipistrelle and Leisler’s bat. Small numbers of Brown long-eared bat, Nathusius’ pipistrelle and *Myotis sp.*, were also recorded infrequently indicating their presence in the area. Given the combination of both riverine and agricultural habitats at the Site, the presence of these species is not unexpected. Brown long-eared bat would usually be associated with more wooded habitats (Russ, 2012) of which there are present to the north and east of the Site within this species’ estimated core sustenance zone (CSZ) (CSZ = approx. 3km according to Collins (2023)). No roosts were confirmed on Site and overall,

there are negligible-low roosting opportunities present for all bat species. The Site provides this local bat population with foraging and commuting opportunities, linking with the surrounding lands via the hedgerow network and the River Tolka’s riparian corridor. As such, the bat population at the Site is deemed to be of **local importance (higher value)**.

14.8.5.5 Other Fauna

14.8.5.5.1 Amphibians and Reptiles

Common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*) have been recorded in the 10km (O04) and 2km (O04B) grid squares encompassing the Site of the Proposed Development. There are no records of common lizard (*Lacerta vivipara*) for the relevant grid squares.

The main Site area is comprised of well drained agricultural grassland for the most part; grazed by sheep and cattle during the Site visits and containing little suitable spawning habitat for amphibians. The suitability for amphibians increases to the south-east and east of the Site where the Tolka flood plain provides wetter ground with flooding observed during winter visits. Small froglets were recorded within the drainage ditch in the east of the Site (Phase 1 LRD lands) during the June 2025 breeding bird survey. The ditch was recorded to be holding pooling water in places at the time as a result of silt-prevention measures (terram wrapped gravel) installed as part of the enabling works for the permitted Phase 1 LRD that overlaps with the Proposed Development.

Given the observed presence of common frog and of suitable areas of pooling within the wider drainage ditch network, and the potential for impacts relating to the proposed culverting of parts of the ditches and general Construction Phase activities, this species is considered to be of **local importance (higher value)** at the Site.

The Site has limited potential to support a common lizard population of note, with the habitats present homogenous in nature and lacking the preferred mosaic structure that lizards would utilise. The dense hedgerows do provide some shelter and habitat, however the Site is unlikely to support a significant lizard population, and therefore lizards are considered to be of **local importance (lower value)** at the Site.

14.8.5.5.2 Fish Species

There are no records of notable fish species within the relevant 10km grid square associated with the Site from the NBDC database. However, the Site is hydrologically linked to the Tolka which is known to support a variety of salmonids, such as brown trout (*Salmo trutta*), as well as lamprey species (*Lampetra spp.*) and European eel (*Anguilla Anguilla*). As such, the fish assemblage of the Tolka is considered to be of **County Importance**.

14.8.5.5.3 Marsh Fritillary (*Euphydryas aurinia*)

The Marsh Fritillary butterfly is the only insect in Ireland that is listed on Annex II of the Habitats Directive, which makes it the only insect protected by law in Ireland. There are no records of marsh fritillary from the last twenty years within the 10km (O04) grid square which encompasses the Proposed Development. No individuals of this species or it’s associated food plant; devil’s bit scabious (*Succisa pratensis*), were recorded during the surveys conducted at the Site this year and the past few years. It should be noted that devil’s bit scabious is an autumn flowering plant and as such may have been missed during the surveys. Additionally, the recommended survey period for marsh fritillary is in September and October when the caterpillars can be found within silken webs on the leaves of the foodplant. While there are suitable habitats on Site that are likely to support devil’s bit scabious or the marsh fritillary, the lack of records from NBDC for these species indicate their likely absence on Site and its surrounding area. The nearest record of this species is from the Royal Canal approximately 3km south of the Site. Therefore, this species is considered to be absent from the Site.

Given the presence of wet grassland areas along the flood plain of the River Tolka in the east of the Site but the lack of records in the area of either Marsh fritillary or its food plant, and a lack of observed presence of either on Site, Marsh fritillary are assessed as being of **local importance (lower value)** at the Site.

14.8.5.6 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. Wicklow, not recorded at the Site.
 - » Slender Naiad (*Najas flexilis*) – A clear water, lowland lake species. No suitable habitat available at the Site.
- Fauna
 - » White-clawed Crayfish (*Austropotamobius pallipes*) – Not present in the Tolka, adjacent ditches and streams not considered suitable for this species.
 - » Freshwater Pearl Mussel (*Margaritifera margaritifera*) – No known records from the Tolka, and the Tolka is not listed as a *M. margaritifera* sensitive area. Nearest known records from River Aughrim, Co. Wicklow and no hydrological connection to this catchment.
 - » Natterjack Toad (*Epidalea calamita*) – Distribution restricted to few coastal sites.
 - » Kerry Slug (*Geomalacus maculosus*) – Distribution restricted to south and west of Ireland.

14.8.6 Evaluation of Ecological Features

Habitats and species 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).

The impacts of the Proposed Development on the identified KERs are assessed in Section 14.9. Table 1418 below summarises the evaluation rating assigned to each ecological feature and the rationale behind these evaluations is also provided.

Table 14.18. Evaluation of Designated Sites, Habitats, Flora, and Fauna associated with the Site of the Proposed Development. KERs are highlighted in green.

Designated sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
Designated sites			
Sandymount Strand/Tolka Estuary Ramsar Site (832).	International importance	No	These sites have been assessed by proxy in the AA Screening and NIS that accompany this application under separate cover. No significant impacts envisaged after mitigation measures are put in place.
North Bull Island Ramsar Site (406).	International importance	No	
Dublin Bay UNESCO Biosphere.	International importance	No	
North Dublin Bay pNHA (000206).	National importance	No	
South Dublin Bay pNHA (000210)	National importance	No	
Dolphins, Dublin Docks pNHA (000201)	National importance	No	
Habitats			
Grassland Habitats: Improved Agricultural Grassland (GA1), Dry Meadows and Grassy Verges (GS2) and Wet Grassland (GS4).	Local importance (lower value)	No	Largely low biodiversity intensive agricultural grassland.
Artificial surfaces (BL3) and Arable Crops (BC1)	Less than local importance	No	Negligible ecological value.
Hedgerows (WL1),Treelines (WL2) and Drainage Ditches (FW4)	Local importance (Higher Value)	Yes	Hedgerows largely assessed as <i>favourable</i> during the Hedgerow Appraisal (Enviroguide, 2024) and along with ditches and treelines, form ecological corridors across an agricultural landscape.
Mixed Broadleaf Woodland (WD1)	Local importance (Higher Value)	Yes	Prominent planted woodland buffer along R157 that provides a wildlife refuge and corridor connecting the Site to the Surrounding lands.
River Tolka	County Importance	Yes	A salmonid river that forms an ecological corridor through the Site and surrounding agricultural land. Supports both kingfisher and otter adjacent to the Site.
Potential Annex 1 habitat: ‘Petrifying springs with tufa formation (<i>Cratoneurion</i>)’ [7220]	National Importance	Yes	Possible presence of Annex 1 priority habitat in a section of the Tolka River adjacent to the Site.
Fauna			
Breeding bird assemblage	Local importance (Higher Value)	Yes	An assemblage of common farmland species recorded breeding at the Site.

Designated sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
Wintering bird assemblage	Local importance (Lower Value)	No	No nearby SPAs or important wetlands. Some occasional usage of the Site by wintering waterbirds may occur, however minimal usage observed during the winter bird surveys.
Non-volant mammals (Badger, Hedgehog and Otter)	Local importance (Higher Value)	Yes	Some suitable habitat for smaller mammals such as Hedgehog in hedgerows. Evidence of badger and otter at the Site/ downstream of the Site respectively.
Bat assemblage	Local importance (Higher Value)	Yes	Six species of bat recorded within the Site during surveys (2023-2025). Good activity recorded along boundaries of the Site and established commuting/ foraging corridors are evident.
Common Frog	Local importance (Higher Value)	Yes	Suitable breeding and foraging habitat present in wetter parts of the Site and the various ditches and hedgerows. Juvenile Common frogs recorded in June 2025.
Common Lizard	Local importance (lower value)	No	Minimal suitable habitat on Site. A significant population is unlikely to be present.
Fish assemblage of the Tolka	County Importance	Yes	A salmonid river that supports both kingfisher and otter adjacent to the Site.
Marsh Fritillary	Local importance (lower value)	No	No recorded presence on Site or nearby. Some suitable habitat present along Tolka River.

14.9 Ecological Impact Assessment

As per the relevant guidelines, likely effects have been assessed for KERs only, as listed in Table 1418. The KERs identified as part of this EclA are as follows:

- Hedgerows (WL1), Treelines (WL2) and Drainage Ditches (FW4).
- Mixed broadleaf Woodland (WD1).
- River Tolka (FW2).
- Potential Annex 1 habitat: ‘Petrifying springs with tufa formation (*Cratoneurion*)’ [7220].
- Hedgehog, Badger and Otter.
- Breeding Bird Assemblage.
- Bat Assemblage.
- Common Frog.
- Fish Assemblage of the Tolka.

The following sections provide an assessment of the impact of the Proposed Development on local ecology. As per CIEEM (2024), where mitigation is fully integrated into the scheme and there is high confidence that it will be implemented the significance of effects of the mitigated project are assessed. Where mitigation has not been integrated into the scheme, for example where it is necessary to include specific measures within a Construction Environmental Management Plan (CEMP), the potential impacts are assessed in the absence of mitigation. In this instance, mitigation has been integrated into the surface water drainage of the Site (via SuDS), landscape plan and public lighting plan. As such, the impact of these plans is taken into account when assessing other relevant impacts (e.g., habitat loss).

14.9.1 Avoidance and Embedded Mitigation

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 1419.

Table 14.19. 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 paving Swales Detention basins Petrol interceptors Hydrobrakes	The SUDS features included in the Project Design will ensure the surface water discharge from the Proposed Development is reduced to greenfield runoff rates and harmful chemicals (e.g., hydrocarbons) are intercepted prior to release to local surface water drains and networks. These features will be implemented as part of the surface water drainage design. Inclusion of riparian buffers along existing retained ditches will also contribute to the protection of these habitat features and downstream aquatic habitats.
Lighting Design: The scheme has been designed so that lux levels along the vegetated boundaries of the Site have been minimised for the most part.	The lighting scheme for the Proposed Development has been designed with input from DNV to ensure it is sensitive to local wildlife usage of the Site and the areas around the Site.
Landscape Plan: Retention of majority of existing boundaries and extensive new tree and shrub planting throughout Site.	Hedgerow and woodland planting along Site boundaries create dense belts of native spaces which act as native habitat and, similarly to the native hedgerows, form ecological corridors which connect with other landscape elements throughout the Site. The retained boundary hedgerows/treelines are important in maintaining the ecological integrity of the Site. The introduction of wildflower meadow through certain open spaces within the Site also provides new habitats for local flora and fauna and helps to increase biodiversity in the local area.

14.9.2 Construction Phase

The Proposed Development will see a change in land use from a complex of former pasture fields bounded by hedgerows and dominated by grassland, to a large-scale residential development.

Potential Construction Phase impacts that could arise as a result of the Proposed Development include, but are not limited to, habitat loss or damage, habitat fragmentation, increases in noise and dust emissions, direct mortality or disturbance of protected species, runoff of sediment or other water borne pollutants into surface waterbodies and designated sites located downstream and light pollution.

It is considered that any negative impacts arising because of the Proposed Development can be readily mitigated through avoidance measures, the use of standard best practice construction measures, and biodiversity enhancement measures that will be incorporated into the Proposed Development plan.

14.9.2.1 Impacts on Habitats

14.9.2.1.1 Hedgerows, Treelines and Woodland

As per the Arboricultural Report prepared by John Morris Arboricultural Consultancy (JMAC), the Proposed Development will require the removal of 11 individual trees and part removal of six hedgerows and tree groups. These trees and hedgerows include:

- Trees 29, 47, 93, 94, 95, 105, 106, 107, 108, 111 & 112
- Hedgerows 5 & 35
- Groups 4, 13, 46 & G92

The reason for these removals is facilitate new dwellings, provide connectivity around the scheme and achieve levels for roads and landscaping around the new built environment. It is also noted that Ash trees suffering from Ash die-back are also set for removal given their risk of failure in the short-term. The layout of the proposal has been designed to ensure the retention and protection of hedgerows and trees where possible, with removals limited to those which are necessary to allow movement and connectivity around the proposed scheme.

As such the loss of the above trees and sections of habitat, when considered in the context of what is being retained and planted, will represent a **short-term, adverse, moderate** effect at the **Site scale** as the new planting develops, with this becoming a **neutral** effect in the long-term.

Construction Phase damage could occur to trees and hedgerows to be retained in the absence of tree protection measures. This represents a **short-term, adverse, moderate** effect at the **Site scale**, in the absence of mitigation measures depending on the amount of damage to trees and hedges at the Site.

14.9.2.1.2 Drainage Ditches

During Construction Phase, and in the absence of appropriate mitigation and protection measures, there is potential for construction-related pollutants to enter the drainage ditches at the Site. This represents a potential **short-term, adverse, slight** effect at a **local** scale.

14.9.2.1.3 Linked River Habitats – The River Tolka

Due to the risk of water quality impacts in the absence of mitigation on the drainage ditches on Site, there is a slight likelihood of pollutants eventually reaching the Tolka. This is considered to be a **short-term, adverse, slight** effect at a **local** scale in the absence of appropriate mitigation and surface water protection measures, given the transient nature of the flows in the ditches on Site and distance via this network to the Tolka.

Should Annex 1 habitat: '*Petrifying springs with tufa formation (Cratoneurion)*' [7220] be present within the Tolka in proximity to the Site, there is the potential for effects relating to construction surface water run-off. Petrifying springs are highly sensitive to changes in water chemistry and water flow and there is the potential for run-off and sediment entering the river during the works. This could potentially dilute the water in the tufa forming section of the river, changing the water chemistry and could potentially affect tufa formation. However, it is noted that this is a fast flowing section of the Tolka and would be unlikely to be significantly affected in this regard. As a precaution, it is considered that this could result in effects that are **short-term, adverse, moderate** at the **National scale** given the importance of this habitat (following the precautionary principle).

14.9.2.2 Impacts to Mammals

Hedgehog may utilise the grassland and hedgerow habitats at the Site. Signs of badger were recorded at the Site and although no active sets were recorded at the Site, badger could potentially occupy the Site prior to the commencement of works and thus be affected by the Proposed Development. The Proposed Development may result in the injury/mortality of these species during the vegetation clearance works if carried out during the hibernation period for Hedgehog in particular. This could result in **short-term, adverse, significant** effects to these mammals at the **local** scale, in the absence of mitigation.

Construction sites can pose a source of harm for mammals should they find themselves trapped in an excavation or uncapped pipe for instance. Badger in particular are known to utilise long established mammal pathways regardless of whether they have been developed upon, and this can lead to mortality or entrapment in some cases. Due to the known presence of badger in the area, there is a potential for **short-term, adverse, significant** effects at the **local** scale, via harm/entrapment, in the absence of construction mitigation.

The loss of what appears to be an existing mammal underpass connecting lands either side of the R157 as a result of the works could result in a reduction in connectivity linking badger habitat either side of the road. This 600mm pipe culvert is located in the vicinity of the proposed eastern entrance and junction from the R157 to the Site. It is not known whether other such mammal underpasses exist along the length of the R157 as it abuts the Site and so the loss of the one mentioned above could reduce habitat connectivity for species such as badger. This would represent a **permanent, adverse, significant** effect at the **local** scale.

Signs of otter were recorded along the Tolka to the east of the Site, although no holts or couches were recorded. Although unlikely to utilise the Site, otter could be impacted through a reduction in water quality in the Tolka should a pollution or sedimentation event occur as a result of the construction works (e.g., bridge construction). This could result in **short-term, adverse, significant** effects to otter, via a direct reduction in fitness or in feeding resources, at the **local** scale (i.e., the stretch of Tolka downstream of the Site) in the absence of mitigation.

There will likely be noise disturbance to local fauna at the Site during the construction works. This will represent a **short-term, adverse, slight** effect at the **local** scale.

14.9.2.3 Impacts to Breeding Birds

Several bird species were recorded as potential breeders within the habitats at and in the vicinity of the Site. Should vegetation be cleared as part of the Construction Phase during the breeding bird season (March 1st to August 31st); there is the potential for direct mortality to bird species and the destruction of nests. This would be in contravention of the Wildlife Act 1976 (as amended) which provides protection to breeding bird species and their nests and young. Therefore, in the absence of any mitigation or precaution, this risk represents a potential **short-term, adverse, significant** effect on breeding birds at a **local** scale.

The Proposed Development will impact local birds through the loss of some foraging/nesting habitat in the form of areas of hedgerow, treeline and woodland. This will be offset by the proposed landscaping at the Site including the provision of significant additional tree and hedgerow planting across the Site. There will be a period between the removal of existing vegetation and when the new planting establishes, however once this occurs the effect will be reduced to neutral. The Proposed Development will therefore have a **short-term, adverse, slight** effect on birds at the **local scale**, through loss of foraging/nesting habitat for some species, with effects becoming **neutral** once the landscaping establishes.

The increased human presence, noise and dust levels associated with the Construction Phase of the Proposed Development may have the potential to cause disturbance impacts to local bird populations, particularly any breeding birds within the hedgerows and treelines at the Site. There is also potential for disturbance from lighting associated with the Construction Phase of the Proposed Development, as lighting may need to be left on over-night to provide security for plant and materials stored at the Site. Considering the above, and in the absence of appropriate Site management and mitigation, disturbance from Construction-related increases in noise, dust and lighting is considered to have the potential to cause **short-term, adverse, slight** effects on **local** bird populations.

14.9.2.4 Impacts to Bats

The construction works will impact local bats through the loss of some sections of the hedgerows and treelines along the field boundaries at the Site to facilitate access roads and pathways. This will be somewhat offset by the proposed landscaping at the Site including additional hedgerow and tree planting however, it has the potential to have a negative impact on bat foraging and commuting through the Site while new planting establishes. The loss of agricultural grassland habitat will be offset by the provision of higher diversity planted habitats via the gardens and open space areas, and night-time lighting will be a determining factor in terms of how much habitat is accessible/lost to bats at the Site. Therefore, physical habitat loss represents a **short-medium term, adverse, moderate** effect to bats at the **local** scale when the proposed landscape plan is taken into account.

Additionally, Construction Phase lighting could potentially disrupt normal foraging and commuting routes, as most bat species avoid strongly lit areas when active. If construction lighting is directed to the retained treelines/hedgerows, it is possible for the illumination to disrupt normal commuting routes of local bats. As such, in the absence of precaution, this impact to bats represents a potential **short-term, adverse, moderate** effect on the **local** bat assemblage.

No PRFs of note were identified within the treelines or hedgerows on the Site. However, adverse weather conditions may alter the status of trees at the Site that are due for removal. In this event, there exists potential risk of injury and/or death to bats potentially present in a tree being felled. This represents a **short-term, adverse, slight-significant** (depending on the nature of the roost) impact at a **local** scale in the absence of mitigation.

14.9.2.5 Impacts to Amphibians

Common frogs are noted as being of *Least Concern* in the NPWS 2011 Red list (King et al., 2011), and are noted as having *Favourable* status in NPWS (2019) due to their adaptability to land use changes and their widespread abundance. Should works take place within drainage ditches supporting areas of pooling during the breeding period for amphibians such as frog, there is the potential for mortality of young and adults. Additionally, adult amphibians may also be present within the field margin habitats, and any vegetation removal/alteration is likely to place any potentially present amphibians at risk of injury or death. Therefore, in the absence of precaution and mitigation measures, the risk of harm, injury and/or death resulting from construction activities (incl. water quality impacts, construction traffic, and vegetation removal) represents a potential **short-term, adverse, significant** effect to frogs at the **local** scale in the absence of mitigation.

14.9.2.6 Impacts to the River Tolka and Fish Assemblage

14.9.2.6.1 Contaminated run-off and Sedimentation

In the absence of mitigation there is the potential for Construction Phase surface waters containing sediment, pollutants and/or cementitious materials to enter the Tolka during the proposed works within the flood plain i.e., the construction of the link-road and bridge over the river.

Such pollutant events could lead to a reduction in fitness and spawning success in fish populations downstream of the Site, especially should they occur within the spawning season. The reduction in fish stocks could have detrimental knock-on effects on populations of predators such as kingfisher and otter which are known to use the stretch of the river near the Site.

These effects are hard to quantify but in a worst-case scenario, they could lead to **short-term, adverse, significant** effects in the sections of the Tolka downstream of the Site, in the absence of mitigation.

14.9.2.6.2 Dust Deposition

Dust from construction sites deposited on vegetation can cause ecological stress to plants, adversely affecting photosynthesis and other biological functions. Rainfall, although removing the deposited dust from foliage, can also rapidly leach chemicals in the dust into the soil. Plant communities near short-term works are likely to recover within a year of the dust soiling stress ceasing (Holman et al., 2014). However, large scale construction sites may give rise to dust deposition over an extended period of time and have more significant effects on vascular plant communities.

As discussed earlier in Section 14.8.3.2.1.1 with regard to designated sites, the IAQM (2016) suggests that dust impacts will occur mainly within 400m of the operation of a minerals site, with adverse dust impacts from sand and gravel sites are uncommon beyond 250m, and beyond 400m from hard rock quarries measured from the nearest dust generating activities. It is commonly accepted that the greatest impacts will be within 100m of a source, and this can include both large (>30µm) and small dust particles (IAQM, 2016). The greatest potential for high rates of dust deposition and elevated particulate matter (PM10) concentrations occurs within this 100m distance. The IAQM (2014) assesses sensitivity to dust impacts from construction sites at <20m and <50m ranges for ecological features; impact zones far smaller than that of mineral sites detailed in IAQM (2016).

Meteorological conditions greatly affect the level of dust emissions and subsequent deposition downwind of the source; the most predominant being rainfall and wind speed. Adverse impacts can occur in any direction from a site; however, they are more likely to occur downwind of the prevailing wind direction and/or close to the site. Relatively high levels of moisture in the surrounding air, soils, and precipitation helps to suppress dust due to the cohesive properties of water between dust particles. The least favourable meteorological conditions for dust generation would typically be warm days with strong winds and low precipitation.

Much of the main body of the Site of the Proposed Development is located outside of the 400m range from the River Tolka, with some parts such as the bridge and link-road within the Phase 1 lands located within the 250m and 100m ranges. The sensitive receptors in this case are the Tolka and its associated plant and animal communities. Potential effects relating to dust are considered to be **short-term, adverse** and **significant** in nature, at the local scale (i.e., the stretch of the Tolka within 100m of the Proposed Development), in the absence of mitigation.

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14.9.3 Operational Phase

14.9.3.1 Impact to habitats

No significant effects are envisaged to habitats at the Site as a result of the Operational Phase of the Proposed Development.

14.9.3.2 Impacts to Mammals

The Operational Phase use of the Proposed Development could place small mammals at a heightened risk of accidental death or injury from collisions with vehicles. This risk is magnified for nocturnal species such as hedgehog due to limited visibility at night and their small size. However, the road design within the Proposed LRD includes a number of traffic calming features which will limit the speed of vehicles travelling on the road, which in turn will reduce the risk of collisions with wildlife. Therefore, the risk of collisions represents a potential **adverse, long-term, slight** effect at the **local** scale on small mammal populations.

Operational Phase lighting may also reduce available habitats for small mammals at the Site, by affecting their commuting and foraging activity. However, the lighting plan interferes minimally with the boundary habitats at the Site and so this is considered to be an **adverse, long-term, imperceptible** effect at the **local** scale on small mammal populations.

The presence of people and potentially dogs at the Site may lead to an increase in disturbance or loss of use of certain areas of the Site for mammals such as badger and hedgehog. The majority of the drainage ditches, hedgerows and woodland habitats will be retained and may be used by these largely nocturnal species, however an **adverse, long-term, slight** effect at the **local** scale on the local mammal population.

14.9.3.3 Impacts to Breeding Birds

Lighting from the Proposed Development may impact on breeding bird success. The current baseline level of light is very low to completely dark along the existing treelines and hedgerows, and it is anticipated that some increase in lighting along the retained and newly planted hedgerows is unavoidable as a result of the Proposed Development. However, the lighting plan for the Proposed Development shows low levels (0 to 1 lux) of light spill along the Site's vegetated boundaries. As such, the overall effect on breeding birds as a result of the Operational Phase lighting is considered to be **adverse, long-term, imperceptible** at a **local** scale.

It is noted that the potential for collisions between flying kingfisher and traffic using the proposed bridge was considered during the impact assessment. The proposed bridge design is a clear span bridge which allows space between the river water level and the underside of the bridge. Kingfisher have no problem flying under bridges as they often fly low along the water surface when commuting.

As discussed in relation to SCI waterbirds associated with designated sites in Section 14.8.3.2.1.1, the buildings proposed at the Site are largely low-rise residential with a max height of four storeys (apartment block C), and so the in-flight collision risk with flying birds is deemed to be negligible. Furthermore, the overall façades of the proposed structures are well broken up, with areas of glazing dispersed across a varied material composition. The opaque materials proposed, such as render and cladding, 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. The 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 extremely low. These architectural design features are part of the overall design of the Proposed Development and are not included as specific mitigation measures to prevent collisions, however, they will contribute to the overall effect in this regard. The potential for collisions is therefore considered to be negligible and any effects would be **imperceptible**.

14.9.3.4 Impacts to Bats

Despite the proposed lighting plan having been designed with bats in mind, the Operational Phase public lighting could reduce areas of foraging and commuting habitat for local bats and nocturnal fauna. This is the case where breaks in hedgerows/treelines are required for access roads and where lighting is required for health and safety purposes. The proposed bridge over the Tolka also has the potential to disturb bats commuting and foraging along the river, should the lighting of same cause light spill onto the river or its banks.

It is noted that the species of bat recorded during the transects surveys of the Site were predominantly the more light tolerant species of pipistrelles and Leisler's bat. Therefore, a certain amount of residual light spill will be tolerated by these species with some bats known to forage around light fixtures during the nighttime.

Overall, increased lighting at the Site, despite the embedded mitigation provided by the lighting plan, represents an **adverse, permanent, moderate to significant** effect at the **local** scale in the absence of mitigation if commuting/foraging habitat becomes fragmented.

14.9.3.5 Impacts to Amphibians

No potential effects (positive or negative) on locally occurring amphibians were identified as a result of the Operational Phase of the Proposed Development. As such, any impacts on any potentially present amphibians are considered to be **imperceptible**.

14.9.3.6 Operational Phase Surface Water Impacts

It is proposed to discharge surface water generated at the Site into the existing drainage ditch network via a suite of SuDS measures during the Operational Phase of the Proposed Development. Operational surface waters could carry hydrocarbons, detergents and other harmful contaminants associated with an active residential development, into the Tolka via this drainage system and adversely affect ecological receptors such as the Tolka's fish assemblage and associated predators. These impacts are hard to define but given the integrated SuDS measures that have been incorporated into the Proposed Development design, as per best practice, it is not envisaged that Operational Phase surface water has the potential to cause significant adverse effects to downstream sensitivities. As such, potential operational surface water effects are considered to be **neutral, permanent, imperceptible** in nature. These embedded mitigation measures are described in Section 14.3.1.3.1.

14.9.4 Cumulative Effects

A search of planning applications located within a 500m radius of the Site of the Proposed Development was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie), the DHLGH EIA Portal, and Meath 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 cumulatively with the Proposed Development and cause significant adverse effects on the surrounding environment and identified KERs. Long-term developments granted outside of this time period were also considered where applicable.

Based on the location of the Site in agricultural land on the outskirts of Dunboyne town and the nature and scale of the Proposed Development as a residential project, a 500m radius is deemed sufficient to capture any projects that could act cumulatively with the Proposed Development to affect the local environment. The larger developments within the vicinity of the Site are listed in Table 1420 below:

Table 14.20. Granted and Pending Development applications within 500 m of the Proposed Development. Location and distance given is relative to the Proposed Development.

Planning Reference	Planning Authority	Status	Location
P822022	Meath CoCo	Part 8	Approx. 260m SW of Proposed Development (along R157)
Development Description: The proposed development will consist of: The provision of a new Link Road (approximately 340m long), from the existing Dunboyne Business Park Road to a new priority junction on the R157. The provision of a new Access Road (approximately 50m long), to provide access to the Recycling and Civic Amenity Centre, and other adjacent landholdings. Provision of footpaths and raised cycle tracks on both sides of the proposed Link Road. Provision of a footpath on the eastern side of the proposed Recycling Centre Access Road. Priority junction implementation between the proposed Link Road and the R157. Priority junction implementation between the proposed Link Road and proposed Recycling Centre Access Road. Provision of off-line bus stops on both sides of the proposed Link Road. Public lighting, accommodation and fencing/boundary works, landscaping works, drainage/attenuation works, and ancillary infrastructure and utility works.			
Potential for In-combination Effects: An AA Screening was prepared for the Proposed Development and screened out the potential for any likely significant effects on European sites. No likelihood of significant in-combination effects to KERs due to the lack of a shared impact pathway of note to any designated site and the small size and nature of the application (i.e., upgrades to existing road infrastructure and roadside verges).			

Planning Reference	Planning Authority	Status	Location
23424; ABP 320091	Meath CoCo	Application Finalised	Adjacent to the N of the Proposed Development
Development Description: The development will consist of: i. Construction of 3 no. office buildings with a cumulative gross floor area (GFA) of 13,729 sq.m ranging in height from 3 to 4- storeys and shall comprise the following: a. Building 1 (3,597 sq.m GFA) 3-storeys in height (12.35 metres to top of parapet), with a setback louvred screen 2m above parapet level. b. Building 2 (5,336 sq.m GFA) 4-storeys in height (16.125 metres to top of parapet), with a setback louvred screen 2m above parapet level. c. Building 3 (4,796 sq.m GFA) 4-storeys in height (16.125 metres to top of parapet), with a setback louvred screen 2m above parapet level. ii. Roof mounted solar PV panels (c. 180 sq.m combined area); iii. Provision of a 4-arm signalised junction replacing the existing Pace roundabout to include a new northern arm with segregated cycleway and footpath; iv. Access to the development is proposed from the new northern arm, with 6m wide internal access roads to serve the development; v. Upgrade works to the R157 and M3 Parkway access road to facilitate junction improvements; vi. A total of 275 surface car parking spaces including 14 disabled access bays and 55 electric car charging points; vii. 280 bicycle parking spaces in 3 secure cycle storage areas adjacent to the buildings; viii. Site signage is to be erected, all spot-lit and back-lit illuminated, including 2 no. type 1 entrance signs (6.15m x 2.4m) and 3 no. type 2 building signs (1.35m x 2.4m); ix. 3 standalone electricity substations; x. Foul sewer connection to existing public system including pumping station on site with rising mains along Kennedy Road and Navan Road; xi. Watermain connection to the northeast of site at Pace for connection to Irish Water Infrastructure; xii. Permission is also sought for associated landscaping, boundary treatments, public lighting, plant, waste storage and all ancillary site and development works. A Natura Impact Statement (NIS) has been prepared in respect of the proposed development.			
Potential for In-combination Effects: The main body of the development (ref: 23424) is located adjacent to the north of the Site. A NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. There will be some combined loss of common agricultural grassland habitats of low ecological value as part of both developments, and potential for water quality impacts on the River Tolka in the absence of mitigation. There is no likelihood of significant cumulative effects due to the targeted river protection measures included in the NIS prepared for the LRD application (ref: 23424) and the NIS and this Biodiversity Chapter prepared for the Proposed Development, along with the insignificant nature of the hydrological pathway connecting both Sites to downstream designated sites (ca. 20km of the River Tolka).			

Planning Reference	Planning Authority	Status	Location
2360065	Meath County Council	Conditional permission granted	Adjacent to the Proposed Development
Development Description: “We, McGarrell Reilly Homes intend to apply for a 10-year permission for development in the Townlands of Bennetstown, Pace, and Dunboyne. The subject site (2.79ha) encompasses an area of 0.87ha situated to the south-west of the M3 Parkway and south-east of the Dunboyne Bypass (R157) located in the Townland of Bennetstown, and the balance (1.92ha) located in the Townlands of Pace, Bennetstown and Dunboyne including the Dunboyne Bypass (R157) and M3 Parkway access, Kennedy Road and Navan Road for infrastructure works. The development will consist of: i. Construction of a single-storey commercial building with a cumulative gross floor space (GFS) of 2,160 sq.m comprising: a. A supermarket with delivery, store and service area (1,880 sq.m), including net retail floorspace of 1,510 sq.m, and b. 2 commercial units (combined 280 sq.m) to facilitate Class 1 (Shop), Class 2 (Financial, Professional and Other Services) or Café (food and beverage) uses. ii. Provision of a 4-arm signalised junction replacing the existing Pace roundabout to include a new northern arm with segregated cycleway and footpath; iii. Upgrade works to the existing R157 and M3 Parkway access road to facilitate junction improvements; iv. Access to the development is proposed via a new 3-arm priority-controlled junction from the upgraded southern arm of the proposed 4-arm signalised junction, with 6m wide internal access roads to serve the development; v. A total of 118 surface level car parking spaces including 6 disabled access bays and 4 electric car charging points; vi. 20 short-stay bicycle parking spaces; vii. 1 Electricity substation / switch room; viii. Foul sewer connection to existing public system including pumping station on site with rising mains along Kennedy Road and Navan Road; ix. Permission is also sought for hard and soft landscaping, lighting, attenuation and drainage and all ancillary site development works. Significant further information/revised plans submitted on this application.” Potential for In-combination Effects: The main body of the development (ref: 2360065) is located adjacent to the main Site Area. A NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. There will be some combined loss of common agricultural grassland habitats of low ecological value as part of both developments, and potential for water quality impacts on the River Tolka in the absence of mitigation. There is no likelihood of significant cumulative effects due to the targeted river protection measures included in the NIS prepared for the LRD application (ref: 2360065) and the NIS and this Biodiversity Chapter prepared for the Proposed Development, along with the insignificant nature of the hydrological pathway connecting both Sites to downstream designated sites (ca. 20km of the River Tolka).			

Planning Reference	Planning Authority	Status	Location
2460805	Meath County Council	Granted with conditions	Overlaps with the Proposed Development
Development Description: “Permission for the following Large-Scale Residential Development consisting of: i) 309 no. residential units comprising 169 no. dwelling houses and 140 no. apartments/duplexes providing a mix of 1, 2, 3 and 4-bed units. The dwelling houses range in height from 2-3 storeys. The apartments/duplexes are in 8 no. blocks (i.e. Blocks A-H) ranging in height from 3 to 4 storeys; ii) a 2 storey creche; iii) modifications to the R157 regional road including changes to the existing carriageway/ traffic lanes, the replacement of an existing roundabout with a new signalised junction and the provision of a northern arm off the new signalised junction ; iii) a new signalised junction and link road (including new bridge over the River Tolka) connecting the R157 and the Old Navan Road; iv) the provision of footpaths, cycle lanes and 2 no. pedestrian crossings on the existing M3 Parkway access road, v) a foul pumping station and connection to the existing public sewerage system via the Old Navan Road; vi) a watermain connection to the north of the site at Pace (townland); vii) 3 no. ESB substation/ kiosks; viii) temporary raised levels and soil storage to the south west of the site; ix) reprofiling of lands, construction of conveyance swales and a surface water runoff retention area as part of pluvial flood mitigation measures and x) all associated ancillary development works including footpaths, cycle lanes, car and bicycle parking, drainage, public lighting, bin storage, boundary treatments and landscaping/amenity areas at this site principally located in Bennetstown (townland) to the west of the R157, and also extending into Pace & Dunboyne (townlands), Dunboyne North, Co. Meath. Access will be via 2 no. new signalised junctions on to the R157 comprising 1 no. new vehicular access point to the southeast along the R157 and via 1 no. new vehicular access point to the north along a new northern arm off a new signalised junction which will replace the existing roundabout on the R157. The planning application red line boundary overlaps with planning ref. 23/60290, 23/60065 and 23/424. An Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) has been submitted to the planning authority with the application.” Potential for In-combination Effects: The LRD application (ref: 2460805) will include a bridge over the Tolka (which is also included under ref: 2360290). As such a NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. The Proposed Development footprint overlaps with that of ref: 2460805. There will be some combined loss of common agricultural grassland habitats of low ecological value as part of both developments, and potential for water quality impacts on the River Tolka in the absence of mitigation. There is no likelihood of significant cumulative effects due to the targeted river protection measures included in the NIS prepared for the LRD application (ref: 2460805) and the NIS and this Biodiversity Chapter prepared for the Proposed Development, along with the insignificant nature of the hydrological pathway connecting both Sites to downstream designated sites (ca. 20km of the River Tolka).			

Planning Reference	Planning Authority	Status	Location
2360290; ABP 320049	Meath County Council	Granted	Overlaps with the Proposed Development
Development Description: “Permission for the following Large-Scale Residential Development consisting of: i) 267 no. residential units comprising 145 no. dwelling houses and 122 no. apartments/duplexes providing a mix of 1, 2, 3 and 4-bed units. The dwelling houses range in height from 2-3 storeys. The apartments/duplexes are in 8 no. blocks (i.e. Blocks A-H, with Blocks B and C joined) ranging in height from 3 to 5 storeys; ii) a single storey creche; iii) modifications to the R157 regional road including changes to the existing carriageway/traffic lanes and the replacement of an existing roundabout with a new signalised junction; iv) a new signalised junction and link road (including new bridge over the River Tolka) connecting the R157 and the Old Navan Road; v) the provision of footpaths, cycle lanes and 2 no. pedestrian crossings on the existing M3 Parkway access road, vi) a foul pumping station and connection to the existing public sewerage system via the Old Navan Road; vii) a watermain connection to the north of the site at Pace (townland); viii) 3 no. ESB substation/kiosks and the undergrounding/re-routing of existing electricity lines; ix) reprofiling of land and relocation of existing berm adjoining the River Tolka as part of flood mitigation measures; and x) all associated ancillary development works including footpaths, cycle lanes, car and bicycle parking, drainage, public lighting, bin storage, boundary treatments and landscaping/amenity areas at this site measuring 14.17 hectares principally located in Bennetstown (townland) to the south of the M3 Parkway park and ride and rail station, and also extending into Pace & Dunboyne (townlands), Dunboyne North, Co. Meath. Access will be via 2 no. new vehicular access points along the new link road between the R157 and the Old Navan Road. Pedestrian access will also be provided on to the existing M3 Parkway access road. An Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS) has been submitted to the planning authority with the application. Significant further information/revised plans submitted with this application.”			
Potential for In-combination Effects: The LRD application (ref: 2360290) will include a bridge over the Tolka. As such a NIS was prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream European sites. No likely significant effects are therefore expected. The Proposed Development footprint overlaps with that of ref: 2360290 and includes the same bridge over the Tolka as part of the Proposed works. There will be some combined loss of common agricultural grassland habitats of low ecological value as part of both developments, and potential for water quality impacts on the River Tolka in the absence of mitigation. There is no likelihood of significant cumulative effects due to the targeted river protection measures included in the NIS prepared for the LRD application (ref: 2360290) and the NIS and this Biodiversity Chapter prepared for the Proposed Development, along with the insignificant nature of the hydrological pathway connecting both Sites to downstream designated sites (ca. 20km of the River Tolka).			

Planning Reference	Planning Authority	Status	Location
25/61001	Meath County Council	Granted	Overlaps with the eastern extent of the Proposed Development
Development Description: “Permission for a Large-Scale Residential Development - Permission for the following Large Scale Residential Development (LRD) comprising modifications to part of the LRD permitted under Meath County Council Ref. 25/60290 (An Coimisiún Pleanála ref. 320049-24). The proposed modifications consist a re-alignment of a portion of the link road (including new bridge over the River Tolka) connecting the R157 and the Old Navan Road, the provision of 1 no. pumping station and associated access road off the Old Navan Road and all associated ancillary development works including footpaths, cycle lanes, drainage, public lighting, boundary treatments and landscaping at Bennetstown and Dunboyne (townlands), Dunboyne North, Co. Meath. An Environmental Impact Assessment Addendum Report and Natura Impact Statement has been submitted to the planning authority with the application. The application may be inspected online at the following website set up by the applicant: www.dunboyneroad.ie”			
Potential for Cumulative Effects: The LRD modification application (ref: 25/61001) will include modifications to a permitted road and bridge over the Tolka. As such an NIS and EIAR Biodiversity Chapter addendum were prepared for this development following a precautionary approach, with targeted mitigation included to protect the Tolka River during the works and any downstream designated sites/ KERs. No likely significant effects are therefore expected. The Proposed Development footprint overlaps with this development. No likelihood of significant cumulative effects due to the targeted river protection measures included in the NIS/ Biodiversity Chapter addendum prepared for the application in question (ref: 25/61001) which are analogous to those proposed in this Biodiversity Chapter and the NIS prepared for the Proposed Development, and the insignificant nature of the hydrological pathway connecting both Sites to downstream European sites (ca. 20km of the River Tolka).			
ABP-319422	An Bord Pleanála	Granted with conditions 05/02/2025	Adjacent to the Proposed Development along the R157
Development Description: According to the AA Screening Report prepared by Jacobs (Jacobs, 2024), the East Meath – North Dublin Grid Upgrade includes approximately 37.5 kilometres (km) of new 400 kilovolt (kV) underground cable circuit (also referred to as the proposed cable route) between the existing Woodland Substation in the townland of Woodland in County Meath, and the existing Belcamp Substation in the townlands of Clonshagh and Belcamp in Fingal, County Dublin. The Proposed Development will also involve works in the substations to facilitate the connection of the underground cable circuit to the electrical grid.			
Potential for In-combination Effects: The development application in question was accompanied by an NIS and EIAR Biodiversity Chapter, with targeted mitigation included to protect waterbodies including the Tolka River during the works and any downstream designated sites. No likely significant effects are therefore expected as a result of this development. No likelihood of significant in-combination effects with the Proposed Development due to the absence of any likely significant effects as a result of the Proposed Development, the targeted river protection measures included in the NIS/ Biodiversity Chapter prepared for both the Proposed Development and the East Meath – North Dublin Grid Upgrade (once mitigation and compensatory measures are considered), and the nature of the hydrological pathway connecting both Sites to downstream designated sites (ca. 20km of the River Tolka).			

Planning Reference	Planning Authority	Status	Location
221509	Meath County Council	Conditional permission granted	Approx. 400m S of the Proposed Development
Development Description: “The development will consist of: construction of a single storey discount foodstore of 2200 gross floor area (GFA) with a net sales area of 1,409sqms with an ancillary off license sales area; car parking for 119 cars including accessible spaces, cycle parking and electric vehicle parking spaces (circa 20% of spaces will be wired for future EV parking). The store will include photovoltaic panels at roof level; trolley bay with cycle parking; bin store and new ESB Substation building as well as a pedestrian and cycle link connecting to the northern boundary in line with the current termination of the existing pedestrian path extending along the eastern elevation of the Supervalu store to the northern boundary of the subject site. There is also provision for future pedestrian and vehicle link from the proposed access road to lands to the east of the application site. The construction of a single storey café unit (165sqms) positioned adjacent to a proposed plaza area which together are located in the existing car park area to the west of St. Peter and St. Paul’s Church (‘The Church’). The vehicular entrance to the development will be approximately in the same location as the entrance to the existing car park, west of The Church. The existing ESB substation in this area will remain in place. The café will also have an enclosed bin store. The construction of a new car park (53 spaces) located to the northeast of the Church and for its exclusive use. It will be connected to the internal grounds of The Church via a two-way connection. The main entrance and exit will be onto the access road serving the proposed foodstore. This access road in turn will have a footpath along its east side, running parallel with The Church boundary. There will also be a crossing point from the existing pedestrian connection on the northwest boundary of The Church. For clarity the majority of the existing northeast, walled, boundary of The Church is proposed for removal along most of its length to facilitate the operation of the new Church car park. The application also includes works and road markings to improve traffic management related to Vehicular access to and from the site on Main Street. A right turn lane is proposed on Main Street with works to the public space located to the southwest of Main Street including alterations to kerbs lines; minor relocation of one disabled parking space and relocation of bollards and other works to footpaths as required.” Potential for In-combination Effects: An AA Screening was prepared for the development (ref: 221509) and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. The development in question largely resulted in the loss of grassland habitat of lower value, as did the Proposed Development. No likelihood of significant cumulative effects due to the absence of any likely significant effects as a result of this development and a lack of a shared impact pathway of note to any designated site or KER.			

Planning Reference	Planning Authority	Status	Location
ABP- 308130	ABP/ Meath County Council	Conditional permission granted	Approx. 320m NE of the Proposed Development
Development Description: “220kV substation with 2 underground transmission cables.” Potential for In-combination Effects: According to the ABP Inspector’s report, an AA Screening was prepared for the development and no notable impact pathways were identified linking the development to any European sites, with likely significant effects therefore screened out. The footprint of the development in question comprises agricultural grassland fields divided by internal hedgerows and is considered of low ecological value. No likelihood of significant cumulative effects with the Proposed Development due to the absence of any likely significant effects as a result of this development and lack of a shared impact pathway of note to any designated site/ KER.			

The granted and pending developments listed above were all accompanied by the appropriate environmental reports. These reports, where necessary, included relevant mitigation to avoid potential adverse effects to the surrounding environments as well as to any European and other designated sites. Based on the tenuous nature of the impact pathway linking the Proposed Development to designated sites in Dublin Bay (i.e., approx. 20km of the River Tolka), it is deemed that no potential for significant cumulative effects on any such sites is likely to occur from the Proposed Development together with any of the above granted and pending developments. Nevertheless, an NIS has been prepared to further ensure no risk of downstream effects as a result of the Proposed Development and accompanies this application under separate cover (DNV, 2025b).

Should the Construction Phase of the Proposed Development overlap with that of the permitted Phase 1 & 2 of the Bennetstown LRD developments (granted under planning ref: 23/60290 (An Coimisiún Pleanála ref. 320049-24) and 24/60805), there is the potential for combined noise, dust and pollution impacts in the area. However, the applications for the above phases and this application are accompanied by NISs and EIARs, both of which detail the mitigation measures to be put in place to protect any KERs for the duration of the works. As such, no significant cumulative effects are envisaged in this regard.

The Proposed Development will act in combination with other developments in the Dunboyne area; through the general loss of semi-natural habitats to development. The Site and other agricultural lands in the surrounding area are zoned for residential development and so a future land-use change is expected. The loss of the agricultural grassland at the Site to development is not considered a significant loss of natural habitats. The Proposed Development design has included the retention of the majority of existing hedgerow, treeline and woodland habitat at the Site, and proposed new planting of tree, hedgerow and shrubs to offset the loss of the sections of hedgerow that are to be lost to facilitate the Proposed Development. Therefore, habitat connectivity with the surrounding lands will be maintained for local birds, bats, small mammals and pollinators/insects into the future. Overall, it is not envisaged that the Proposed Development will act cumulatively with any other development to significantly affect local ecological receptors.

14.10 Avoidance, Mitigation, Compensation and Enhancement Measures

The following sections outline the avoidance and mitigation measures identified to eliminate the potential for significant adverse impacts on KERs and the ecology of the Site and its surrounds. Once the recommended measures outlined in the following sections are implemented in full, no significant adverse impacts on the relevant KERs are anticipated as a result of the Proposed Development. These mitigation measures will be included in a CEMP that will be prepared prior to commencing works by the appointed construction contractor.

In addition, to ensure the CEMP remains ‘fit for purpose’ for the duration of the project it will be reviewed and updated by the Project Manager in consultation with the Contractor’s Ecologist during the life of the project to ensure that it remains suitable to facilitate efficient and effective delivery of the project’s environmental commitments.

14.11 Avoidance by Design

The Proposed Development design does not implement any specific avoidance measures.

14.11.1 Construction Phase Mitigation

14.11.1.1 Mitigation 1: Pre-construction Surveys : Badger and Otter

A minimum of 2-3 months prior to the commencement of works on Site (including enabling works), a suitably qualified Ecologist will be instructed to carry out surveys of the Site and river Tolka upstream and downstream of the proposed bridge crossing, for the below listed species. The results of these pre-commencement surveys will be provided to Meath CoCo prior to commencement of works on Site.

- Badger.
- Otter.

These pre-commencement surveys will ensure that no change has occurred in the status of these species at or near the Site since planning was submitted. The above surveys should confirm whether any nesting/resting places etc., for the above species have occurred since previous surveys and will advise further mitigation measures as required.

14.11.1.2 Mitigation 2 : Provision of a Mammal Underpass under the R157

The suspected existing mammal underpass under the R157 will be retained or replaced as part of the Proposed Development and road junction at the main eastern entrance to the Site. The underpass will be decommissioned under the watching brief of the Project Ecologist/ECoW to ensure no impacts to mammals occur.

Should the underpass require removal, a suitable replacement will be provided as part of the Proposed Development to ensure that mammal connectivity east and west of the R157 is maintained into the future. Any new underpass will be designed with the input of the ECoW/Ecologist and signed off by Meath CoCo to ensure that it is an effective and suitable replacement. Any new underpass to be constructed will be located as close to the existing mammal underpass as possible.

14.11.1.3 Mitigation 3: Tree Protection Measures

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.

The project Arborist will be instructed **prior to commencement on Site**; to ensure that appropriate tree protection measures are in place. These measures will entail robust fencing around the root protection zones of all trees and hedgerows being retained on Site. An adequate level of signage will also be provided to highlight ‘no work zones’ and ensure that Site creep and damage to retained habitats does not occur.

The areas of hedgerow that are to be retained at the Site must be sufficiently protected for the duration of the Construction Phase to ensure maximise their value in the final landscape plan.

The drainage ditches and their riparian buffers must also be suitable protected for the duration of the works until their landscaping is to be carried out.

The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of hedgerow protected for the duration of the works.

14.11.1.4 Mitigation 4: Construction Environmental Management Plan (CEMP)

A CEMP based on the mitigation commitments presented in the various EIAR Chapters and this NIS, will be prepared for the Construction Phase.

A planning stage CEMP has been prepared for submission with the planning application (PMG, 2025a), which entails an Environmental Management Section. This outline document provides a framework for the contractor to develop further as the project moves into the Construction Phase.

The Construction Phase CEMP will collate and set out the environmental control measures required to minimise, and control adverse environmental impacts associated with the Proposed Development. It is intended that the CEMP will be a live document, which will capture all Construction Phase environmental mitigation measures included within the EIAR, NIS and any other measures which become apparent through the EIA consultation process and/or are prescribed through planning conditions etc. The CEMP will include enabling and decommissioning works.

- All construction and operations are to be carefully planned and implemented with a series of environmental management and control procedures. The CEMP will detail the general pollution prevention principles and measures which are to be implemented, water and sediment management measures to prevent pollution during the Construction Phase and measures to ensure the potential for pollution fuel, oil, chemicals and other construction materials is minimised.
- **The Contractor shall engage a suitably experienced ecologist, the Project Ecologist**, who will be a full member of a relevant professional institute such as CIEEM, have relevant experience in the management of ecological constraints during construction. The Project Ecologist shall be appointed sufficiently in advance of construction to arrange for any mitigation requirements to be incorporated into the CEMP and any site-specific method statements.
- The construction management of the Site will take account of the recommendations of the Construction Industry Research and Information Association (CIRIA) guides ‘*Control of Water Pollution from Construction Sites*’ and ‘*Groundwater control - design and practice*’ to minimise as far as possible the risk of pollution.

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- The Contractor shall take all necessary precautions **to prevent pollution or siltation of surface or groundwaters** from construction activities; with a particular focus on the protection of existing drainage ditches and the River Tolka. The following management, control and mitigation measures will be implemented:
 - » Any groundwater temporarily dewatered during the construction of the attenuation basins and any deep building foundations will be treated via the installation of a temporary *in-situ* water treatment system.
 - » This system should be designed and sized to ensure that all pumped groundwater water is treated prior to discharge to a selected onsite location (via a temporary soakaway).
 - » The Contractor will be required to provide a site-specific dewatering plan, clearly setting out proposed excavation methodology, estimated dewatering rates, details of the proposed treatment system, and discharge location.
 - » Surface water attenuation measures are to be designed which will not be overwhelmed by one-off adverse precipitation events.
 - » Where practical, cut-off V drains will be utilised to divert water entering Site and reduce the amount of water to be managed on-Site. Attention will be given to the maintenance and protection of all drains and temporary channels to minimise scour and the mobilisation of suspended solids (e.g. lining with hessian or clean stone, check dams, silt fencing etc.).
 - » Mud will be controlled at entry and exits to the site using wheel washes and/or road sweepers, and tools and plant will be washed out and cleaned in designated areas. Wheel washings will be contained and treated prior to discharge.
 - » Runoff will be directed to and intercepted by temporary settlement lagoons. The size of the settlement lagoon will be determined from predicted flow rates and retention times based on sediment particle size and density.
 - » Neither groundwater nor surface water runoff from the working areas will be permitted to discharge directly to the environment (e.g., existing ditches or River Tolka). Runoff generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. Total Suspended Solids (TSS), pH/EC and colour will be monitored daily and outlets from sedimentation ponds will incorporate a turbidity monitor with alarm at a high level.
 - » Subject to consent, water that is unpolluted, aside from its silt content, may be pumped out over adjacent vegetated ground, where appropriate, with consideration given to groundwater level and saturation, wildlife importance and proximity to drainage channels.
 - » In the event of surface water failing to meet the required standards water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site.
 - » The performance of the surface water drainage network will be maintained and monitored throughout the construction of the Proposed Development, noting that the proposed storm system will include permanent hydrocarbon separators.
 - » Where the Contractor utilises pumping to drain works areas, a back-up pump and generator must be provided on Site for use in the event of the primary pump failing.
 - » Procedures are to be put in place to ensure the identification, remediation and correct reporting of any silt or other pollution incidents that may occur.
- **During localised construction works along existing drainage ditches** (e.g., to facilitate the realignment and culverting of parts of the ditch in the south-west of the Site and construction of headwalls/outfalls), a construction methodology will be drawn up. This will detail the approach to the construction and installation of culverts along the southern drainage ditch that runs along the proposed link-road (both the western and eastern sections) and the slight

realignment of the western section of said ditch (See Figure 144).

- Any such works e.g., realignment/re-profiling of ditch and channel, are to take part in dry weather conditions, when the ditch bed is dry, to minimise sedimentation of watercourses downstream.
- Any minor volumes of stripped soils from these works will be stockpiled a minimum distance of 10m from the channel and will be appropriately covered. A temporary stormwater management system will be implemented by the Contractor.
- Areas will be designated where stockpiles will be established in order to facilitate the efficient transfers of material within the Site. Stockpiles will be stabilised as soon as possible (e.g. sealed, closed over, seeded or covered using geotextile mats), and bunded by earth or silt fences at the toe to intercept silt-laden runoff during rainfall events.
- Appropriate working practices to avoid the repetitive handling of excavated substrates, minimise vehicle movements, limit the size, number and frequency of stockpiles, reduce the compaction and erosion of soils etc. and control the generation of dust. The implementation of a construction traffic management plan and controls on the locations of plant and materials will minimise the compaction and erosion of soil. Excavation is to be restricted during high winds and heavy rainfall to minimise dust generation and contaminated surface runoff.
- Excavated materials are to be inspected for signs of possible contamination, such as staining or strong odours. Should any be noticed, substrates are to be segregated and samples analysed for contaminants to determine an appropriate means of disposal to licensed/permitted facilities appropriate for the waste classification.
- In order **to prevent any potential surface water/groundwater impacts via release of hydrocarbon/chemical contaminants** the following standard measures will be implemented:
 - The Contractor will ensure all Site personnel are trained in the handling of materials, the sensitive nature of the receiving environment, the drainage system and the consequences of accidental spillages.
 - » Fuels, lubricants and hydraulic fluids for equipment used on the construction Site, as well as any solvents, oils, and paints, will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice;
 - » Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Proposed Development for disposal or recycling;
 - » Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the Proposed Development and properly disposed of;
 - » All Site vehicles used will be refuelled in bunded and adequately sealed and covered areas in the construction compound area.
 - » Strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on Site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Site. This will minimise the risk of groundwater becoming contaminated through Site activity.
 - » All oil stored on Site for construction vehicles will be kept in a locked and bunded area;
 - » Generators, pumps and similar plant will be placed on drip-trays to prevent contamination;
 - » All temporary construction fuel tanks will also be located in a suitably bunded area and all tanks will be double skinned. Relevant Material Safety Data Sheets along with oil absorbent materials will be kept on Site in close proximity to any fuel storage tanks or bowers during proposed Site development works; and,
 - » All fuel/oil deliveries to on Site oil storage tanks will be supervised, and records will be kept of delivery dates and volumes.
 - » Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection. Drip trays will be covered, emptied regularly as required and disposed of off Site having regard for local waste management legislation.
 - » Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations

around the Site to reduce the risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points.

- » Procedures are to be put in place to ensure the identification, remediation and correct reporting of any fuel, oil, chemical or other pollution incidents that may occur.
- In order **to prevent any potential surface water/groundwater impacts via release of cementitious materials** the following measures will be implemented:
 - » No mixing of concrete will be carried in close proximity to existing watercourses or drainage ditches as will be detailed in the CEMP. The measures detailed below will be employed where poured concrete is being used in the construction process;
 - » The production, transport and placement of all cementitious materials will be strictly planned and supervised;
 - » Shutters will be designed to prevent failure. Grout loss will be prevented from shuttered pours by ensuring that all joints between panels achieve a close fit or that they are sealed;
 - » Any spillages will be cleaned up and disposed of correctly;
 - » Where concrete is to be placed by means of a skip, the opening gate of the delivery chute will be securely fastened to prevent accidental opening;
 - » Where possible, concrete skips, pumps and machine buckets will be prevented from slewing over water when placing concrete;
 - » Surplus concrete will be returned to batch plant after completion of a pour; and
 - » The Contractor will dispose of all alkaline wastewaters and contaminated stormwater offsite having regard for local waste management legislation.
- The Contractor will implement procurement procedures to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.
- The Contractor will vet the source of aggregate, fill material and topsoil imported to the Site in order to ensure that it is of a reputable origin and that it is “clean” (i.e. it will not contaminate the environment).
- All material to be disposed of off Site to a facility licensed having regard for local waste management legislation. Where material is to be stockpiled on site prior to disposal, the Contractor will control all run-off to prevent contamination of surrounding watercourses (via silt-fencing etc.).
- **The CEMP will include an Emergency Response Plan (ERP)** based on the Contractor’s Risk Assessment, to be reviewed and approved by the Project Ecologist. The ERP will include (but not limited to):
 - » Training of relevant staff, including cover staff, in the implementation of the ERP and the use of spill kits;
 - » Procedures to be undertaken in the event of the release of any sediment into a watercourse, or any spillage of chemicals, fuel, oil or other hazardous materials or wastes;
 - » Procedures to be undertaken in the event of any non-compliance incidents with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks;
 - » The number, specification and location of all spill kits which shall be carried/kept on the site; and
 - » Information on clean-up and reporting procedures; etc.

While it is expected that the Site drainage system will be installed and commissioned early in the Site construction programme and will therefore be operational for much of the Construction Phase, there will be a period of the construction phase during which the Site drainage system will not be operational. The CEMP is required to cover this period and to deal with other issues during the Construction Phase.

14.11.1.5 Mitigation 5: Construction Programme

The CEMP will include a section setting out the construction programme and will include all the environmental control measures required to avoid impacts to salmonids and other species, as set out below.

All discrete elements involving construction over or within the River Tolka (such as bridge construction, bank works etc) are to be programmed to take place outside the spawning season for salmonids (i.e. these will **take place between July and September**) to ensure that potential impacts to protected fish species are avoided.

14.11.1.6 Mitigation 6: Bridge Construction

The installation of a bridge over the River Tolka will bring works close to the river channel. The proposed bridge has a clear span of 32.712m and traverses a section of the river. Consequently, bridge abutment construction will be several metres away from the channel which will reduce the risk of silt or construction debris entering the watercourse in the event of spillages during the excavation or construction process.

During the construction of the bridge, the Contractor will ensure that the river is protected from any inputs of contaminants/pollutants for the duration of the works. To minimise risks, best practise Construction measures for works within, or in the vicinity of watercourses will also be followed as per ‘*Guidelines for the crossing of watercourses during the construction of national road schemes*’ (TII, 2008) and ‘*Control of water pollution from linear construction projects - CIRIA C648*’ (CIRIA, 2006). The below measures will be included in the Contractor’s CEMP to prevent the release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters into the receiving surface water network:

- A **Construction Method Statement** for the bridge construction will be prepared by the Contractor and signed off by the Project Ecologist/ECOW. This Method Statement will detail the mitigation/protection measures that will be put in place to protect the river during these works.
- All works adjacent to the River Tolka will be carried out in accordance with Inland Fisheries Ireland (IFI), “*Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*”.
- Prior to commencement on Site, **contact will be made with IFI** to ensure the works comply with the provisions of the Fisheries Act and Habitats Regulations, and that said works will be in accordance with any detailed operational and construction requirements issued by IFI.
- Works will be carried out from the bank side, **and in-stream works will be restricted to the period 1st July through 30th September**, to comply with the seasonal restrictions in salmonid rivers.
- A **suitably qualified ECoW** will be present on-site during the installation of the bridge and associated bank works.
- Wet concrete works in proximity to the watercourse will be avoided as much as practicable and the use of precast elements to form retaining structures and bridge foundations (e.g., segmental retaining walls, driven piles) will form part of the construction specification where feasible in lieu of in-situ concrete alternatives.
- It will be ensured that **all river protection measures will be maintained in good and effective condition** for the duration of the proposed works and checked regularly to ensure that the silt fencing and other mitigation measures are operating effectively.
- To prevent elevated levels of erosion and sedimentation at the Site during the Construction Phase, surface water at the Site will be managed and controlled for the duration of the construction works, until the permanent surface water drainage system (including attenuation and storage) for the Proposed Development is complete.
- Entry to the river channel by vehicles will be avoided, while vehicle usage along the banks will be restricted as much as practicable. Any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels.
- Works involving the breaking of riverbanks e.g., any reprofiling of the riverbank, will be carried out with suitable

and effective mitigation in place to minimise/ prevent sediment release to the river i.e., cofferdams, Silt-traps and other suitable in-stream measures for the collection/filtration of sediment.

- Suitable temporary erosion control measures will be employed where required, to prevent sedimentation/erosion arising from any newly profiled banks until new vegetation establishes e.g., **jute/coir mesh blankets** (plastic will be avoided where possible).
- Features such as silt fencing and berms, will be installed prior to the commencement of construction to ensure the protection of the river during construction works. A silt fence set back **at least 10m** from the watercourse will be required, to be constructed of a suitable geotextile membrane to ensure water can pass through, but that silt will be retained.
- An interceptor trench will be required in front of the silt fencing where space allows. The silt fence must be capable of preventing 425µ (micron) and above sediment from passing through. It should also be resistant to damage during deformation resulting from loading by entrapped sediment.
- The silt fences will be monitored to ensure that they remain functional throughout construction of the Proposed Development. Where necessary, maintenance will be carried out on the fences to ensure that they continue to be effective. This will be particularly important after heavy rainfall events. The checks will be undertaken by a suitably qualified person. The frequency of monitoring will depend on the stage of works, and local environmental conditions. Daily checks may be appropriate during the initial site clearance, during works in the vicinity of the watercourse, and during and after storm events. Weekly or bi-weekly checks may be appropriate at other times.
- When cofferdams are being kept dry by pumping, the discharge must be routed to an approved settlement facility before return to the river.
- Every care must be taken to insure against spillage of concrete or leakage of cement grout within cofferdams if being used.
- In a worst-case scenario where a spillage of pollutants or cement grout etc into the river occurs during the construction of the bridge, the source of the pollution will be addressed immediately and works will cease until the situation has been rectified.
- Should such a spillage occur, the project ECoW, Meath CoCo and Inland Fisheries Ireland (IFI) will be contacted and informed immediately.

14.11.1.7 Mitigation 7: 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 1421 provides guidance for when vegetation clearance is permissible. Information sources include The Herpetological Society of Ireland, British Hedgehog Preservation Society's *Hedgehogs and Development* and *The Wildlife (Amendment) Act, 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 14.21. Seasonal restrictions on habitat/vegetation removal. Red boxes indicate periods when clearance/works are not permissible.

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
Breeding Birds	Vegetation clearance permissible (Sept - Feb)		<u>Nesting bird season.</u> No clearance of vegetation unless confirmed to be devoid of nesting birds by an ecologist. (Mar - Aug)						Vegetation clearance permissible (Sept - Feb)			
Bats	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist. (Jan - Aug)								Preferred period for tree-felling (Sep - Oct)	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist (Nov - Dec)		
Hibernating mammals (e.g., Hedgehog)	<u>Mammal hibernation season.</u> No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. (Jan - Mar)			Vegetation clearance permissible (Apr - Oct)					<u>Mammal hibernation season.</u> No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. (Nov - Dec)			
Amphibians	Habitat clearance permissible (Jan - Feb)		<u>Amphibian breeding season</u> (estimated). No habitat destruction (Ponds, drainage ditches) unless confirmed to be devoid of tadpoles and other signs of amphibians. (Mar - June)				Habitat clearance permissible if devoid of tadpoles and signs of amphibians (July - Dec)					

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14.11.1.8 Mitigation 8: Bat Precautions when felling Trees

Although all trees on Site set for felling have been assessed and confirmed to be of low-negligible bat roost suitability, harm to individual bats is possible should they be present during the felling process. It is also possible that trees can become damaged in the time between the original PBRA survey and the tree felling taking place, and this can sometimes increase the bat roost suitability of a tree, providing new roost features e.g., cracks, holes etc.

As such, a pre-felling check will be conducted by a suitably qualified Ecologist of all trees to be felled at the Site prior to felling taking place; to ensure that no changes have occurred and that no individual bats will be harmed. In the unlikely event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat.

It is important to note that permission for the Proposed Development can be granted without any reliance on the potential grant of a derogation licence, and that any references to the potential need to obtain a licence are purely precautionary, as detailed above, and therefore not integral to the decision on whether to grant permission.

14.11.1.9 Mitigation 9: Construction Phase Lighting

Any night-time lighting required during the Construction Phase for security etc., will be directed away from the boundary vegetation at the Site (i.e., away from hedgerows and woodland areas), and will not be directed skyward. Lighting will be focused into the centre of the Site and only on equipment and machinery that needs to be illuminated.

The Project Ecologist acting as ECoW for the project will review the Construction Phase lighting with the Contractor regularly during their site visits and make recommendations as required to ensure the lighting is maintained as bat friendly for the duration of the works.

14.11.1.10 Mitigation 10: Construction Site Management for Mammals

As best-practise all construction-related rubbish on site e.g., plastic sheeting, netting 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.

Trenches/pits must be either covered at the end of each working day or include a means of escape for any animal falling in e.g., a plank or objects placed in the corner of an excavation. (Species such as 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 animals gaining access as may happen when contractors are off Site.

14.11.1.11 Mitigation 11: Protection of Drainage Ditches/ Amphibian Habitat

For the duration of the Construction Phase, the contractor will ensure that the sections of open drainage ditch that are being retained at the Site will be protected by way of terram silt-fencing and/or staked hay bales along their length. These measures will be located inside the robust protective tree fencing required to protect the hedgerows and the ditches' riparian buffer.

The above measures will be put in place before soil stripping/ excavation activities begin on Site; to protect the drainage ditches from construction related pollutants/ sediments/ oils/ which will undoubtedly be generated on the construction Site nearby once it is operational.

The project ECoW will inspect and ensure that these measures are in place and operational for the duration of the works

14.11.1.12 Mitigation 12: Noise Control

Noise generated during the Construction Phase of the Proposed Development could cause temporary disturbance to a number of faunal species in the vicinity of the Site of the Proposed Development. To mitigate this disturbance, noise control measures will be adhered to as detailed in the CEMP (PMG, 2025a).

14.11.1.13 Mitigation 13: Dust Control

Dust control measures will be adhered to as detailed in the CEMP (PMG, 2025a).

14.11.2 Operational Phase Mitigation

14.11.2.1 Mitigation 14: Post Construction Bat Lighting Check

A post construction check of the proposed lighting will be carried out by a suitably qualified bat ecologist once the development is complete; to ensure that it is operating effectively and that impacts to bats through operational lighting at the Proposed Development are minimised and mitigation has been successful. Where necessary the bat ecologist will make recommendations to address any problem areas for bats and lighting. The bat ecologist will provide the Biodiversity officer/ Parks Department of Meath CoCo with a report detailing the survey results and mitigation installed once complete.

14.11.3 Enhancement Measures

14.11.3.1 Enhancement 1: Hedgerow Management Plan

The existing hedgerows proposed to be retained within the south of the Site, along with any reinstated 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 and the River Tolka riparian corridor to the east.

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.

To ensure the retained and newly planted hedgerows provide an adequate replacement of continuous habitat for the hedgerows to be removed at the Site, a **Hedgerow Management Plan (HMP)** will be prepared by a suitably qualified Ecologist. The HMP will specify the management of the retained and newly planted hedgerows for the party who will take charge of the operational landscape management of the Site. The HMP will be prepared in line with the recommendations made in the Hedgerow Appraisal Report (Enviroguide, 2024c) appended to this Chapter (provided in Appendix 14.5).

This low-intervention management approach may not be appropriate for internal ornamental hedgerows planted within the main residential component of the Proposed Development, due to aesthetic or logistical reasons, however, it is best suited for the retained existing hedgerow sections within the linear open spaces and the external hedgerows located along the margins of the Site. In the case of this Proposed Development, the retained existing farmland hedgerows are ideal areas for

the provision of these semi-natural, high biodiversity value hedgerows The goal of the HMP will be to ensure a semi-natural, network of wildlife corridors is created throughout the Site.

To mitigate and compensate for the impact of the Proposed Development on hedgerows at the Site, it is recommended that areas of new hedgerows planted at the Site will be maintained in such a way that they achieve the same or higher condition scores as those hedgerows that will be lost as a result of the Proposed Development, namely:

- Condition Score: Higher than **2- Favourable**.
- Significance (Ecology) Score: Higher than **2- Moderately Significant**.

In practice, to achieve these scores the new hedgerows should ultimately have the following characteristics:

- A minimum 2.5m in height.
- A minimum of 2m in width.
- Have a dense base (regardless of whether they are to be topped or 'escaped' (un-topped) hedgerows).
- Have >2m meadow margin on one side at least.
- Have <5% gaps.
- Support <20% noxious species and no invasive species.

Generally, hedgerows with high ecological value can be divided into two types of profiles, namely: escaped hedges which remain un-topped but can be side-trimmed, and topped hedges which are trimmed into an A-shaped cross-section with a wide base excluding occasional trees. Both should have a flowering canopy. Although the original hedgerows have the profile of escaped hedges without the dense base, the choice will depend on the feasibility with the Proposed Development.

The period, frequency and intensity of management will depend on the choice of whether escaped hedges, managed with coppicing and laying, or topped hedges are being proposed. In any case, it is desirable that partial cutting/laying is carried out every year, e.g., a third of the entire length of the hedge annually and done in multi-year (three years at the minimum) rotation, and that the management and maintenance is continued in perpetuity, with monitoring conducted until the new hedges achieve the targeted overall scores (for details see Appendix 14.5 –Hedgerow Appraisal Report).

The following measures will also be included in the HMP:

- 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.
- 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 wildlife. 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 (Blackthorn 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.

14.11.3.2 Enhancement 2: Bat Boxes

By way of enhancement a set of 5 bat boxes will be erected at the Site, on suitably mature trees located along the Site's boundaries under the guidance of the Project Ecologist. The bat box type installed will be the 2F Schwegler Bat Box or a similar durable woodcrete make.

It is understood that Schweglers can be particularly difficult to source in Ireland and so suitable alternatives can be used provided they meet the following criteria:

- The bat boxes must be made from a durable, and sufficiently insulated material such as woodcrete.
- The bat boxes must be open bottomed or contain their entrance point near the bottom of the bat box so that a build-up of droppings will not prevent the box being used as a long-term roost.

The location of bat boxes will be advised by a suitably qualified ecologist but must meet the following criteria:

- Be placed a minimum of 4m off the ground.
- The bat boxes will not be placed in areas that are subject to lighting, particularly at night. Consideration should be given to placement of bat boxes on trees that are likely to lose their foliage in winter, and how this might increase light levels on boxes that may be harboured by hibernating bats.
- Bat boxes should ideally face southeast or southwest, provided they are not exposed to light disturbances in doing so.

14.11.3.3 Enhancement 3: 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 corners/margins of the Site as advised by the Project Ecologist; to provide habitat for common Frog and small mammals such as Hedgehog. These areas of woody debris will also benefit local invertebrate species through provision of shelter and food sources.

14.11.4 Monitoring

14.11.4.1 Construction Phase Monitoring

14.11.4.1.1 Ecological Clerk of Works (ECoW)

A suitably qualified ECoW will be employed before commencement and for the duration of the Construction Phase; to provide ecological advice and input to the construction team. The ECoW will carry out the monitoring activities listed below for the duration of the Construction Phase of the Proposed Development.

NOTE: The ECoW will be employed several weeks before commencement of works on Site; to allow time for the scope of ECoW works to be reviewed by the ecologist and any necessary pre-construction surveys to be carried out.

- The ECoW will be required to work closely with the Site Manager and Arborist; to arrange to carry out **pre-clearance surveys** of any vegetation present on Site, especially if clearance during the period March 1st – August 1st (i.e., the breeding bird nesting season) is required. It is noted that clearance will be avoided during this period wherever possible through good management of the construction timeline. **Pre-felling checks of trees for bats** will also be conducted by the ECoW.
- This will include a **pre-commencement badger survey** of the Site for evidence of badger usage to ensure no badgers are impacted by the construction works.
- As part of the mitigation recommended in relation to mammals e.g., hedgehogs, the ECoW will liaise with the Site Manager to ensure that an adequate level of **site tidiness** is being maintained, i.e., that construction materials such as netting, plastic sheeting etc., are being stored securely and above ground.
- The ECoW will also liaise with the Site Manager to ensure that **mammal escape measures** are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.
- The ECoW will visit the Site and **assess the night-time lighting measures in place for the Construction Phase**; to ensure that they will not cause any impacts to local bats during the nighttime. The ECoW will consult this Chapter to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.
- The ECoW will visit the Site and check that the **mitigation measures are in place and working effectively** for the protection of on-Site drainage ditches and the River Tolka as per the CEMP.

14.11.4.1.1 Project Arborist

The project Arborist will be instructed **prior to commencement on Site**; to ensure that appropriate tree protection measures are in place. The existing retained hedgerow and treelines will be sufficiently protected for the duration of the Construction Phase to maximise their ecological value in the final landscape plan. The ECoW will report any issues relating to failure in the tree protection measures on Site to the project Arborist and the Site Manager throughout the Construction Phase to ensure these sections of habitat are protected for the duration of the works.

14.11.4.2 Operational Phase Monitoring

14.11.4.2.1 Ecologist

The ECoW will visit the Site post-construction to check the following are in place:

- **Bat Boxes** – A suitable qualified Ecologist will liaise with the Site Manager to ensure that these measures are in place.
- **Hedgerow Management** - A suitable qualified Ecologist will review the Hedgerow Management Plan (HMP) once

prepared for the Site and signed off by Meath CoCo’s Biodiversity Department. The Ecologist will visit the Site each summer for the first 2-3 years post completion to review the management of the hedgerows and woodland areas at the Site and confirm that the HWMP is being followed by the landscape maintenance company.

- The ECoW will visit the Site and **assess the night-time lighting measures in place for the Operational Phase**; to ensure that it is operating effectively and that impacts to bats through operational lighting at the Proposed Development are minimised and mitigation has been successful. Where necessary the bat ecologist will make recommendations to address any problem areas for bats and lighting. The bat ecologist will provide the Biodiversity officer/Parks Department of Meath CoCo with a report detailing the survey results and mitigation installed once complete. The ECoW will consult this Chapter to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.

14.12 Summary of Mitigation and Monitoring

The following Table summarises the mitigation and monitoring measures recommended for the Proposed Development.

Table 14.22. Summary of Construction (yellow highlight) and Operational Phase (blue highlight) Mitigation and Monitoring

Ecological Receptor	Relevant stage of the Proposed Development	Mitigation/ Enhancement Measure	Monitoring Type	Details
Hedgerow and Woodland Areas	Construction Phase	Mitigation 3: Tree Protection Measures	ECoW & Arborist	The project Arborist will be instructed prior to commencement on Site ; to ensure that appropriate tree protection measures are in place to protect the hedgerow/treeline habitat being retained on Site. These measures will entail robust fencing around the root protection zones of all trees and hedgerows being retained on Site. An adequate level of signage will also be provided to highlight ‘no work zones’ and ensure that Site creep and damage to retained habitats does not occur. Retained hedgerows/woodland will be sufficiently protected for the duration of the Construction Phase to maximise their ecological value in the final landscape plan. The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of hedgerow/woodland are protected for the duration of the works.
Birds, Small Mammals, Amphibians	Construction Phase	Mitigation 7: Timing of Vegetation Clearance Mitigation 12: Noise Control	ECoW	The ECoW will be required to work closely with the Site Manager; to arrange to carry out pre-clearance surveys of any vegetation present on Site, especially if clearance during the period March 1 st – August 1 st (i.e., the breeding bird nesting season) is required. It is noted that clearance <u>will be avoided</u> during this period wherever possible through good management of the construction timeline.

Ecological Receptor	Relevant stage of the Proposed Development	Mitigation/ Enhancement Measure	Monitoring Type	Details
Drainage Ditches, Amphibians & River Tolka	Construction Phase	Mitigation 4: CEMP	Site Manager & ECoW	For the duration of the Construction Phase, the contractor will ensure that the mitigation measures detailed within the CEMP and those included in this Chapter and the NIS (DNV, 2025b) will be adhered to in relation to protection of surface water, ground water and the River Tolka.
		Mitigation 13: Dust Control		The ECoW will visit the Site and check that the mitigation measures are in place and working effectively as per the CEMP for the protection of on-Site drainage ditches and the River Tolka and aquatic species.
		Mitigation 5: Construction Programme		The CEMP will include a section setting out the construction programme and will include all the environmental control measures required to avoid impacts to salmonids and other species, as set out below.
		Mitigation 6: Bridge Construction		All discrete elements involving construction over or within the River Tolka (such as bridge construction, bank works etc.) are to be programmed to take place <u>outside the spawning season for salmonids</u> (i.e. will take place between July and September) to ensure that impacts to protected fish species are avoided. A Construction Method Statement for the bridge construction will be prepared by the Contractor and signed off by the Project Ecologist/ECoW. This Method Statement will detail the mitigation/protection measures that will be put in place to protect the river during these works.
		Mitigation 11: Protection of Drainage Ditches/ Amphibian Habitat		For the duration of the Construction Phase, the contractor will ensure that the sections of open drainage ditch that are being retained at the Site will be protected by way of terram silt-fencing and/or staked hay bales along their length. These measures will be located inside the robust protective tree fencing required to protect the hedgerows and the ditches' riparian buffer. The above measures will be put in place before soil stripping/ excavation activities begin on Site ; to protect the drainage ditches from construction related pollutants/ sediments/ oils/ which will undoubtedly be generated on the construction Site nearby once it is operational. And the project ECoW will inspect and ensure that these measures are in place and operational for the duration of the works.

Ecological Receptor	Relevant stage of the Proposed Development	Mitigation/ Enhancement Measure	Monitoring Type	Details
Amphibian, Small Mammals	Construction Phase	Enhancement 3: Log Piles for Invertebrates and Fauna	ECoW/ Site Manager	Piles of logs and other woody vegetation arising from the proposed tree felling will be left in suitable secluded corners/margins of the Site as advised by the Project Ecologist; to provide habitat for common frog and small mammals such as Hedgehog. These areas of woody debris will also benefit local invertebrate species through provision of shelter and food sources.
Mammals	Construction Phase	Mitigation 1: Pre-construction Surveys for Badger and Otter.	ECoW	A minimum of 2-3 months prior to the commencement of works on Site (including enabling works), a suitably qualified Ecologist will be instructed to carry out surveys of the Site and river Tolka upstream and downstream of the proposed bridge crossing, for the below listed species. The results of these pre-commencement surveys will be provided to Meath CoCo prior to commencement of works on Site. Badger. Otter. These pre-commencement surveys will ensure that no change has occurred in the status of these species at or near the Site since planning was submitted. The above surveys should confirm whether any nesting/ resting places etc., for the above species have occurred since previous surveys and will advise further mitigation measures etc as required.
		Mitigation 2: Provision of a Mammal Underpass	ECoW / Site Manager	The suspected existing mammal underpass under the R157 will be retained or replaced as part of the Proposed Development an. If removal is required, the underpass will be decommissioned under the watching brief of the Project Ecologist/ECoW to ensure no impacts to mammals occur. Should the underpass require removal, a suitable replacement will be provided as part of the Proposed Development to ensure that mammal connectivity east and west of the R157 is maintained into the future. Any new underpass will be designed with the input of the ECoW/Ecologist and signed off by Meath CoCo to ensure that it is an effective and suitable replacement.
		Mitigation 10: Construction Site Management for Mammals	ECoW/ Site Manager	The ECoW will also liaise with the Site Manager to ensure that mammal escape measures are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.

Ecological Receptor	Relevant stage of the Proposed Development	Mitigation/ Enhancement Measure	Monitoring Type	Details
Bats	Construction Phase	Mitigation 8: Bat Precautions when Felling Trees.	ECoW	Any night-time lighting required during the Construction Phase for security etc., will be directed away from the boundary vegetation at the Site (i.e., away from hedgerows and woodland areas), and will not be directed skyward. Lighting will be focused into the centre of the Site and only on equipment and machinery that needs to be illuminated. The ECoW will be required to check all trees to be felled for bats prior to felling . In the event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The Area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat.
		Mitigation 9: Construction Phase Lighting	ECoW	The ECoW will assess the lighting measures in place for the Construction Phase ; to ensure that they will not cause any impacts to local bats during the nighttime. The ECoW will consult this EclA Report to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.
Hedgerow and Woodland Areas	Operational Phase	Enhancement 1: Hedgerow Management Plan	Ecologist	Hedgerow Management - A suitably qualified Ecologist will review the Hedgerow Management Plan (HMP) once prepared for the Site and signed off by Meath CoCo's Biodiversity Department. The <u>Ecologist will visit the Site each summer for the first 2-3 years post completion</u> to review the management of the hedgerows and woodland areas at the Site and confirm that the HMP is being followed by the landscape maintenance company.
Bats	Operational Phase	Enhancement 2: Bat Boxes	Ecologist	Bat Boxes – A suitably qualified Ecologist will oversee installation of bat boxes and liaise with the Site Manager to ensure that these enhancement measures are functional.
		Mitigation 14: Post Construction Bat Lighting Check		A post construction check of the proposed lighting will be carried out by a suitably qualified bat ecologist once the development is complete; to ensure that it is operating effectively and that impacts to bats through operational lighting at the Proposed Development are minimised and mitigation has been successful. Where necessary the bat ecologist will make recommendations to address any problem areas for bats and lighting. The bat ecologist will provide the Biodiversity Officer/Parks Department of Meath CoCo with a report detailing the survey results and mitigation installed once complete.

14.13 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. Potential residual impacts from the Proposed Development were considered as part of this environmental assessment.

In summary, the construction mitigation measures detailed in this Chapter (e.g., timing of vegetation clearance, timing of works over the Tolka, pre-construction checks by an Ecologist, preparation of a robust CEMP, post construction lighting checks by an Ecologist), along with the design features to be adopted to minimise adverse effects on fauna at the Site, will be sufficient to reduce any identified potential effect on KERs associated with the Site to ‘**not-significant**’ at the **local level**.

14.14 Conclusion

It is considered that provided the mitigation measures proposed are carried out in full, there will no significant adverse effects on any valued habitats, designated sites or individual or group of species as a result of the Proposed Development.

14.15 The ‘Do nothing’ Scenario

In the ‘Do nothing’ scenario, the land would likely remain as is; biodiversity poor pasture farmland. There would likely continue to be cattle poaching the banks of the Tolka and accessing the river channel. The various treelines and hedgerows would continue to provide habitat connectivity across the agricultural landscape. Ash die-back would continue to be present within the Ash tree population at the Site. It is noted, that the land in question is zoned for development; to be brought forward within the plan period, and therefore it is reasonable to assume that a similar residential development could be brought forward on the Site during the period up to 2027.

14.16 Risk of Major Accidents or Disasters

In terms of Biodiversity, the main risks of major accidents would be confined to the main sensitive ecological receptor at the Site, which is the River Tolka. In a worst-case scenario, mitigation measures would not be followed during the construction of the bridge and the works within proximity to the Tolka, resulting in cementitious materials and sediments being discharged to the river during the spawning season for salmonids. This could result in a fish kill downstream from the Site, with potential knock-on adverse effects on predators such as kingfisher and otter through the reduction of their food source, and/or (on a precautionary basis) damage and potential loss of potential Annex I tufa formation habitat within the River Tolka.

14.17 Significant Interactions

This chapter pertaining to the ecological and biodiversity aspects of the Proposed Development, has the potential to interact with aspects of the following chapters of this EIAR:

- Chapter 5: Land, Soils and Geology
- Chapter 6: Hydrology and Hydrogeology
- Chapter 7: Air Quality
- Chapter 9: Noise and Vibration

14.17.1 Land, Soils and Geology

An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment; with emphasis on the effects of the Proposed Development on the receiving soils underlying the Site during the Proposed Development, is described in Chapter 5 - 'Land, Soils and Geology' of this EIAR. These effects are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing potential effects are described in full in Chapter 5. The bulk removal of soils, sands and gravel at the Site can have implications for biodiversity. Natural regeneration of native and local seeds is the preferred option for re-vegetating areas to be retained for biodiversity.

14.17.2 Hydrology and Hydrogeology

The key environmental interaction with biodiversity is water. An assessment of the potential effect of the Proposed Development on the hydrological and hydrogeological environment is described in Chapter 6 - 'Hydrology and Hydrogeology' of this report as well as in this Chapter, to ensure the quality (pollution and sedimentation) and quantity (surface water run-off) of water is of the appropriate standard. Interactions between hydrology and biodiversity can occur through effects on water quality, arising, for example from an accidental pollution event during the Construction and/or Operational Phase. This interaction has the potential to result in adverse effects on KER habitats and fauna that are hydrologically linked to the Site.

14.17.3 Air and Climate

An assessment of the potential impact of the Proposed Development on air quality is included in Chapter 7 of this EIAR. Dust emissions arising from the Construction Phase of the Proposed Development were identified as having potential effects on local biodiversity. Once dust minimisation measures are implemented, adverse effects on biodiversity are not predicted to be significant.

14.17.4 Noise and Vibrations

An assessment of the potential impact of the Proposed Development in the form of excess noise and vibrations associated with the Proposed Works are laid out in Chapter 9 - 'Noise and Vibrations'. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing the potential effects of noise impacts are both referenced in this Chapter and described in full in Chapter 9. There is potential for interactions between noise and sensitive fauna, e.g., birds, that occur in adjacent habitats from increased noise levels during the Construction Phase. However, as described, adverse noise related effects are not deemed to be significant.

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CHAPTER FIFTEEN

CULTURAL HERITAGE & ARCHAEOLOGICAL



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CHAPTER FIFTEEN

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CHAPTER 15 | Cultural Heritage & Archaeological

15.1 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. UNESCO define the term ‘Cultural Heritage’ as encompassing several aspects of tangible assets (immovable: archaeological sites and monuments, architectural heritage structures; movable: artefacts; and underwater: shipwrecks, submerged features) and intangible assets (such as historical associations, folklore, oral tradition and language).

15.1.1 Author Information and Competency

This chapter was prepared by John Cronin, Camilla Brännström and Tony Cummins of John Cronin and Associates. Mr. Cronin holds qualifications in Archaeology (B.A. University College Cork (UCC), 1991) and Regional and Urban Planning (MRUP (University College Dublin (UCD) 1993) as well as a postgraduate qualification in Urban and Building Conservation (MUBC (UCD), 1999). Ms. Brännström also holds a postgraduate qualification in Archaeology (M.A. Umeå University, Sweden (2000-2004)) and is a licence-eligible archaeologist. Mr. Cummins holds primary and postgraduate degrees in Archaeology (B.A. and M.A., UCC 1992/1994) and is also a licence-eligible archaeologist. These individuals each have extensive experience in the compilation of archaeological, architectural, and cultural heritage impact assessments.

15.1.2 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*.

15.1.3 Methodology

The assessment was based on a programme of desktop research combined with a field survey, geophysical survey and targeted archaeological testing of the proposed development lands which were carried out in order to identify any features of archaeological, architectural or cultural heritage significance likely to be impacted by the proposed development. The recorded and potential cultural heritage resource within a study area encompassing the green field lands within the proposed development site and the surrounding lands extending for 1km in all directions from the green field areas. This study area was reviewed in order to compile a comprehensive cultural heritage context for the location of the proposed development and surrounding lands.

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.

15.1.3.1 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 of the Department of Housing, Local Government and Heritage. The current Record of Protected Structures (RPS) for County Meath and structures and lands 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:

- Meath County Development Plan 2021-2027 – 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 October 2025.
- Archaeological Inventory of County Meath – This publication dates to 1987 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 October 2025 to ascertain if any archaeological sites have been identified within the study area identified 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 15.6 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 15.2.3.3 of this chapter.
- Aerial/Satellite/LiDAR imagery: A review of publicly accessible imagery from Tailte Éireann, 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 15.2.3.4 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 digitised and published online at www.duchas.ie.

15.1.3.2 Field Inspection

All greenfield areas within the site were subject to a programme of systematic field-walking in February 2024 and no access constraints were encountered. The lands were assessed in terms of existing land use, any remnants of historic structures or landscaped features, vegetation cover and the potential for the presence of previously unrecorded archaeological and architectural heritage sites/features. The inspection results are described within the chapter (**Section 15.2.4**) and extracts from the photographic record compiled during the field survey are presented in **Appendix 15.1**.

15.1.3.3 Geophysical Surveys

A geophysical survey of the green field areas within the section of the proposed development site to the west of the Dunboyne Link Road was carried out by Dr Ger Dowling in March 2024 (Licence 24R0165). A full copy of the report on this non-intrusive survey is presented in **Appendix 15.4** and the results are summarised in **Section 15.2.5**, which includes mapping sourced from the geophysical survey report.

In addition, a geophysical survey of the lands containing the area of the proposed development on the east side of the Dunboyne Link Road was previously carried out by Target Archaeological Geophysics (TAG) in July 2023 as part of the proposed Phase 1 development in that area. A full copy of the report on this non-intrusive survey is presented in **Appendix 15.5** and the results are summarised in **Section 15.2.5**, which includes mapping sourced from the geophysical survey report.

15.1.3.4 Archaeological Test Excavation

Following consultation with Meath County Council, a programme of targeted archaeological test trenching of a selection of geophysical anomalies identified within the west end of the proposed development lands was carried out by Camilla Brannstrom of John Cronin and Associates in June 2024 (Licence no. 24E0676). The aim of this targeted site investigation was to appraise geophysical anomalies identified as being of archaeological origin in order to inform this assessment and the results are detailed in **Section 15.2.6** of this chapter. A final report on the test trenching site investigations is provided in **Appendix 15.6** and copies have been submitted to the Planning Authority and the National Monuments Service.

15.1.3.5 Consultation

The cultural heritage content contained in Meath County Council's LRD opinion on the proposed development was reviewed as part of this assessment. This content includes items related to archaeological impact assessment, mitigation measures and reporting requirements which are addressed in this chapter.

15.1.3.6 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)

Type of Effect on the cultural heritage resource can be described as follows.

- Direct Effect – where a cultural heritage site is physically located within the footprint of the Project, which will result in its complete or partial removal;
- Indirect Effect – Effects on the cultural heritage environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway;
- Cumulative Effect -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; or
- 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 15.1**). 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 15.1 are based on guidance published in *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011, 16-7).

Table 15.1 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.
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.

Value/Sensitivity Criteria: While various national and local authority legal designations exist for elements of the Irish cultural heritage resource (see **Section 15.2.2**), there is no formal criteria for grading the value of individual constraints. The evaluations used in this assessment have been informed by guidelines presented in the *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (ICOMOS 2011). The evaluation of the values of cultural heritage assets is, therefore, not intended as definitive but rather as an indicator which contributes to a wider judgment based on the individual circumstances

of each asset. The application of values included a consideration of their legal designations (e.g., National Monuments in State Care), condition/preservation; documentary/historical significance, group value, rarity, visibility in the landscape, vulnerability and amenity value on a case-by-case basis. Archaeological sites which possess little, or no surface expressions may retain low-medium sensitivity to effects on their wider setting while levelled archaeological sites that retain no visible surface traces are typically not sensitive to any setting effects. It is noted that archaeological monuments, whether extant or levelled, have the potential to possess sub-surface attributes, including artefacts and other archaeological remains, which may possess values that cannot be discerned without recourse to archaeological excavation but are unlikely to be affected in the absence of direct negative effects. The values of known or potential cultural heritage assets are ranked according to the following scale as defined by ICOMOS: Very High; High; Medium; Low, Negligible and Unknown (**Table 15.2**). The values assigned to the identified constraints within the study area were determined following the completion of desktop research and site inspections and are outlined in **Section 15.2** of this chapter.

Table 15.2 Guidance Criteria Used 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
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 15.3** and **Table 15.4**).

Table 15.3 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 15.4 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/Sensitivity of Asset					

15.1.4 Difficulties Encountered in Compiling Information

There were no difficulties encountered during the compilation of this assessment.

15.2 Description of Existing Environment

15.2.1 Introduction

The proposed development site is located in a green field area within the townlands of Bennetstown and Dunboyne and is approximately 1km to the north of the historic core of Dunboyne town. Details on the existing environment within the proposed development site are provided in **Section 15.2.4**. 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.

15.1.2 Legal and Planning Context

15.2.2.1 Introduction

The management and protection of cultural heritage in Ireland is achieved through a framework of national laws and policies which are in accordance with the provisions of the Valetta Treaty (1995) (formally the European Convention on the Protection of the Archaeological Heritage, 1992) ratified by Ireland in 1997; the European Convention on the Protection of Architectural Heritage (Granada Convention, 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 with 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:

- Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023
- National Monuments Act 1930 (as amended);
- Heritage Act 1995 (as amended);
- National Cultural Institutions Act (1997);
- Planning and Development Act 2000 (as amended);
- Department of Arts, Heritage and Gaeltacht (2011) Architectural Heritage Protection: Guidelines for Planning Authorities;
- Department of Arts, Heritage, Gaeltacht and the Islands (1999) Framework and Principles for the Protection of Archaeological Heritage;
- Office of the Public Regulator (2022) A Guide to Architectural Heritage; and
- Office of the Public Regulator (2021) Archaeology in the Planning Process.

15.2.2.2 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.

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 2023¹ 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 necessary, enable certain aspects of the existing National Monuments Acts 1930 to 2014 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. A commencement order made on 31st May 2024, insofar as it relates to the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 (other than section 5), has come into operation. On 12th December 2024, further provisions of the Act came into operation, and these relate to historic wrecks and underwater archaeological objects, and also for Irish citizens (and a range of specified other persons), and vessels operating in international waters if they intend to engage in activities directed at underwater cultural heritage.

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 or archaeological sites subject to Preservation Orders located within the study area.

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 the vicinity of the study area.

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

1 <https://www.archaeology.ie/news/enactment-of-historic-and-archaeological-heritage-and-miscellaneous-provisions-act-2023-and>

1994 and the NMS must be given two months’ notice in advance of any works proposed at their locations.

The Archaeological Survey of Ireland (ASI) lists 19 recorded archaeological sites within the 1km study area (see **Figure 15.1** and **Table 15.5** below). Details on these recorded archaeological sites are presented in **Section 15.2.3.1** and their published ASI inventory descriptions are provided in **Appendix 15.2**.

The protection of the architectural heritage resource is provided for through a range of legal instruments that include the Heritage Act 1995 (as amended) and the Planning and Development Act 2000 (as amended).

The Planning and Development Act 2000 (as amended) requires all Local Authorities to keep a ‘Record of Protected Structures’ (RPS) of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. As of the 1st January 2000, all structures listed for protection in current Development Plans, have become ‘protected structures’. Since the introduction of this legislation, planning permission is required for any works to a protected structure that would affect its character. A protected structure also includes the land and other structures within its curtilage. While the term ‘curtilage’ is not defined by legislation, the *Architectural Heritage Protection Guidelines for Local Authorities* (Department Arts, Heritage and the Gaeltacht 2011), describes it as the parcel of land immediately associated with a structure and which is (or was) in use for the purposes of the structure. In addition, Local Authorities must provide for the preservation of places, groups of structures and townscapes of architectural heritage significance through designation of Architectural Conservation Areas (ACAs).

The National Inventory of Architectural Heritage (NIAH) was established to record architectural heritage structures within the State. 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, or historical gardens of landscapes, located within the proposed development site.

Details on architectural heritage resource within the surrounding 1km study area are provided in Section 15.2.3.2 of this chapter.

The Meath County Development Plan 2021-2027 is the relevant development plan for the study area and includes the following objectives in relation to the protection of the archaeological and architectural heritage resources:

“HER POL 2. To protect all sites and features of archaeological interest discovered subsequent to the publication of the Record of Monument and Places, in situ (or at a minimum preservation by record) having regard to the advice and recommendations of the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht and The Framework and Principles for the Protection of the Archaeological Heritage (1999).

HER POL 3. To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, for development in the vicinity of monuments or in areas of archaeological potential. Where there are upstanding remains, a visual impact assessment may be required.

HER POL 4. To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, where development proposals involve ground clearance of more than half a hectare or for linear developments over one kilometre in length; or developments in proximity to areas with a density of known archaeological monuments and history of discovery as identified by a suitably qualified archaeologist.

HER POL 5. To seek guidance from the National Museum of Ireland where an unrecorded archaeological object is discovered, or the National Monuments Service in the case of an unrecorded archaeological site.”

“HER POL 16. To protect the setting of Protected Structures and to refuse permission for development within the curtilage or adjacent to a protected structure which would adversely impact on the character and special interest of the structure, where appropriate.”

15.2.3 Desktop Study

15.2.3.1 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 SMR lists two recorded archaeological sites within an area of the proposed development boundary that extends along a section of the Dunboyne Link Road and these comprise an area of structural remains (ME050-057----) and a burnt mound (ME050-058----) both of which were discovered during archaeological investigations during the construction of this roadway. The former site was fully excavated while the latter was partially excavated with a section extending outside the road-take, and outside the proposed development boundary, was preserved *in situ*.

The RMP/SMR list an additional 17 recorded archaeological sites, none of which have extant above ground remains, within the surrounding 1km study area and these include 11 examples which were identified and excavated in advance of the construction of the M3 motorway and Dunboyne link road (Table 15.5 and Figure 15.1). The archaeological sites which have been subject to full archaeological excavation no longer remain *in situ* and are deemed to be of negligible value. The levelled examples within the study area that have not been subject to archaeological excavation likely retain sub-surface remains of potential high value but are not sensitive to effects on their setting. The Archaeological Survey of Ireland inventory descriptions for each of the archaeological sites within the study area are presented in Appendix 15.2, which contains information sourced from reports on the excavated examples.

Table 15.5 Recorded Archaeological Sites in Study Area

Monument no.	Class	Townland	Condition*	Period* (if known)	Approx. distance from green field area of development
ME050-027----	Enclosure	DUNBOYNE	Levelled	Medieval	335m south
ME050-029----	Church	DUNBOYNE	Levelled	Potential early/late medieval	40m south
ME050-030----	Field system	DUNBOYNE	Levelled	Potential post-medieval	225m south
ME050-033001-	Ring-ditch	WARRENTOWN (Dunboyne By.)	Levelled	Unknown	890m west
ME050-033002-	Ring-ditch	WARRENTOWN (Dunboyne By.)	Levelled	Potential Bronze Age	890m west
ME050-036----	Enclosure	PIERCETOWN (Dunboyne By.)	Levelled	Unknown	920m north
ME050-041----	Kiln - corn-drying	PIERCETOWN (Dunboyne By.)	Excavated	Early medieval	885m north
ME050-045----	Fulacht fia	BRACETOWN	Excavated	Bronze Age	960m southeast
ME050-056----	Excavation miscellaneous	PACE	Excavated	Bronze Age	510m north
ME050-056001-	Kiln - corn-drying	PACE	Excavated	Early medieval	510m north
ME050-057----	Excavation miscellaneous	BENNETSTOWN	Excavated	Bronze Age	95m northeast
ME050-058----	Burnt mound	BENNETSTOWN	Partially Excavated	Bronze Age	150m southeast
ME050-059----	Burnt mound	BENNETSTOWN	Excavated	Bronze Age	160m northeast
ME050-060001-	Structure	DUNBOYNE	Excavated	Bronze/Iron Age	190m east
ME050-060002-	Kiln - corn-drying	DUNBOYNE	Excavated	Iron Age	190m east
ME050-060003-	Furnace	DUNBOYNE	Excavated	Unknown	190m east
ME050-061----	Pit	DUNBOYNE	Excavated	Neolithic	260m east
ME050-062001-	Structure	DUNBOYNE	Excavated	Bronze Age	60m south
ME050-062002-	Kiln	DUNBOYNE	Excavated	Unknown	80m south

*Condition and potential periods are based on Historical Environment Viewer descriptions



Figure 15.1 Locations of Recorded Archaeological Sites (Red), Zones of Notification (Green) and Architectural Heritage Structures (Cyan) Within 1km Study Area Around Greenfield Areas within the Site

Early 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. The study area contains a pit site (ME050-061----), which was identified and excavated in advance of the construction of the M3 motorway. It was found to contain sherds of Neolithic pottery and demonstrates that the general area was occupied by human settlers during early prehistory (see Figure 15.1 and Appendix 15.2).

Late Prehistoric Periods

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 *fulachta fiadh*. The development of new burial practices during this period also saw the construction of funerary monuments such as wedge tombs, cairns, barrows, ring-ditches, 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.

The 1km study area contains the locations of a number of sub-surface sites of Bronze Age date, with some evidence of Iron Age activity, which were identified and fully or partially excavated in advance of the construction of the M3 motorway and Dunboyne link road schemes. These comprise four structures (ME050-056----, ME050-057----, ME050-060001-, ME050-062001-), a kiln feature (ME050-060002-), a pit feature (ME050-061----), two ring-ditches (ME050-033001- and ME050-033002-) and two burnt mounds (ME050-058---- and ME050-059----). In addition, two iron-working bowl furnace features (ME050-060003-) were identified and excavated during the M3 motorway investigations. While these furnace features were undated, the potential exists that they date to the Iron Age period. The locations of the late prehistoric sites within the study area are identified on Figure 15.1 and the Archaeological Survey of Ireland inventory descriptions of each example, which includes content sourced from their excavation reports, are presented in Appendix 15.2. The amount of evidence for late prehistoric activity identified during archaeological investigations indicates that the study area was widely settled during these periods.

As detailed in Sections 15.2.5 and 15.2.6, the programmes geophysical survey and targeted archaeological test trenching carried out within green fields areas, including within the Phase 3 boundary, revealed the presence of 3-4 previously unrecorded potential ring-ditch sites which are located outside the boundary of the proposed Phase 3 development. These are typically associated with Bronze/Iron Age (c.2400 BC - AD 400) burial traditions and comprise small circular enclosures delimited by shallow ditches. They may often form the surviving sub-surface remains of levelled barrows which were formed by low mounds. While some excavated barrows have produced evidence for burials other examples have not and the sites may simply have served to demarcate an area of now unknown special importance perhaps as empty tombs built as memorial cenotaphs (Waddell 1998 and Daly & Grogan 1993).

Early Medieval Period

The early medieval (c. 400–1169 AD) 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. The ubiquity of these enclosures within the Irish landscape is attested to by the fact that their original Gaelic names (rath, lios and dun) still form some of the most common placename elements in the country. Archaeological excavations have demonstrated that the majority comprised enclosed farmsteads containing evidence for occupational, agricultural and craft/industrial activities. In the pre-Norman era, the area encompassing modern Meath, in addition to parts of Dublin and Louth between the Liffey and the Boyne, was known as Mag Breg (the plain of Breg). This area became associated with the Síl nÁedo Sláine, part of the Southern Uí Néill and descendants of Áed mac Diarmato. The southern kingdom of Meath, in which the proposed development is located, was controlled by the Uí Chernaig, whose centre of power was located in Lagore, Dunshaughlin. The study area does not contain any extant early medieval sites such as ringforts but a sub-surface kiln feature (ME050-056001-) identified and excavated in advance of the construction of the M3 motorway produced dating evidence demonstrating that it was of early medieval date. As detailed in **Sections 15.2.5** and **15.2.6**, the programmes of geophysical survey and targeted archaeological test trenching carried out to inform the assessment of the proposed development revealed the presence of a previously unrecorded enclosure site which extends within the boundary of the proposed Phase 3 development. The potential exists that this may comprise a levelled ringfort enclosure, but the potential also exists that it may form the remains of another site type, and this cannot be ascertained without systematic archaeological excavation.

High and Late 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. AD 1400, which was followed by the late medieval period which extended to c.AD 1550. These periods saw the continuing expansion of Irish urbanisation as many of the port cities developed into international trading centres and numerous villages and towns began to develop 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. In AD 1172, the majority of Meath was granted by King Henry II to Welsh lord Hugh de Lacy. He subsequently granted the barony of Dunboyne to William le Petit and a manorial centre was thereafter established in the area. The borough of Dunboyne was established in the 13th century by Nicholas le Petit, son of William le Petit and was granted rights to hold a market and a fair at this time. The location of the historic settlement (ME050-021----) around the medieval core of Dunboyne is located outside the south end of the 1km study area and the lands containing the proposed development likely formed part of the agricultural hinterland around the settlement during the medieval period. Archaeological excavations within a levelled enclosure (ME050-027----) in the south end of the surrounding 1km study area produced evidence indicating that it was constructed during the 13th or 14th centuries (see **Figure 15.1** and **Appendix 15.2**): This enclosure site is located c. 335m to the south of the green field area containing the proposed residential development. The recorded location of a levelled church site (ME050-029----) of potential medieval date was identified by aerial survey within the southern end of the study area and is located c. 40m to the south of the nearest green field area with the proposed residential development (see **Figure 15.1** and **Appendix 15.2**).

Post-Medieval and Early Modern Periods

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. These periods saw the continuing expansion of Irish urbanisation as many of the port cities, including Waterford, developed into international trading centres and numerous villages and market towns began to develop throughout the country. 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 there are no recorded archaeological sites of certain post-medieval date within the study area, there are a number of historical references to landowners in Bennetstown townland during the period. In the 16th century Nicholas Huse was resident in the area in 1531 while the townland is included in a list of lands leased by Edward Waterhowse in 1566². The 17th century Down Survey records that in 1641 and 1670 the townland formed part of the Meath landholdings of Thomas Luttrell of Luttrellstown Castle, Clonsilla, Co. Dublin. The mid-19th century Griffith Valuation Survey records that the landowners of the area of Bennetstown townland containing the proposed development were John Preston and John Scriven who both leased lands to a tenant farmer named Thomas Murphy³. Samuel Lewis's *A Topographical Dictionary of Ireland* (1837) provides descriptions of Irish parishes during the 1830s and often provides information on contemporary land use patterns, historical events as well as the presence of archaeological sites and structures of architectural heritage interest such as large country houses. The description of Dunboyne parish, an extract of which is included below, does not contain any references to Bennetstown townland, but does provide an overview of the 19th century settlement and agricultural practices within the general area.:

“DUNBOYNE, a parish and village, (formerly an incorporated town), in the barony of DUNBOYNE, county of MEATH, and province of LEINSTER, on the road from Dublin to Navan; containing, with the post-town of Clonee, 2419 inhabitants, of which number, 470 are in the village. This place, which is on the confines of the county of Dublin, appears to have been an ancient borough. In the reign of Henry VI., a writ was issued, dated July 28th, 1423, ordering “the Provost and Commonalty of the town of Dunboyne to be at Trim with all their power for its defence.” The town was burnt down in the disturbances of 1798; the present village contains 82 houses. The manufacture of straw hats is carried on here, and in the neighbourhood; and a fair, chiefly for horses and cattle, is held on July 9th, and is much frequented by the Dublin dealers. The parish is principally grazing land; there are about 50 acres of common, and a bog of about 40 acres, called the “Moor of Meath. The church is an ancient edifice, for the repair of which the Ecclesiastical Commissioners have recently granted £159. The R. C. union is co-extensive with that of the Established Church, and in each parish is a chapel. About 40 children are taught in the public schools of the parish; and there are two private schools, in which are about 120 children. A dispensary is supported in the village, and adjoining it are some remains of an ancient castle, which gives the title of Baron of Dunboyne to the family of Butler.”

Further details on the character of the proposed development site during the post-medieval and early modern periods are presented in the review of cartographic sources provided below (**Section 15.2.3.3**).

Database of Irish Excavation Reports

This database contains summary accounts of licensed archaeological excavations carried out in Ireland from 1970 to present. The review of the Database revealed that a series of archaeological investigations were carried out within the study area in advance of the construction of the M3 motorway and Dunboyne link road (R157) schemes and the identified archaeological

² <https://www.logainm.ie/en/37761>

³ <https://www.askaboutireland.ie/griffith-valuation/index.xml?action=doNameSearch&PlaceID=986248&county=Meath&barony=Dunboyne&parish=Dunboyne&townland=Bennetstown>

sites have been included in the SMR (see **Figure 15.1** and **Table 15.5**). The Database also contains an entry describing the results of the programme of archaeological test trenching carried out within the west end of the proposed Phase 3 development which are summarised in **Section 15.2.6** (full report provided in **Appendix 15.6**).

The Database of Irish Excavation Reports entries for the archaeological site investigations within the study area are provided in **Appendix 15.3**. The Archaeological Survey of Ireland inventory descriptions of the excavated sites are presented in **Appendix 15.2**, and these include content sourced from their excavation reports. None of the identified sites contained above ground remains and their discoveries highlight the potential for the presence of sub-surface archaeological remains within green field locations in the study area. The Database also contains entries for two programmes of geophysical survey and archaeological test trenching in advance of a proposed development within a land parcel on the east side of the Dunboyne Link Road which is located adjacent to the proposed Phase 3 development, and these revealed nothing of archaeological significance (O’Connell 2023a and 2023b).

National Museum of Ireland Topographical Files

An inspection of the topographical file archive held in the National Museum’s premises in Kildare Street, Dublin was carried out as part of the assessment. This revealed that the archive contains no files describing the discovery of archaeological objects within Bennetstown townland. The archive does contain a number of files detailing the discovery of archaeological objects in Dunboyne townland and those which contain contextual information for the discovery locations indicate that they were found within known archaeological sites or within the town. None of the files contained information indicating that objects were retrieved from the small section of Dunboyne townland that extends into the south end of the proposed development.

15.2.3.2 Architectural Heritage

There are no extant buildings of any date located inside the boundary of the proposed development site and the existing built environment within its immediate surrounds to the north is modern in date with green field lands located in other directions. The Meath Development Plan 2021-2027 does not list any Protected Structures or Architectural Conservation Areas within the proposed development site. In addition, the National Inventory of Architectural Heritage (NIAH) also does not list any structures or historic gardens/landscapes within the proposed development site.

There is one Protected Structure located within the 1km study area and this comprises an early 20th century terrace of ten houses located on St. Marys Road in the north end of Dunboyne town (ref. PS 91540) (**Figure 15.1**). The NIAH also lists one structure located within the 1km study area and this comprises a 19th century railway bridge (NIAH 14405001) located c.165m outside the east end of the site boundary (**Figure 15.1**). The housing terrace and railway bridge have been assigned regional ratings by the NIAH, which is indicative of a medium value, and they are described in the inventory as follows:

- St. Mary’s Road Housing Terrace (PS 91540/NIAH 14341011)*
Terrace of ten three-bay two-storey houses, built c.1910. Hipped artificial slate roof with brick eaves course, cast-iron rainwater goods and red brick chimneystacks. Rendered walls with stone quoins. Red brick dressings to window openings, with some stone sills and timber sash windows. Red brick dressing to door openings.
- Railway bridge (NIAH 14405001)*
Single-arch rock-faced limestone railway bridge with string courses and copings, built c.1850, carrying the road over the former railway track which is now disused. The masonry treatment of this railway bridge adds textural interest to the site. The robust rustication of the walls, voussoirs, string courses and copings was executed by skilled craftsmen. This bridge forms part of a group with the related railway structures along this disused line.

Table 15.6 Architectural Heritage Structures within 1km Study Area

RPS no.	NIAH no.	Name/Type	Townland	Distance from nearest greenfield area within site
PS 91540	14341011	Housing terrace	DUNBOYNE	930m south
n/a	14405001	Railway Bridge	BENNETSTOWN	240m northeast

15.2.3.3 Review of Cartographic Sources

The cartographic sources examined for the study area comprised the 17th-century Down Survey mapping (**Figure 15.2**), the 1st edition 1:10,560 (6-inch) Ordnance Survey (OS) map series (published 1837) (**Figure 15.3**) and the 1:2,500 (25-inch) OS map (published 1911) (**Figure 15.4**). The location of Bennetstown townland is indicated on the Down Survey mapping which shows no large structures or other features of potential cultural heritage interest within its boundary. The review of the 6-inch and 25-inch OS maps revealed that they both depict the proposed development site as vacant fields with no buildings or other structures of potential cultural heritage interest indicated within its boundary. The maps do show the boundary between the townlands of Bennetstown and Dunboyne extending in an east to west direction through the centre of the proposed development site and this is described in **Section 15.2.3.5**.



Figure 15.2: Down Survey Map showing Bennetstown townland

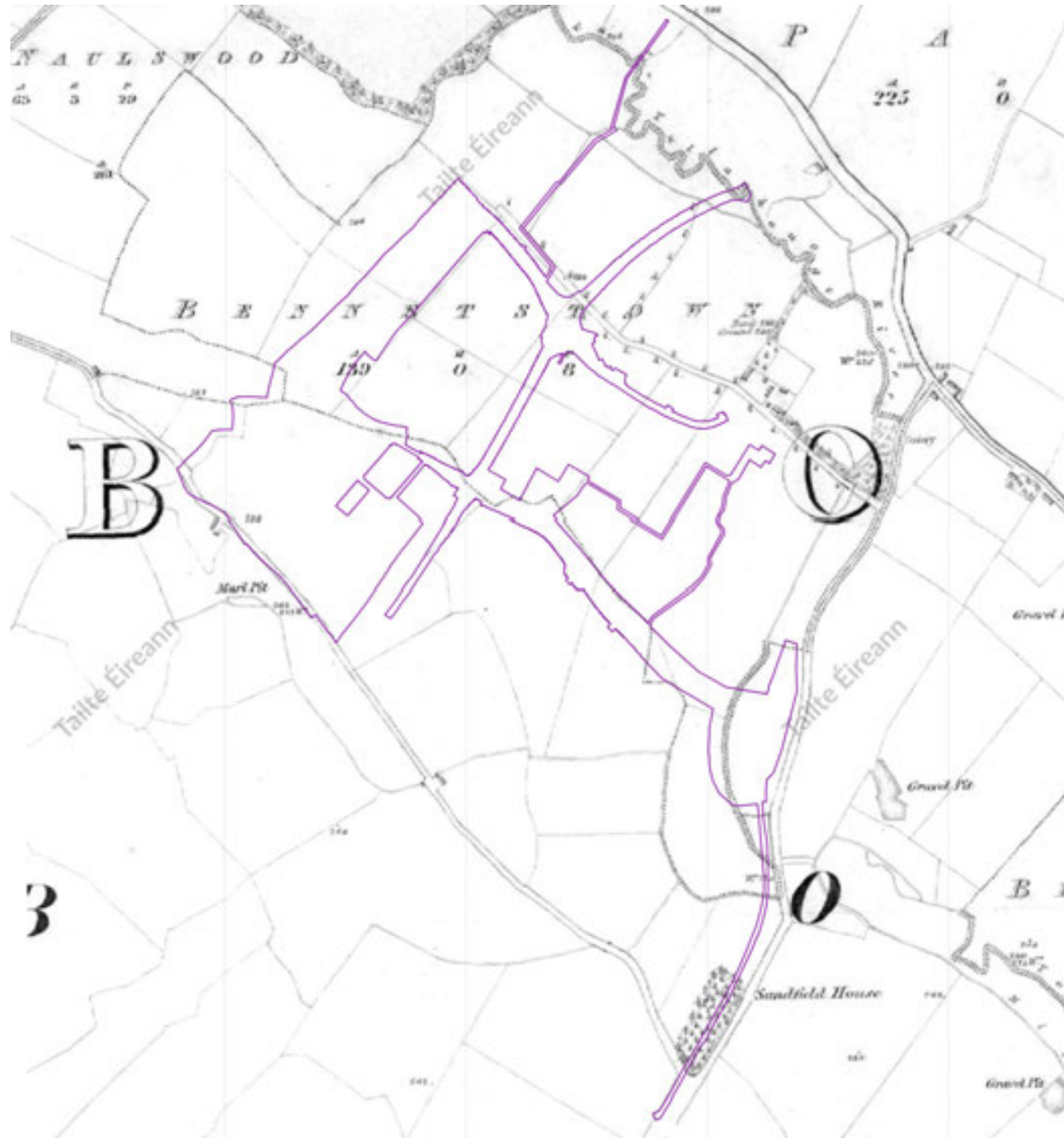


Figure 15.3: 1st edition 6-inch OS Map (1837) Showing Proposed Development

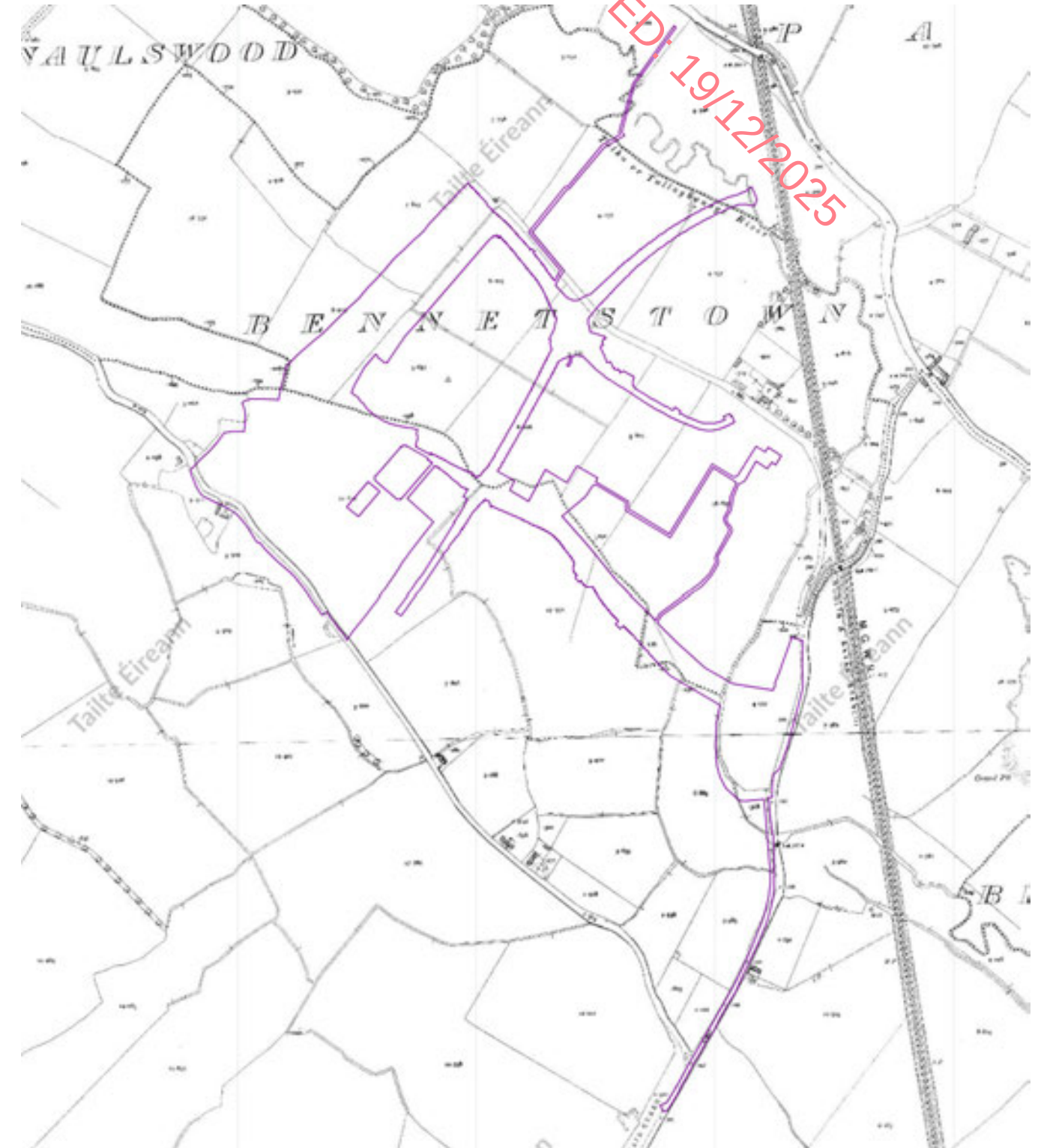


Figure 15.4: 25-inch OS Map (1911) Showing Proposed Development

15.2.3.4 Aerial, Satellite and LiDAR Imagery

A review of modern aerial and satellite images published online by Tailte Éireann, Google and Bing revealed no potential unrecorded archaeological sites within the proposed development site and indicated that the layout of the green fields within the proposed development has not been significantly altered since the publication of the 25-inch OS map in 1911 (**Figure 15.4**). A review of LiDAR datasets published online by the Geological Survey of Ireland⁴ (GSI) was also carried out and revealed traces of regular linear features extending through the fields which appear to be the result of agricultural activity, such as land divisions, field drainage and cultivation. No surface traces of potential unrecorded archaeological sites were noted during the review of the LiDAR imagery of the proposed development site (**Figures 15.5 and 15.6**).



Figure 15.5 Satellite Image of Proposed Phase 3 Development (source: Google)

⁴ <https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b7c4b0e763964070ad69bf8c1572c9f5>



Figure 15.6: LiDAR Image of Greenfield areas within Proposed Development (source GSI)

15.2.3.5 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. There are no historic settlement centres, extant structures or associations with historical events located within, or in close proximity to, the proposed development site. 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 proposed development site. While the consulted historical OS maps show a number of country houses within the surrounding landscape none of their formal demesne features, such as avenues, woods or gardens, are shown within the environs of the proposed development site (**Figures 15.3 and 15.4**).

The proposed development site is contained within sections of the townlands of Bennetstown and Dunboyne which formed part of agricultural lands within the northern hinterland of the settlement of Dunboyne. 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, rath or dun may indicate the presence of a ringfort while temple, saggart, termon or kill indicate associations with church sites. The townland name Bennetstown is English in origin and has been used as the townland name since at least the publication of the Down Survey in the 17th century. In the case of Dunboyne, as well as being the townland names, it is also the name of the Barony, Civil Parish and village. The Placenames Database⁵ cites *Dún* (fort) *Búinne* as the Gaelic version of the townland name Dunboyne which may potentially be associated with a recorded castle site (ME050-021005-) located within the village area outside the south end of the study area. The townland boundary between Bennetstown and Dunboyne extends in an east to west direction through the centre of the proposed development site and its line is marked by a tree-lined field boundary.

15.2.4 Field Inspection

The proposed development site was inspected in February 2024 during clear weather conditions that afforded good landscape visibility and extracts from the photographic record of the site inspections are presented in **Appendix 15.1**. The proposed development site contains a number of pasture and arable fields located directly to the west of the Dunboyne Link Road (R157) and north of a local road (Kennedy Road). The centre of Dunboyne village is located c.1km to the southwest and lands to the north, west, and south of the site are under agricultural use. As detailed in **Section 15.2.5** below, a geophysical survey subsequently carried out within the proposed development site in March 2024 revealed the presence of a number of sub-surface archaeological sites/features and none of these retain visible surface expressions.

The proposed development site is within an area of level terrain and is occupied by a number of fields, the majority of which are in use as pastureland, and a sports pitch which is in the southwest quadrant. The field boundaries consist of ditches flanked by tall hedges which are interspersed with mature trees, and this includes the field division which marks the townland boundary between Bennetstown and Dunboyne. The central/southern plots are divided by post and wire fences. The majority of the lands were in use as grazing land (sheep) with low grass at the time of the survey with one field used for winter wheat. A farm access lane extends from a modern farmyard next to Kennedy Road in the south end of the proposed development. There are no visible above ground remains of the anomalies identified by the geophysical survey and no surface traces of any other potential archaeological or cultural heritage features were noted during the walkover survey.

15.2.5 Geophysical Surveys

A geophysical survey (Licence No. 24R0165) of green field lands within the section of the proposed development site on the west side of the Dunboyne Link Road was carried out by Dr Ger Dowling in March 2024. A full copy of the report on this non-intrusive survey is presented in **Appendix 15.4** and the results are summarised in Section 15.2.5.1, which includes mapping sourced from the geophysical survey report. In addition, an earlier geophysical survey of the lands containing the area of the proposed development on the east side of the Dunboyne Link Road was previously carried out by Target Archaeological Geophysics (TAG) in July 2023 as part of the proposed Phase 1 development in that area (Licence No. 23R0292). A full copy of the report on this non-intrusive survey is presented in **Appendix 15.5** and the results are summarised in Section 15.2.5.2, which includes mapping sourced from the geophysical survey report.

5 www.logainm.ie

15.2.5.1 Geophysical Survey (Western Area)

The geophysical survey (Licence No. 24R0165) in the lands to the west of the Dunboyne Link Road comprised high resolution magnetic gradiometry and was implemented over several adjoining pasture fields and a football pitch and covered an area of approximately 15.3 hectares (**Figure 15.7**). The survey area included lands that are outside the proposed Phase 3 development and these locations are identified below.

The results of the geophysical survey are summarised hereafter, and a full copy of the geophysical report is presented in **Appendix 15.4**. The survey identified a number of anomalies (Anomalies 1 to 7) which are of potential archaeological origin within the proposed development site and the reference numbers for these used below are sourced from the geophysical report. The locations of the potential archaeological features, including their associated survey reference numbers, are identified on **Figure 15.8**.

The main potential feature (Anomaly 1), noted in the northwest portion of the greenfield area, is the section of a large circular enclosure with a maximum diameter of c.60m and the northwest end of this site appears to extend into a field to the west which is in third-party lands. The full extent of the section of the enclosure identified during the geophysical survey is located within the proposed Phase 3 development boundary (**Figure 15.8**).

The enclosure is located c.55m to the west of a number of circular features (Anomalies 2-4) ranging between 6m-7.3m in diameter which may represent the remains of prehistoric ring-ditches or building foundations. A cluster of potential ditch segments and small pits/deposits were also identified in this area. Further to the east, the survey mapped what appears to be the western portion of a large ring-ditch or small enclosure (Anomaly 5), measuring c.20m in diameter. The projected eastern end of this feature is occupied by the adjacent Dunboyne Link Road. The entirety of the identified extents of Anomalies 2-5 are located outside the boundary of the proposed Phase 3 development.

Another possible enclosure or early field plot (Anomaly 6) was identified in the west end of the survey area and is perhaps associated with two linear ditches/drains (Anomaly 7) which extend outward from its location to the east, and these are located within the boundary of the proposed Phase 3 development. The geophysical survey also identified evidence for agricultural activity in the form of a former field boundary marked on historic OS maps, and several linear anomalies and trends across the surveyed area which are interpreted as land divisions, drainage and/or cultivation features (see **Appendix 15.4**).



Figure 15.7: Greyscale Image of Gradiometry Survey Results in Western Area



Figure 15.8: Interpretative Plan of Geophysical Anomalies 1-7 in Western Area Showing Phase 3 Development Boundary (dotted white line)

15.2.5.2 Geophysical Survey (Eastern Area)

A geophysical survey (Licence No. 23R0292) of the proposed Phase 1 development lands on the east side of the Dunboyne Link Road was carried out by Target Archaeological Geophysics (TAG) in July 2023 as part of the assessment of that development. All lands that were deemed suitable by TAG for geophysical investigation were investigated and this comprised a total of 6.8ha green field areas which were subject to high-resolution recorded magnetometry. The results of the survey are summarised in this section and a full copy of the geophysical report is presented in **Appendix 15.5**.

The geophysical survey in this area identified two potential archaeological sites and the reference numbers for these used below are sourced from the TAG geophysical report. The locations of the potential features, including their associated reference numbers, are also identified on **Figure 15.9**. The two anomalies of archaeological potential comprised two enclosures in the east end of the surveyed area. Anomaly M3:1 comprised a small circular enclosure measuring c.10m in diameter and the geophysical report notes that it is indicative of a ring-ditch site. Anomaly M4:4 comprised a circular ditched enclosure measuring c.40m in diameter, which the geophysical report identifies as a probable ringfort, with trends of unknown significance noted within its the internal area. The geophysical survey also identified a number of linear trends of unknown origin but the potential that some of these may indicate natural geology, cultivation features, levelled field boundaries is noted within the geophysical report (see **Appendix 15.5**). The assessment of likely Phase 1 construction phase impacts and appropriate pre-construction mitigation measures for the geophysical features identified in this area are presented in Chapter 14 of the EIAR compiled for that development. The identified pre-development mitigation measures include archaeological test trenching and preservation by record through archaeological excavation of identified archaeological features where direct impacts are predicted to occur. It is noted that the Phase 1 development in this area was granted permission by Meath County Council (ref. 23/60290).

In relation to the extent of the proposed Phase 3 development within lands to the east of the Dunboyne Link Road, Anomaly M3:1 (potential ring-ditch) is located 21m outside the nearest section of the Phase 2 development boundary. The majority of Anomaly M4:4 (potential ringfort) is also located outside the Phase 3 development boundary but a c.30m long section of a c.4m wide foul sewer, which was also included in the Phase 1 development (granted permission by Meath County Council (ref. 23/60290) and granted on appeal by An Bord Pleanála (ref. ABP 320049-24) on 20th November 2024), does extend in a northeast to southwest direction through the east end of this anomaly (see **Figure 15.9**).



Figure 15.9: Location of Geophysical Anomalies M3:1 and M4:4 in Relation to the Boundary of the Proposed Phase 3 Development (orange line) on East Side of Dunboyne Link Road

15.2.6 Archaeological Test Trenching

Thirteen archaeological test trenches, measuring 370 linear metres, were excavated within lands on the west side of the Dunboyne Link Road in June 2024 (Licence no. 24E0676) (see **Figure 15.10**). The programme of testing was undertaken in order to inform this assessment and targeted five of the geophysical anomalies (Anomalies 1-5) identified as being of archaeological potential during the geophysical survey in this area (see **Section 15.2.5.1** and **Figure 15.10**). These included trenches excavated at the location of a potential enclosure site (Anomaly 1) which extends into the proposed Phase 3 development while the remainder of the test trenches were excavated to investigate anomalies located outside this phase of development (**Figure 15.10**). Two geophysical anomalies of archaeological potential (Anomalies 6 and 7) are located within a sports pitch which was not accessible for test trench excavations.

The testing programme confirmed the results of the geophysical survey and identified a section of a large circular enclosure (Anomaly 1) which contained linear features, pits and possible postholes, one smaller enclosure (Anomaly 5) and three potential ring-ditches or round houses (Anomalies 2, 3 and 4). The majority of the large circular enclosure (Anomaly 1) is located within the boundary of the Phase 3 development although it appears that a section of the northwest end of this enclosure extends into a field located within third-party lands outside the development site. Test trenches 1, 2, 3, 4, 5 and 6 were excavated to investigate the enclosure site and the results are summarised in **Table 15.7** (full report is provided in **Appendix 15.6**). The remainder of the trenches (Trenches 7 to 13) were located outside the proposed Phase 3 development, but the results are also summarised in **Table 15.7** to provide contextual information for adjoining lands.

Table 15.7 Summary of Archaeological Test Trenching Results

Trench	Description
Trench 1	Test trench 1 (T1) was excavated to a maximum depth of 0.6m below the ground surface across the north end of Anomaly 1, a large enclosure. A number of archaeological features were identified within this trench and included a 2.2m wide curved section of the west end of the enclosure ditch. It was orientated NW-SE and defined by a fill of moderately compacted light yellowish brown silty clay. Occasional small fragments of animal bone were noted on the surface of the ditch fill. The remaining features were all located within the interior of the enclosure and comprised a cluster of two possible pits, four linear features and a rectangular arrangement of four circular pits or postholes. All of the internal features contained dark brownish grey clayey silt fills with moderate to frequent charcoal flecks and unburnt animal bone fragments. None were indicated from the geophysical survey. The location of this trench is outside the revised development boundary.
Trench 2	Test Trench 2 (T2) was excavated in an area outside the south end of Anomaly 1 and identified nothing of archaeological significance. The location of this trench is outside the revised development boundary.
Trench 3	Test Trench 3 (T3) was excavated within the south end of Anomaly 1. Two linear features were identified within this trench and were interpreted as the fills of an inner (0.4m wide) and an outer (1.7m wide) enclosure ditch.
Trench 4	Test Trench 4 (T4) was excavated in an area outside the south end of Anomaly 1 and identified nothing of archaeological significance.
Trench 5	Test Trench 5 (T5) was excavated within the south end of Anomaly 1. Two linear features were identified and were interpreted as the fills of an inner (1.35m wide) and an outer (2.4m wide) enclosure ditch. A 3.6m long charcoal-rich deposit was also identified in the area of the trench within the enclosure.
Trench 6	Test Trench 6 (T6) was excavated within an area outside the east end of Anomaly 1 and identified the fills of a pit and a curvilinear feature.
Trench 7	Test Trench 7 (T7) was excavated to investigate Anomalies 2 and 3, which both comprise potential small ring-ditches. Anomaly 2 contained a 1m wide ditch which enclosed an area measuring 6.2m in diameter. break of slope at top, concave sides and base. The ditch fill was a compact dark grey/black silty clay with frequent charcoal flecks, small sub-angular stones (some heat affected), occasional fragments of unburnt and burnt animal bone and flecks of undiagnostic burnt bone. Anomaly 3 contained a 0.30m wide ditch which enclosed an area measuring 4m in diameter and its fill was similar to that identified at Anomaly 2. Test trenching of these two anomalies did not reveal any internal features or datable artefacts but it was noted that their sub-surface remains were indicative of ring-ditch sites.
Trench 8	Test Trench 8 (T8) was excavated to investigate Anomaly 2 and revealed similar results as those identified in Trench 7.
Trench 9	Test Trench 9 (T9) was excavated to investigate Anomaly 3 and revealed similar results as those identified in Trench 7.
Trench 10	Test Trench 10 (T10) was excavated to investigate Anomaly 4, which comprises a potential ring-ditch. A curvilinear, charcoal-rich ditch fill, measuring 0.64-0.9m in width, and a charcoal-rich pit were identified at the anomaly location.
Trench 11	Test Trench 9 (T9) was excavated to investigate Anomaly 4 and revealed similar results as those identified in Trench 10.
Trench 12	Test Trench 12 (T12) was excavated to investigate Anomaly 5, a possible ring-ditch or enclosure, and revealed the fill of a 1.16m wide enclosing ditch which was composed a compact mid grey silty clay with occasional small and medium sized sub-angular stones. A fragment of a copper cast cake or ingot was retrieved from this fill.
Trench 13	Test Trench 13 (T13) was excavated to investigate Anomaly 5 and revealed similar results as those identified in Trench 12.

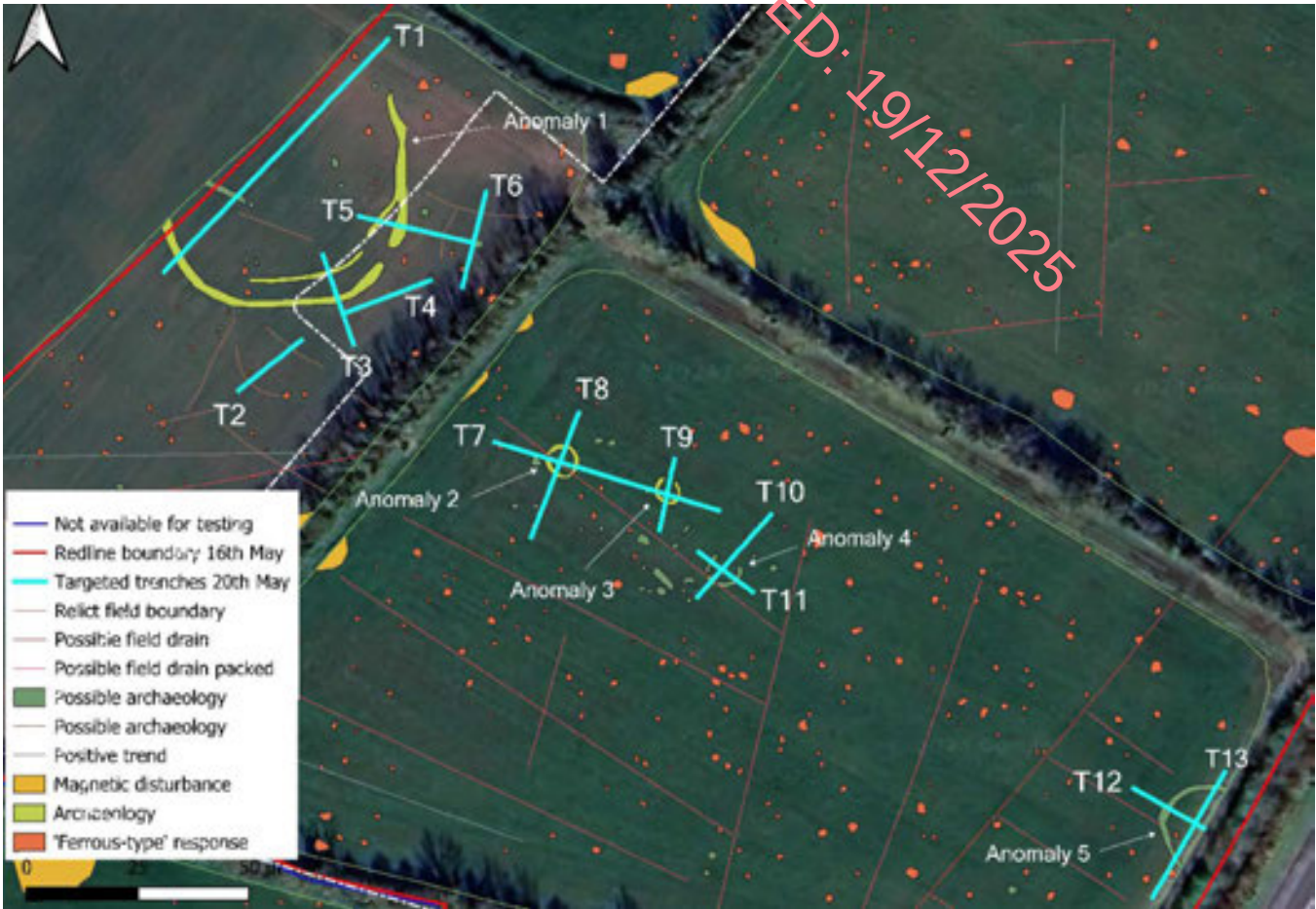


Figure 15.10: Location of Test Trenches Targeting Geophysical Anomalies 1-5

15.3 Predicted Impacts

15.3.1 Do Nothing Scenario

A ‘Do Nothing Scenario’ will see the continued preservation of recorded and potential cultural heritage features within the study area.

15.3.2 Construction Phase

The SMR lists two recorded archaeological sites within an area of the proposed development boundary that extends along a section of the Dunboyne Link Road, and these comprise a cluster of structural remains (ME050-057----) and a burnt mound (ME050-058----) both of which were identified during archaeological investigations during the construction of this roadway (see **Figure 15.1**). The former site was fully excavated while the latter was partially excavated with a section extending outside the road-take preserved *in situ*. The location of the remaining section of burnt mound ME050-058---- is located c.150m outside the nearest section of green field area within the proposed development boundary. The full extent of these

two archaeological sites within the boundary of the proposed development have been preserved by record through full archaeological excavation and no archaeological materials remain at their former locations. The proposed development will, therefore, not result in any predicted impacts on these excavated archaeological sites.

There are no extant archaeological sites listed in the SMR/RMP located within the green field areas of the proposed development site and the construction phase will, therefore, have a neutral effect on the known archaeological resource listed in these records.

The geophysical survey of green field areas within the section of the proposed development on the west side of the Dunboyne Link Road identified the sub-surface remains of a number of sites/features of archaeological potential (see **Section 15.2.5.1** and **Appendix 15.4**). A programme of archaeological test trenching targeted at the locations of Anomalies 1-5 identified during the geophysical survey confirmed the archaeological nature of these features. Anomalies 2-5 are located outside the boundary of the proposed Phase 3 development and no impacts on these features will occur.

Anomaly 1 was identified in the northwest portion of the green field area and comprises a section of a large circular enclosure with a maximum diameter of c.60m. The northwest end of this enclosure appears to extend into an adjacent field to the west which is located outside the proposed development boundary. Test trenching confirmed the presence of archaeological features, including a pair of enclosure ditches, within the section of the enclosure located within the development boundary. The groundworks required for the construction phase within the boundary of the proposed development will result in a permanent, direct, moderate to significant, negative effect on this enclosure and this will require mitigation. A negligible magnitude, indirect, imperceptible negative effect will occur on the section of the enclosure located outside the development boundary.

Two additional geophysical anomalies of archaeological potential (see **Figure 15.8**; Anomalies 6 and 7) were also identified within a sports pitch area within the boundary of the proposed development which was not available for test trench excavations. While the nature of these anomalies remains to be determined, the groundworks required for the construction phase will result in a permanent, direct, potential moderate to significant, negative effect on these features and this will require mitigation.

Two geophysical anomalies of potential archaeological origin were identified during a geophysical survey of Phase 1 development lands on the east side of the Dunboyne Link Road in 2023 (see **Section 15.2.5.2** and **Appendix 15.5**). These comprise a potential ring-ditch (Anomaly M3:3) and a potential ringfort enclosure (Anomaly M4:4). Anomaly M3:3 is located c.21m outside the boundary of the proposed Phase 3 development in this area and the proposed development will have a neutral impact on this potential archaeological site. The majority of Anomaly M4:4 is also located outside the Phase 3 development boundary but a c.30m long section of a c.4m wide foul sewer, which was also included in the Phase 1 and 2 developments, does extend in a northeast to southwest direction through the east end of this anomaly (**Figure 15.9**). The ground works required for the construction phase will result in a permanent, direct, moderate to significant, negative effect on the section of this potential archaeological site within the footprint of the foul sewer line and this will require mitigation.

The River Tolka is located outside the east end of the proposed development site and no in-channel works which would have the potential to impact on any unrecorded underwater archaeological sites will be carried out.

There are no Protected Structures located within the proposed development site, and it is not located within or adjacent to an Architectural Conservation Area. There are no NIAH-listed buildings or garden/lands within the proposed development site and the nearest structure listed in the inventory is a railway bridge (NIAH 14405001) located c.240m outside the east end of the proposed development boundary. Given the absence of any architectural heritage constraints within the proposed development site or its close environs, the construction phase of the proposed development will have a neutral effect on the architectural heritage resource which does not require mitigation.

There are no undesigned vernacular structures or historic settlements located within the proposed development site and no intangible attributes, such as historical or folklore associations, were noted during the assessment. A section of the townland boundary between Bennetstown and Dunboyne extends through the proposed development site and continues outside its boundary. The construction phase of the proposed development will result in a direct, permanent, slight, negative effect on this local (low value) element of the undesigned cultural heritage resource, and this will require mitigation.

15.3.3 Operational Phase

There is no intervisibility between the proposed development site and the archaeological sites listed in the RMP/SMR within the surrounding 1km study area as none retain any recorded above ground remains. The proposed development will, therefore, have a neutral effect on the setting of the recorded archaeological resource within the study area during the operational phase. Following the successful implementation of archaeological mitigation measures presented in **Section 15.4**, it is predicted that no impacts will arise in relation to the potential archaeological resource within the proposed development site during the operational phase.

There are two designated architectural heritage structures located within the surrounding 1km study area. These comprise a housing terrace listed as a protected structure (PS 91540), located 930m to the south and a railway bridge listed in the NIAH (ref. 14405001) located 240m to the east (see **Figure 15.1**). No potential undesigned structures of architectural heritage interest were identified within the boundary of the proposed development during the desktop studies and site investigation works carried out as part of this assessment. The operation phase of the proposed development will therefore have a neutral effect on the architectural heritage resource during the operational phase and no mitigation measures for this resource will be required.

The section of the townland boundary between Bennetstown and Dunboyne within the proposed development site comprises an undesigned cultural heritage asset. Following the implementation of the mitigation measures detailed in **Section 15.4**, no effects on this element of the cultural heritage resource are predicted during the operational phase.

15.3.4 Risks to Human Health

There are no predicted risks to human health associated with potential effects on the cultural heritage resource.

15.3.5 Cumulative Impacts

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed office development (planning ref. 23/424) within a green field site in lands to the north of the proposed development, which is located on the opposite side of the Dunboyne link road. The online planning file for that development includes an archaeological assessment report which notes that a geophysical survey and subsequent phase of archaeological test trenching at this location did not identify anything of archaeological significance⁶. The assessment report recommended that archaeological monitoring of the construction phase of the development should be carried out (O'Connell 2023b).

⁶ <http://idocswebdpss.meathcoco.ie/iDocsWebDPSS/ViewFiles.aspx?docid=2515671&format=djvu>

A review of the Meath County Council planning enquiry system was carried out in relation to an application for a single storey commercial building within a site adjacent to the north end of the green field area of the proposed development (planning ref. 23/600657), The online planning files contain an archaeological impact assessment report describing the results of a geophysical survey and test trenching of the proposed development location which revealed nothing of archaeological significance (O’Connell 2023a). The assessment report recommended that archaeological monitoring of the construction phase of the development should be carried out.

A review of online planning files for the Dunboyne Link Road - Dunboyne Business Park and the R157 project (Meath County Council ref. P822022) revealed that a Heritage Assessment was prepared as part of the assessment of this proposed development⁸. The assessment concluded that, given the proximity of archaeological remains in the area, that the site should subject to advance archaeological test trenching and that any archaeological remains found should be assessed for significance and then, if appropriate, be subject to licensed archaeological rescue excavation.

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed Large Scale Residential Development (planning ref. 23/60290⁹), this is the Phase 1 lands of the MP 22 masterplan area. An EIAR was produced for this application, which included a Cultural Heritage chapter. It was concluded that The construction and operational stages of the proposed development would have no predicted effect on any archaeological sites listed in the SMR or RMP or on any recorded architectural heritage structures. A programme of archaeological test trenching of the features identified during a geophysical survey was to be carried out in advance of the construction phase under licence by the National Monuments Service (NMS)

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed Large Scale Residential Development (planning ref. 25/61001¹⁰). This is not a separate development, but relates to application 23/60290, Phase 1 lands of the MP 22 masterplan area outlined above, specifically the re-alignment of a portion of the link road. A separate EIAR was not produced for this application. An Environmental Impact Assessment Addendum Report and Natura Impact Statement were submitted. It was concluded that the proposed road realignment and pumping station will not a significant impact on the conclusions of the EIAR with regard to archaeology. The archaeological mitigation measures set out in the EIAR will ensure that a potential slight/moderate range of significance of effect in the context of residual impacts on the unrecorded archaeological resource.

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed Large Scale Residential Development for 705 no. residential units (planning ref. 23/849; 25/60854¹¹) located north of the site, c.1km west of Dunboyne town centre. An EIAR was produced for this application, which included a Cultural Heritage (Architecture) chapter and a Cultural Heritage (Archaeology) chapter. It was concluded that the construction and operational stages of the proposed development would have no predicted effect on any archaeological sites listed in the Sites and Monuments Record or the Record of Monuments and Places or on any recorded architectural heritage structures. A programme of archaeological test trenching of the features identified during a geophysical survey were to be carried out in advance of the construction phase under licence by the National Monuments Service (NMS).

7 <http://idocswebdpss.meathcoco.ie/iDocsWebDPSS/listFiles.aspx?catalog=planning&id=2360065&orderBy=type>
8 <http://idocswebdpss.meathcoco.ie/iDocsWebDPSS/listFiles.aspx?catalog=planning&id=P822022>
9 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2360290/0>
10 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2561001/0>
11 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2560854/0>

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed Large Scale Residential Development for 309 no. residential units (planning ref. 24/6080512) located north of the site, c.1km west of Dunboyne town centre. An EIAR was produced for this application, which included a Cultural Heritage chapter. It was concluded that the construction and operational stages of the proposed development would have no predicted effects on any archaeological sites listed in the SMR or RMP or on any designated architectural heritage structures. A programme of test trenching was due to be carried out in advance of construction.

A review of the Meath County Council planning enquiry system was carried out in relation to the proposed development of 76 no. dwellings and a creche (planning ref. 24/60468¹³) at Station Road, Dunboyne, Co. Meath. One condition of the planning permission for this development related to archaeology. It was a requirement that all groundworks associated with the development should be monitored under licence by an archaeologist. In the case that archaeological material was identified, further mitigation measures should be carried out pending discussion with the Department of Housing, Local Government and Heritage.

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed Large Scale Residential Development for 853 no. residential units (planning ref. 24/60709¹⁴). An EIAR was produces for this application, this included a Architectural, Archaeological and Cultural Heritage chapter. There are three recorded monuments located within the site, which consist of a ring ditch (ME050- 031), an enclosure (ME050-032001) and a further ring ditch (ME050-032002). All three sites will be preserved in-situ as part of the development, and in accordance with national and regional policy. A geophysical survey and archaeological testing took place at the site as part of mitigation measures. It was not possible to preserve the archaeological sites identified during geophysical survey and archaeological testing, the sites were to be fully preserved by record (archaeological excavation). Following the completion of all mitigation measures, there will be no significant residual impacts upon the archaeological, architectural or cultural heritage resource. No effects during construction or operation are predicted upon the architectural heritage resource.

A review of the Meath County Council planning enquiry system was carried out in relation to a proposed a 400kV underground cable from East Meath to North Dublin (planning ref. VA06F.319422¹⁵), this is approximately 37.5km in length and includes a section in close proximity to the site at Dunboyne. An EIAR was produces for this application, this included an Archaeology, Architectural Heritage and Cultural Heritage chapter. It was noted that there is the potential for the discovery of previously unknown below-ground archaeological features, materials and deposits along the Proposed Development. As a result, archaeological investigations were to be implemented post-consent and pre-construction in all off-road sections required for construction. Following the implementation of mitigation measures, there will be one Moderate (which is considered ‘Significant’ for this assessment) impact on the recorded monument to be removed (DU015-001----) during the Construction Phase but no other significant residual impacts as a result of the Construction and Operational Phases of the Proposed Development. The mound that was to be removed is over 17km from the site at Dunboyne.

A review of the Meath County Council planning enquiry system was carried out in relation to the proposed development of 8 no. dwellings located to the south-east of the subject site (planning ref. 24/39¹⁶). This was a small development in comparison to others on this list. There were no Archaeological Impact Assessment, further information requests or conditions related to archaeology found on the planning file.

12 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2460805/0>
13 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2460468/0>
14 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2460709/0>
15 <https://www.pleanala.ie/en-ie/case/319422>
16 <https://www.eplanning.ie/MeathCC/AppFileRefDetails/2439/0>

The recorded archaeological sites within the 1km study area comprise examples that have either been fully excavated or retain no discernible above ground expressions and, therefore, are not considered to have the potential for significant cumulative effects on their wider settings. Following the application of the site-specific archaeological mitigation measures presented in **Section 15.4**, it is concluded that the proposed development will not act in combination with other developments to result in any significant cumulative impacts on the cultural heritage resource.

15.4 Mitigation Measures

15.4.1 Construction Phase Mitigation

There are no extant archaeological sites listed in the SMR/RMP located within the proposed development site. There are also no Protected Structures or structures/gardens listed in the NIAH within the proposed development site, and it is not located within, or in the close environs of, an Architectural Conservation Area. No mitigation measures for the architectural heritage resource are, therefore, required.

The programme of geophysical survey was followed by targeted archaeological test trenching within lands on the west side of the Dunboyne Link Road has confirmed the presence of the sub-surface remains of a previously unrecorded enclosure (Anomaly 1) located within the boundary of the proposed development (see **Figure 15.10** and **Appendix 15.4**). In addition, a geophysical survey of lands on the east side of the Dunboyne Link Road, which was carried out as part of the assessment of the proposed Phase 1 development in this area, identified a potential ringfort site (Anomaly M4:4) within the line of a foul sewer which was also included in the Phase 1 and 2 developments (see **Figure 15.9** and **Appendix 15.5**). Following a grant of planning, and in advance of the construction phase, a suitably qualified archaeologist will be appointed to prepare and submit a licence application to the National Monuments to preserve by record (through archaeological excavation) the full extent of the archaeological sites/features located within the boundary of the proposed development. The extent of identified archaeological sites/features that extend outside the boundary of the proposed development (i.e. Anomalies M3:3 and M4:4 in the eastern area) will be securely fenced off for the duration of the construction phase and no works, storage or site traffic will occur at their locations (see **Figures 15.8** and **15.9**).

All archaeological excavation works to preserve by record identified archaeological remains will be carried out under licence by the National Monuments Service and in advance of construction works at their locations. All required archaeological excavation works, including post-excavation analyses and reporting, will be carried out in accordance with the archaeological method statement submitted to the National Monuments Service and the National Museum of Ireland as part of the licence application. An archive containing stratigraphic records (including all associated digital and hard copy records and reports) will be submitted to the National Monuments Service upon completion of archaeological works. Any archaeological objects and relevant environmental material retrieved during archaeological excavation works, as well as all relevant reports, including post-excavation analysis reporting, will be provided to the National Museum of Ireland upon completion of all archaeological works. The results of all excavation works will also be published in the Database of Irish Excavation Reports and dependent on the nature of the results, the potential for additional publication in appropriate periodicals/journals will also be appraised.

The appointed archaeologist will also carry out further programmes of archaeological test trenching of other green field areas within the proposed development site as a confirmatory measure. This will be carried out in advance of the construction phase under licence by the National Monuments Service and will comprise test trenching of 10-12% of the green field areas. This will include test trenching at the locations of two geophysical anomalies located within a sports pitch area (Anomalies 6 and 7; see **Figure 15.8**) and the section of the townland boundary between Bennetstown and Dunboyne within the proposed development site. This townland boundary will also be subject to a written and photographic record. Any archaeological remains identified during the test trenching investigations will be cordoned off, recorded in written, drawn and photographic formats and the National Monuments Service notified

A report on the test trenching results, including written, illustrative and photographic records, will be submitted to the National Monuments Service, per licensing requirements, who will then be consulted to determine appropriate mitigation measures in the event that previously unrecorded archaeological remains are identified. This will entail either total/partial preservation *in situ* by avoidance or preservation by record by systematic archaeological excavation of any identified archaeological remains where direct impacts are predicted. An Archaeological Impact Assessment will be produced following the completion of the pre-development mitigation measures, this will also detail proposals for short term (construction phase) and long term (operation phase) preservation measures for any previously unrecorded archaeological remains identified during testing that will be preserved *in situ*.

15.4.2 Operational Phase Mitigation

All of the mitigation measures identified in **Section 15.4.1** will be enacted and completed prior to and during the construction phase and, therefore, no mitigation measures during the operational phase of the proposed development are predicted.

15.4.3 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 excavation works which will allow for monitoring of the successful implementation of the mitigation measures detailed in **Section 15.4**. A detailed method statement stating the proposed strategy for the archaeological excavation works will accompany the submitted licence application which will clearly detail the extent of the archaeological works and the onsite and post-excavation processes that will be enacted in order to preserve identified archaeological remains by record. Following the completion of all archaeological excavation works, preliminary and final reports will be submitted to the National Monuments Service, the National Museum of Ireland and the Planning Authority which will clearly describe the results of all onsite archaeological works and post-excavation analyses in written, illustrative and photographic formats.

15.5 Residual Impacts

The proposed development site and its close environs does not contain any extant archaeological sites listed in the SMR/RMP and or designated architectural heritage structures and no residual effects on examples within the surrounding 1km study area are predicted.

This assessment has been informed by programmes of geophysical survey and targeted archaeological test trenching which have identified a number of previously unrecorded sub-surface archaeological sites/features located within, and in the environs of, the boundary of the proposed Phase 3 development. Sections of two these identified sites, Anomaly 1 (enclosure site) in the western area and a section of Anomaly M4:4 (potential ringfort) in the eastern area, extend inside the development boundary **Figures 15.8** and **15.9**). The full extent of these sites within the boundary of the proposed Phase 3 development will be preserved by record through full archaeological excavations (**Figures 15.8** and **15.9**).

As described in **Section 15.4.1**, an additional programme of archaeological test trenching will be carried out in advance of the construction phase. The National Monuments Service will be consulted to determine appropriate mitigation measures in the event that previously unrecorded archaeological remains are identified. This will entail either total/partial preservation *in situ* by avoidance or preservation by record by systematic archaeological excavation of any identified archaeological remains where direct impacts are predicted.

Preservation *in situ* 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 unrecorded archaeological resource. Preservation by record 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.

Table 15.8: Construction Effects, Mitigation and Residual Effects on Geophysical Anomalies

Geophysical Anomaly	Description	Construction Phase Effect	Mitigation	Residual Effect Significance
Anomaly 1	Potential enclosure	Permanent, high magnitude, direct, moderate to significant, negative effect on section of enclosure within the development boundary.	Archaeological excavation of extent of site within development boundary.	Slight to Moderate
Anomaly 2	Potential ring-ditch	Permanent, high magnitude, direct, moderate to significant, negative effect	Archaeological excavation	Slight to Moderate
Anomaly 3	Potential ring-ditch	Permanent, high magnitude, direct, moderate to significant, negative effect	Archaeological excavation	Slight to Moderate
Anomaly 4	Potential ring-ditch	Permanent, high magnitude, direct, moderate to significant, negative effect	Archaeological excavation	Slight to Moderate
Anomaly 5	Potential enclosure	Permanent, high magnitude, direct, moderate to significant, negative effect	Archaeological excavation	Slight to Moderate
Anomaly 6	Potential Field/Enclosure	Neutral	None required	Neutral
Anomaly 7	Linear features	Neutral	None required	Neutral
Anomaly M3:3	Potential ring-ditch	Neutral	Protective fencing	Neutral
Anomaly M4:4	Potential ringfort	Permanent, high magnitude, direct, moderate to significant, negative effect on section of east end of enclosure within the development boundary.	Archaeological excavation of extent of site within development boundary. Protective fence cordon will be erected along adjacent section of development boundary	Slight to Moderate

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CHAPTER SIXTEEN

SIGNIFICANT INTERACTION OF IMPACTS



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CHAPTER SIXTEEN

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CHAPTER 16 | Significant Interaction of Impacts

16.1 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.

16.2 Expertise & Qualifications

This chapter of the EIAR has been prepared by Saoirse Kavanagh, Executive Planning Consultant of McCutcheon Halley Planning Consultancy. Saoirse holds a Bachelors Degree in Arts (International), majoring in Geography, and a Masters 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, Alternatives, and Population and Human Health chapters.

- Cooldown Commons Strategic Housing Development, Citywest, Dublin.
- Parkside 5B Strategic Housing Development, Belmayne, Dublin.
- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath

16.3 Proposed Development

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

16.4 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 16.1.

16.5 Difficulties Encountered

There were no difficulties encountered in completing this EIAR chapter.

16.6 Potential Significant Interactions

16.6.1 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 and River Tolka.
- Air Quality and Climate: 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 the 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.

16.6.2 Land, Soil and Geology

Chapter 5 assesses the likely potential impacts on land, soil, and geology arising from the proposed development. Land, Soil, and Geology attributes interact with other environmental attributes are summarised as follows:

- **Air Quality & Climate:** Potential effects on the receiving Land, Soils and Geology environment could also affect air quality (dust) conditions present. However, the mitigation measures described in Chapter 5 - Land, Soils & Geology, and those relevant in Chapter 7 - Air Quality, and Chapter 8 - Climate, will ensure that this will not occur.
- **Hydrology & Hydrogeology:** Potential effects on the receiving land, soils and geology environment could also affect hydrology and hydrogeology conditions present. However, the mitigation measures described in Chapter 6 - Hydrology & Hydrogeology, and those relevant in Chapter 5 – Land, Soils & Geology will ensure that this will not occur.

The potential significant impacts to Soils and Geology 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.

16.6.3 Hydrology and Hydrogeology

Chapter 6 assesses the likely potential impacts on Hydrology and Hydrogeology arising from the proposed development. Hydrology and Hydrogeology attributes interacting with other environmental attributes are summarised as follows:

- **Biodiversity:** Effects and impacts in relation to surface water and groundwater have the potential to negatively affect biodiversity. For example, unmitigated water quality impacts may result in negative impacts on aquatic ecology. With the mitigation measures in place, the predicted impact during construction phase due to this interaction will be *negative, imperceptible* and *short-term*.

There are no potentially significant interactions identified between Hydrology & Hydrogeology, and Biodiversity during the operational phase.

- **Waste:** During the construction phase, excavated topsoil and subsoil (c. 31,384 m³) will be generated from the excavations required to facilitate site levelling and construction of new foundations. It is currently envisaged that c. 17,726 m³ of excavated material will be retained on site for reuse as fill and/or landscaping purposes while the remaining c. 13,658 m³ of excavated material will be removed off site for reuse, recycling or disposal, as appropriate. During construction stockpiling of material may result in runoff water being sediment laden. Adherence to the mitigation measures presented above and the requirements of the RWMP (Chapter 10 – Material Assets, Appendix 10.1), will ensure the effect is *negative, imperceptible* and *short-term*.

There are no potentially significant interactions identified between Hydrology & Hydrogeology, and Material Assets - Waste during the operational phase.

- **Air Quality – Dust:** There is a risk of dust impacts associated with the proposed development. With the appropriate mitigation measures for dust as described in Chapter 7, to prevent fugitive dust emissions, it is predicted that there will be a *negative, imperceptible* and *short-term*.

There are no potentially significant interactions identified between Hydrology & Hydrogeology, and Air during the operational phase.

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.

16.6.4 Air Quality

Chapter 7 assesses the likely potential impacts on Air Quality arising from the proposed development.

The following aspects would interact with Air Quality and in the absence of mitigation may give rise to significant effects.

- **Population and Human Health:**

An adverse air quality impact during the construction phase can cause health and dust nuisance issues. With the implementation of best practice mitigation measures, the predicted impact during the construction phase is direct, short-term, negative, localised and not significant.

During the 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.

- **Climate:**

Air Quality and Climate have interactions as the emissions from the burning of fossil fuels during the construction and operational phases generate both air quality and climate impacts. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

- **Land and Soil:**

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.

- **Biodiversity:**

During the construction phase, dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. With the implementation of the mitigation measures dust emissions will be minimised and impacts will be direct, short-term, negative, localised and not significant with respect to biodiversity.

- **Traffic and Transport:**

Interactions between Air Quality and Construction Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. 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.

During the operational phase, the impact of the interactions between Traffic and Air Quality are considered to be long-term, direct, negative and not significant.

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.

16.6.5 Climate

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:

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 Transport:

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 CO2, 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.

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.

16.6.6 Noise and Vibration

Chapter 9 assesses the likely potential impacts on Noise and Vibration arising from the proposed development.

The most significant interaction for noise and vibration, during both the construction and operational phases, is traffic and transportation.

The assessment of noise and vibration impacts in Chapter 9 has been informed by the information from the Traffic chapter and the architectural drawings.

With increased traffic movements, the noise levels in the surrounding area increase. The impacts of the proposed development on the noise environment are assessed by reviewing the change in traffic flows on roads close to the site. In this assessment, the impact of the interactions between traffic and noise are considered to be imperceptible due to the low-level changes in traffic flows associated with the proposed development.

16.6.7 Waste

Chapter 10 assesses the impact of waste arising from the proposed development.

The most significant interactions are as follows:

- Land, Soil and Geology:

During the construction phase, excavated soil, stone and clay will be generated from the excavations required to facilitate site levelling, construction of new foundations and the installations of site services across all the proposed development sites. It is envisaged that some of the excavated material will need to be removed off-site. When material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 10 (Waste), Chapter 5 (Land, Soils and Geology) and the requirements of the RWMP (Appendix 10.1), will ensure the effect is **long-term, imperceptible** and **neutral**.

- Traffic and Transport

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the sites during the construction and operational phases of the proposed development. The increase in vehicle movements as a result of waste generated during the construction phase will be **temporary** in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movements will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 12 (Material Assets : Traffic & Transport). Provided the mitigation measures detailed in Chapter 10 and Chapter 12 are adhered to, the predicted effects are **short to long-term, imperceptible** and **neutral**.

- Population and Human Health

The potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific RWMP and mitigation measures in Chapter 4 (Population & Human Health) and Chapter 10, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be **long-term, imperceptible** and **neutral**.

16.6.8 Landscape

Chapter 11 assesses the likely potential impacts on Landscape and any visual impacts arising from the proposed development.

The landscape and visual amenity closely relate to the site’s biodiversity and cultural heritage elements. The current proposals are expected to be imperceptible with regards to cultural heritage and slight with regards to biodiversity. These interactions are not significant.

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.

16.6.9 Material Assets: Traffic and Transport

Chapter 12 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.

16.6.10 Material Assets Service Infrastructure and Utilities

Chapter 13 assesses the likely impacts on Services and Infrastructure arising from the proposed development.

- Soils and Geology

Construction phase: Trench excavations to facilitate site service installation will result in exposure of subsoils and bedrock to potential erosion and subsequent sediment generation. Exposed soil during the construction phase of the proposed development may give rise to increased dust emissions. However, the implementation of the dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.

Quality of Effect: Negative.

Significance of Effect: Slight.

Operational Phase: Interactions between soils/geology will be limited to the construction phase due to material excavation. Implementation of the mitigation measures described in Chapter 5 – Soil and Geology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Neutral.

Significance of Effect: Imperceptible.

- Water Quality

Construction Phase: A deterioration in water quality in nearby watercourses could occur during the construction phase of the proposed development due to rainwater run-off containing sediments, concrete and hydrocarbon spillages.

Implementation of the mitigation measures described in Chapter 6 – Water: Hydrology and Hydrogeology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Neutral.

Significance of Effect: Not significant.

Operational Phase: As all wastewater from the site is to be discharged to the existing 450mm Uisce Eireann Pipe and it is not anticipated that there will be any impacts on water quality during the operational phase of the development.

Implementation of the mitigation measures described in Chapter 6 – Water Hydrogeology and Hydrology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Neutral.

Significance of Effect: Not significant.

- Human Health

Construction Phase: Mismanagement or failure of the potable water supply drainage could lead to contamination during the construction phase. Working in trenches and in close proximity with live services could pose a risk to human health if mitigation measures are not put in place. The exposure of bedrock could, cause the risk of Radon exposure to human health during the construction phase. The use of Radon barriers in construction will mitigate this risk.

Quality of Effect: Negative.

Significance of Effect: Slight.

Operational Phase: The completed development will generate additional emissions to the atmosphere due to traffic associated with the development, and due to plant equipment within the development. However, air quality in the region of the site is expected to be within the limits set by the air quality standard. Implementation of the mitigation measures described in this chapter and in Chapter 6 – Water Hydrogeology and Hydrology will prevent and minimize the potential impacts of this interaction.

Quality of Effect: Negative.

Significance of Effect: Slight.

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. No other significant interactions have been identified, other than those discussed above. With mitigation measures in place, no significant residual negative impacts are predicted.

16.6.11 Biodiversity

Chapter 14 assesses the likely impacts on Biodiversity arising from the proposed development.

- Land, Soil and Geology: An assessment of the potential impact of the Proposed Development on the existing land, soils and geological environment; with emphasis on the impact of the Proposed Development on the receiving soils underlying the Site during the Proposed Development, is described in Chapter 5 - 'Land, Soils and Geology' of this EIAR. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are described in full in Chapter 5. The bulk removal of soils, sands and gravel at the Site can have implications for biodiversity. Natural regeneration of native and local seeds is the preferred option for re-vegetating areas to be retained for biodiversity.
- Hydrology and Hydrogeology: The key environmental interaction with biodiversity is water. An assessment of the potential impact of the Proposed Development on the hydrological and hydrogeological environment is described in Chapter 6 - 'Hydrology and Hydrogeology' of this report as well as in this Chapter, to ensure the quality (pollution and sedimentation) and quantity (surface water run-off) of water is of the appropriate standard. Interactions between hydrology and biodiversity can occur through impacts to water quality, arising, for example from an accidental pollution event during the Construction and/or Operational Phase. This interaction has the potential to result in impacts on habitats and fauna that are hydrologically linked to the Site.
- Air and Climate: An assessment of the potential impact of the Proposed Development on air quality is included in Chapter 7 of this EIAR. Dust emissions arising from the Construction Phase of the Proposed Development were

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identified as having potential impacts on local biodiversity. Once dust minimisation measures are implemented, impacts to biodiversity are not predicted to be significant.

- Noise and Vibrations: An assessment of the potential impact of the Proposed Development in the form of excess noise and vibrations associated with the Proposed Works are laid out in Chapter 9 - 'Noise and Vibrations'. These impacts are considered to be relevant to the ecological sensitivities associated with the Site of the Proposed Development discussed in this Chapter; and mitigation measures addressing these potential impacts are both referenced in this Chapter and described in full in Chapter 9. There is potential for interactions between noise and sensitive fauna, e.g., birds, that occur in adjacent habitats from increased noise levels during the Construction Phase. However, as described, noise related impacts are not deemed to be significant.

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.

16.6.12 Cultural Heritage and Archaeology

Chapter 15 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 16.1 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.

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Table 16.1 Summary of Interactions

	Population & Human Health		Land, Soil & Geology		Hydrology		Air Quality		Climate		Noise & Vibration		Waste		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	C	O
Population and Human Health			X		X		X		X		X				X	X	X	X	X					
Land, Soil and Geology					X		X												X					
Hydrology							X						X								X			
Air Quality	X	X	X						X	X							X	X			X			
Climate			X	X	X	X	X	X					X	X			X	X						
Noise & Vibration																	X	X						
Waste	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	X	X																		
Biodiversity			X	X	X	X	X	X	X	X	X	X												
Cultural Heritage and Archaeology																								

CHAPTER SEVENTEEN

SUMMARY OF MITIGATION MEASURES & MONITORING

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CHAPTER SEVENTEEN

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CHAPTER 17 | Summary of Mitigation Measures & Monitoring

17.1 Introduction

A key objective of the Environmental Impact Assessment process is to identify likely significant environmental impacts at the pre-consent stage and where necessary to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR summarises the proposed mitigation measures set out in Chapters 4 to 18.

All the mitigation measures proposed within the individual specialists’ assessments will be incorporated into the Construction and Environmental Management Plan (CEMP) prior to works commencing on-site.

Table 17.1 Incorporated Design Mitigation Measures

Aspect	Incorporated Design Mitigation
Land & Soils	This section outlines the measures that will be employed in order to ensure the project has minimal adverse effects on the surrounding environment, in this case land, soils and geology. These measures include appropriate design measures such as the proper storage and containment of hazardous substances and proper drainage systems in line with best practice, standard details, policies and guidelines already incorporated into the proposed design.
Water & Hydrology	This section outlines the measures that will be employed in order to ensure the project has minimal adverse effects on the surrounding environment, in this case hydrogeology and hydrology. These measures include appropriate design measures such as the proper storage and containment of hazardous substances and proper drainage systems in line with best practice, standard details, policies and guidelines. For further information on design refer to Engineering Planning Report - Paul Mc Grail Construction Engineers Limited, 2024. <i>Surface Water Quality and Drainage</i> The proposed development design includes hardstand cover across the site and the proposed surface water drainage system for this development has been designed as a sustainable urban drainage system (SuDS). It is proposed to use a sustainable urban drainage system (SuDS) approach to stormwater management throughout the site where possible. The overall strategy aims to provide an effective system to mitigate the adverse effects of urban stormwater runoff on the environment by reducing runoff rates, volumes and frequency, reducing pollutant concentrations in stormwater. The SUDs features proposed are as follows: • Modular Permeable Paving • Swales • Detention Basins • Petrol interceptor • Hydrobrake flow control. <i>Foul Water Drainage</i> A new network of foul sewers will be installed to serve the proposed development, discharging to existing connections to the existing foul sewer system along the R147. There will be no direct or indirect foul water discharge into any surface water courses. <i>Potential Impacts on Water Framework Directive Status</i> The following design mitigation measures have been incorporated in the design to mitigate potential impacts have taken account of the potential impacts of the development. • Provision of SuDS measures such as Modular Permeable Paving, Swales, Detention Basins, Petrol interceptor, Hydrobrake flow control included. Therefore, the risk of accidental discharge has been adequately addressed through design. • All surface water will be discharged to the existing storm water network and foul water will be discharged to the existing foul sewer system located along the R147.

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Table 17.2 Construction Mitigation

Aspect	Construction Phase Mitigation
Population & 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 Construction Traffic Management Plan (CTMP) and the Construction and Environment Management Plan (CEMP) submitted with the application. A final CTMP and CEMP will be agreed with the Planning Authority prior to commencement of development.
Land & Soils	In order to reduce impacts on the land, soils and geological environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include: Construction Environmental Management Plan The project engineer (Paul Mc Grail Consulting Engineers Limited) has prepared a Construction Environmental Management Plan (CEMP) that is included with the application documentation. The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation and monitoring measures which are described in the EIAR. The CEMP demonstrates the applicant’s commitment to implementing the proposed development in such a way as to avoid or minimise the potential environmental effects arising from construction activities. All personnel will be required to understand and implement the requirements of the plan. Construction works and the proposed mitigation measures outlined in the CEMP are informed by best practice guidance on the prevention of pollution during development projects including but not limited to: • Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532); • Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016); • Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741); • Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005); and • Guidelines for the crossing of watercourses during the construction of national road schemes (National Roads Authority; 2008). The CEMP will be implemented and adhered to by the construction contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to consent conditions which may be imposed. Specific mitigation relating to land soil and geology is described below: Soil Extraction, Removal and Infill The excavation will require soil excavation and infill. The project engineers (Paul McGrail Consulting Engineers) have estimated that c. 2524m³ of material will need to be excavated to do so. It is currently envisaged that all of the material will be able to be retained and reused onsite for landscaping and fill If any potentially contaminated material is encountered and is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments. Contractors should prepare and adhere to a method statement indicating the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works. Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

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Aspect	Construction Phase Mitigation
	Any excavation works should be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil will be tested and classified as hazardous or non-hazardous in accordance with the EPA <i>Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous</i> publication, HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with <i>EC Decision 2003/33/EC</i>. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility. Management of Dust • Soils will be stabilised and protected from erosion whilst planting becomes established. • During earthworks and excavation works, care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. • Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only; • A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate; • Movement of material will be minimised to reduce the degradation of soil structure and generation of dust; • Dust monitoring will be undertaken. Sources of Fill and Aggregates All fill and aggregate for the proposed development will be sourced from reputable suppliers per the project Contract and Procurement Procedures. All suppliers will be vetted for: • Aggregate compliance certificates/declarations of conformity for the classes of material specified for the proposed development; • Environmental Management status; and • Regulatory and Legal Compliance status of the Company. Cement/Concrete Works Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 m of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Irish Water / MCC. Pouring of cement-based materials for works will only be carried out in dry conditions. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings and excess concrete will not be discharged directly into the drainage network. Concrete washout areas will be created to avoid any accidental discharge from the proposed development site. The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures. Hydrocarbons and other construction chemicals The following mitigation measures will be implemented during the construction phase to prevent any spillages to ground of fuels and other construction chemicals and prevent any spillages resulting to surface water and groundwater systems: • Designation of bunded refuelling areas on the site; • Provision of spill kit facilities across the site; • Where mobile fuel bowsers are used, the following measures will be taken: » Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use; » the pump or valve will be fitted with a lock and will be secured when not in use; » All bowsers to carry a spill kit and operatives must have spill response training; » Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

Aspect	Construction Phase Mitigation
	In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted: • Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area; • Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/ container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal. • Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage; • All drums to be quality approved and manufactured to a recognised standard; • If drums are to be moved around the Site, they will be secured and on spill pallets; • Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site). In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “<i>Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors</i>” (CIRIA 532, 2001) will be complied with. All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at a designated wash out point on site. Environmental Procedures There will be comprehensive emergency response procedures and standard operating procedures to respond to chemical spillage all types. All employees will be provided with such equipment, information, training and supervision as is necessary to implement the emergency response procedures and standard operating procedures. The predicted impact on land and soils during the construction phase is neutral, imperceptible and short-term, the magnitude of impact is considered negligible.
Water & Hydrology	Construction Environmental Management Plan Paul Mc Grail Consulting Engineers Limited have prepared a Construction Environmental Management Plan (CEMP) (2025) in respect of the subject development that is included with the application documentation. It contains best practice measures and protocols to be implemented during the construction phase of the proposed development to avoid / minimise environmental impacts. This outline and explains the construction techniques and methodologies which will be implemented during construction of the proposed development. Construction works and the proposed mitigation measures are informed by best practice guidance on the prevention of pollution during development projects including but not limited to: Construction Industry Research and Information Association (CIRIA), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532); Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (4th edition), (C741); and Enterprise Ireland Best Practice Guide, Oil Storage Guidelines (BPGCS005). The CEMP will be implemented and adhered to by the construction Contractor and will be overseen and updated as required if site conditions change by the Project Manager, Environmental Manager, Resource Manager, and Ecological Clerk of Works where relevant. All personnel working on the Site will be trained in the implementation of the procedures. The CEMP sets out the proposed procedures and operations to be utilised on the proposed construction site to protect water quality. The mitigation and control measures outlined in the CEMP will be employed on site during the construction phase. All mitigation measures outlined here, and within the CEMP will be implemented during the construction phase, as well as any additional measures required pursuant to planning conditions which may be imposed. Surface Water Management Plan The CEMP will include preparation of a surface water management plan to ensure all run-off water is discharged through an attenuation pond. This allows for attenuation and collection of contaminated water in the event of an accidental discharge of alkaline water/hydrocarbons. During construction a site drainage and protection system will be built to collect run-off from the site, prevent soil erosion, and protect water quality in the River Tolka. Temporary excavated channels, bunds, silt fences, or ridges or a combination of the three, may be constructed to manage sediment-laden water. Temporary surface water management systems, and a treatment train (if required) with attenuation will throttle runoff and allow suspended solids to be settled out and removed. The surface water management plan should include daily monitoring of the discharge to the attenuation pond including at minimum visual monitoring of colour (suspended solids), iridescence presence or absence, pH and conductivity.

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Aspect	Construction Phase Mitigation
	Management of Soil & Silty Runoff In addition to provision of the attenuation pond prior to discharge the following silt control measures are planned: During earthworks and excavation works care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. Silt deposited during construction will be removed. Any hard surface site roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only. A power washing facility or wheel cleaning facility will be installed near to the site compound for use by vehicles exiting the site when appropriate. A stabilised entranceway consisting of an aggregate on a filter cloth base that is located at any entry or exit point of the construction site. Aggregate will be established at the site entrance points from the construction site boundary extending for at least 10 m. The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. Construction materials, including aggregates etc. will be stored a minimum of 20-meter buffer distance from any surface water bodies and surface water drainage points. Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a secure compound area to prevent contamination. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site. Any surface water run-off collecting in excavations will likely contain a high sediment load. This will be diverted to settlement ponds and will not be allowed to directly discharge to existing onsite concrete storm water sewer drains within the site boundary or the River Tolka. In addition to the measures above, all excavated materials will be visually assessed by suitably qualified persons for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor. Cement/Concrete Works Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. No wash-down or wash-out of ready-mix concrete vehicles during the construction works will be carried out at the site within 10 meters of an existing surface water drainage point. Washouts will only be allowed to take place in designated areas with an impervious surface where all wash water is contained and removed from site by road tanker or discharged to foul sewer submit to agreement with Irish Water / Meath Co. Co. The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures. Riparian buffers will be implemented in compliance with INF OBJ 30 (Meath County Development Plan 2021-2027; “To establish riparian corridors free from new development along all significant watercourses and streams in the County as follows: A 10 metre wide riparian buffer strip measured from the top of the bank either side of all watercourses in urban areas; A 30m wide riparian buffer strip from top of bank to either side of all watercourses is required as a minimum outside of urban areas”. Material Storage and Handling The following mitigation measures will be implemented during the construction phase in order to prevent any spillages to ground, of fuels and other construction chemicals, and prevent any discharges to surface water and groundwater systems: Designation of bunded refuelling areas on the site. Provision of spill kit facilities across the site.

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Aspect	Construction Phase Mitigation
	Where mobile fuel bowzers are used, the following measures will be taken: Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use. The pump or valve will be fitted with a lock and will be secured when not in use. All bowzers to carry a spill kit and operatives must have spill response training. Portable generators or similar fuel containing equipment will be placed on suitable drip trays. In the case of drummed fuel or other potentially polluting substances which may be used during the construction phase, the following measures will be adopted: Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area; Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be stored within temporary bunded areas, doubled skinned tanks or bunded containers to a volume of 110% of the capacity of the largest tank/container. Drainage from the bunded area(s) shall be diverted for collection and safe disposal. Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage. All drums to be quality approved and manufactured to a recognised standard. If drums are to be moved around the site, they will be secured and on spill pallets; and Drums will be loaded and unloaded by competent and trained personnel using appropriate equipment. Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area or within the construction compound (or where possible off the site) which will be away from surface water gullies or drains minimum 20 m buffer zone. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as “Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors” (CIRIA 532, 2001) will be complied with. The construction contractor will be required to implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures. Wastewater Management Foul wastewater discharge from the site will be managed and controlled for the duration of the construction works. Site welfare facilities will be established to provide sanitary facilities for construction workers on site. The main contractor will ensure that sufficient facilities are available at all times to accommodate the number of employees on site. Foul drainage from site offices and compound, where not directed to the existing wastewater network, will be contained and disposed of off-site in an appropriate manner and in accordance with the relevant statutory regulations to prevent the pollution of watercourses. The construction contractor will implement emergency response procedures, and these will be in line with industry guidance. All personnel working on the site will be suitably trained in the implementation of the procedures. Human Health and Populations It has been established that there are no recorded Recreational Waters, Bathing Waterbodies, or Surface Water Drinking RPA, located in the vicinity of the site. However, there is a Groundwater Water PWS source protection zone (SPZ). As outlined in the risk assessment presented in Appendix 6.3, on a precautionary basis, the mitigation measures will include implementation of a surface water management plan during construction and measures described above to manage any accidental spills to ground. Potential Impacts on Water Framework Directive Status Even in the absence of the mitigation measures detailed in Section 6.6, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland. There are appropriately designed mitigation measures which will be implemented during the construction phase to protect the hydrological environment. There is a potential of accidental discharges during the construction phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment.

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Aspect	Construction Phase Mitigation
Air Quality	Construction Phase Mitigation The proposed development has been assessed as having a medium 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 medium 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.
	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.

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Aspect	Construction Phase Mitigation
	<i>Waste Management</i> Avoid bonfires and burning of waste materials. <i>Measures Specific to Demolition</i> 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. <i>Measures Specific to Earthworks</i> 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. <i>Measures Specific to Construction</i> 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. <i>Measures Specific to Trackout</i> 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 logbook. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsters 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. <i>Monitoring</i> 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.

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Aspect	Construction Phase Mitigation
Climate Change	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. • Waste materials will be re-used on site where possible and where re-use is not possible on-site, they will be sent off-site for recycling, re-use or recovery. • Sourcing materials locally where possible to reduce transport related CO2 emissions. • Material choices and quantities will be reviewed during detailed design, to identify and implement lower embodied carbon options where feasible.
	The project developer, Marina Quarter Ltd. (Glenveagh Properties), has committed to achieving Net Zero by 2050 across its whole business. Therefore, the proposed development will be built with carbon reduction and sustainability in mind and will include reductions of embodied emissions during the construction phase. Glenveagh Properties have published a Net Zero Transition Plan and Annual Reports which detail a commitment to achieving Net Zero by 2050.
	The above listed measures are supported by Glenveagh Properties PLC’s Net Zero Transition Plan 2023, published in March 2023, which identifies the sources of Glenveagh Properties PLC’s emissions and proposed measures to reduce these. A commitment to achieve a 55% reduction in Scope 3 (construction methods) emissions intensity (tCO2e per 100 m2 of complete floor area) by 2031 (using 2021 as the baseline year) will involve supplier engagement to make informed procurement decisions, engaging with subcontractors to support their transition to less carbon intensive fuels (diesel and gas oil is currently the norm) and investing in innovation of designing and building homes to reduce their associated embodied carbon. A reduction target of 46.2% by 2031 is also set in the plan for Scope 1 and 2 emissions (company operations). All targets have been validated by the Science Based Targets initiative (SBTi).
	The Science Based Targets initiative (SBTi) is a corporate climate action organisation, incorporated as a charity, which develops standards, tools and guidance enabling companies to set GHG emissions reductions targets in line with net-zero by 2050 at the latest. Science-based targets show companies and financial institutions how much and how quickly they need to reduce their GHG emissions to prevent the worst effects of climate change (SBTi, 2024a). Glenveagh Properties PLC is one of the over 4,000 companies and financial institutions who have had their emission reduction targets validated by the SBTi (Glenveagh’s targets can be searched in the SBTi’s target dashboard (SBTi, 2024b)).
	Glenveagh Properties PLC’s Full Year 2024 Results, published in March 2025, identified that Scope 3 emissions are 7% below the 2021 baseline, measured on an intensity basis (tCO2e per 100m2). This is primarily due to the focus on the energy efficiency of the residential units. Scope 1 and 2 emissions decreased by 47% compared to 2021 baseline, which can be attributed to the first full year HVO (hydrotreated vegetable oil) was used across all sites as a replacement to diesel.
	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.

Aspect	Construction Phase Mitigation
Noise & Vibration	Construction Phase Mitigation With regard to construction activities, best practice operational and control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2. BS5228 includes guidance on several aspects of construction site practices, including, but not limited to: - • Selection of quiet plant. • Control of noise sources. • Screening (boundary, and or localised plant screening). • Hours of work. • Liaison with the public. Monitoring. Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring. Selection of Quiet Plant This practice is recommended in relation to sites with static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers’ proprietary acoustic enclosures where possible. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Noise Control at Source If replacing a noisy item of plant is not a viable or practical option, consideration should be given to noise control “at source”. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. BS5228 states that “as far as reasonably practicable sources of significant noise should be enclosed”. In applying this guidance, constraints such as mobility, ventilation, access and safety must be taken into account. Items suitable for enclosure include pumps and generators. BS5228 makes a number of recommendations in relation to “*use and siting of equipment*”. These are all directly relevant and hence are reproduced below. These recommendations will be adopted on site. <i>"Plant should always be used in accordance with manufacturers’ instructions. Care should be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading should also be carried out away from such areas.</i> <i>Machines such as cranes that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Machines should not be left running unnecessarily, as this can be noisy and waste energy.</i> <i>Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise-sensitive areas. Attendant operators of the plant can also benefit from this acoustical phenomenon by sheltering, when possible, in the area with reduced noise levels.</i> <i>Acoustic covers to engines should be kept closed when the engines are in use and idling. The use of compressors that have effective acoustic enclosures and are designed to operate when their access panels are closed is recommended.*</i> <i>Materials should be lowered whenever practicable and should not be dropped. The surfaces on to which the materials are being moved could be covered by resilient material."</i> Other forms of noise control at source relevant to the development works are set out below: - For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should 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 muffler or sound reducing equipment to the breaker ‘tool’ and ensure any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries. For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.

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Aspect	Construction Phase Mitigation
	For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials. Demountable enclosures can also be used to screen operatives using hand tools/ breakers and will be moved around site as necessary. All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures. Screening Typically screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver. Screening may be a useful form of noise control when works are taking place at basement and ground level to screen noise levels at ground floor adjacent buildings. In addition, careful planning of the site layout should also be considered. The placement of site buildings such as offices and stores and in some instances materials such as aggregate can provide a degree of noise screening if placed between the source and the receiver. The use of localised mobile (mobile hoarding screens and / or acoustic quilts) to items of plant with the potential to generate high levels of noise are an effective noise control measure. These options should be considered when percussive works are taking place in close proximity to the nearest sensitive perimeter buildings. Liaison with the Public A designated noise liaison should be appointed to site during construction works. All noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, prior to particularly noisy construction activity, e.g. demolition, breaking, piling, etc., the liaison officer should inform the nearest noise sensitive locations of the time and expected duration of the noisy works. Hours of Work Construction works will be undertaken within the times below, taken from the Section 6 of the Draft Construction Management Plan: - Monday to Friday: 07:00 to 19:00hrs Saturday: 07:00 to 14:00hrs Sunday and Public Holidays: No noisy work on site.

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Aspect	Construction Phase Mitigation
Material Assets: Waste	The following mitigation measures will be implemented during the construction phase of the proposed development: - As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of the EPA ‘Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects’ (2021) and is included as Appendix 10.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of the mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development. • Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 10.1) in agreement with MCC and in compliance with any planning conditions, or submit an addendum to the RWMP to MCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream. • The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases. A quantity of topsoil and sub soil will be excavated to facilitate the proposed development. The project engineers (Paul McGrail Consulting Engineers) have estimated that none of the excavated material will be removed off-site, and it will be retained on site for reuse as fill and/or landscaping purposes. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. In addition, the following mitigation measures will be implemented: • Building materials will be chosen to ‘design out waste’; • On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated: » Concrete rubble (including ceramics, tiles and bricks); » Plasterboard; » Metals; » Glass; and » Timber. • Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal); • All waste materials will be stored in skips or other suitable receptacles in designated areas of the site; • Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required); • A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works; • All construction staff will be provided with training regarding the waste management procedures; • All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal; • All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and • All waste leaving the site will be recorded and copies of relevant documentation maintained. Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 (By-products), as amended, European Union (Waste Directive) Regulations 2011-2020. EPA approval will be obtained prior to moving material as a by-product. These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997 and the NWCP. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.
Landscape and Visual	Provided that the existing boundary vegetation is retained and protected as shown in the proposed layouts, no significant landscape nor visual impacts are expected during construction. Less visually intrusive hoarding is recommended if required to reduce visibility of moving plant from outside the site.

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Aspect	Construction Phase Mitigation
Material Assets: Traffic & Transport	The following mitigation measure shall apply during the construction stage: • All construction activities will be managed and directed by a Construction Traffic Management Plan (CTMP). The details of the CTMP will be agreed with the roads department of the Local Authority in advance of construction activities commencing on-site. • Below is a list of proposed traffic management measures to be adopted during the construction works by the Contractor. Note that this is not an exhaustive list, and it will be the appointed contractor's responsibility to prepare a detailed Construction Traffic Management Plan to be approved with the Planning Authority prior to commencement of construction. • Warning signs / Advanced warning signs will be installed at appropriate locations in advance of the construction access; • Construction and delivery vehicles will be instructed to use only the approved and agreed means of access and movement of construction vehicles will be restricted to these designated routes; • Restriction of HGV movements during drop off and pick up times associated with the adjacent schools; • Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material; • Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within the Site; • Parking of Site vehicles will be managed, and will not be permitted on public roads, unless proposed within that designated area that is subject to traffic management measures; • A road sweeper will be employed to clean the public roads adjacent to the Site of any residual debris that may be deposited on the public road leading away from the construction Site; • On Site wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the Site, to avoid any potential for debris on the local roads; • All vehicles will be suitably serviced and maintained to avoid leaks or spillage of oil, petrol or diesel. Spill kits will be available on Site. All scheduled maintenance carried out off Site will not be carried out on the public highway; and, • Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footway. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users and mobility impaired persons. • HGV movements will be managed so as not to occur during the network traffic peak period, particularly the AM school drop off period. The above mitigation measures will minimise any significant environmental degradation or safety concerns in the vicinity of the proposed works, due to the presence of construction traffic. Furthermore, it is in the interest of the construction programme that deliveries, particularly concrete deliveries are not unduly hampered by traffic congestion, and as a result continuous review of haulage routes, delivery timings and access arrangements will be undertaken as construction progresses to ensure smooth operation.
Material Assets: Built Services	The following mitigation measures are proposed for the construction phase of the development with respect to Material Assets: • The proposed development will comply with the provisions of the Construction Waste Management Plan with respect to construction waste. • The proposed development will comply with the provisions of the Construction Environmental Management Plan. • Water metering will be provided during the construction phase to record consumption. • All new services will be constructed and provided in strict accordance with the relevant codes of practice.

Aspect	Construction Phase Mitigation
Biodiversity	Mitigation 1: Pre-construction Surveys : Badger and Otter A minimum of 2-3 months prior to the commencement of works on Site (including enabling works), a suitably qualified Ecologist will be instructed to carry out surveys of the Site and river Tolka upstream and downstream of the proposed bridge crossing, for the below listed species. The results of these pre-commencement surveys will be provided to Meath CoCo prior to commencement of works on Site. • Badger. • Otter. These pre-commencement surveys will ensure that no change has occurred in the status of these species at or near the Site since planning was submitted. The above surveys should confirm whether any nesting/resting places etc., for the above species have occurred since previous surveys and will advise further mitigation measures as required.
	Mitigation 2 : Provision of a Mammal Underpass under the R157 The suspected existing mammal underpass under the R157 will be retained or replaced as part of the Proposed Development and road junction at the main eastern entrance to the Site. The underpass will be decommissioned under the watching brief of the Project Ecologist/ECow to ensure no impacts to mammals occur. Should the underpass require removal, a suitable replacement will be provided as part of the Proposed Development to ensure that mammal connectivity east and west of the R157 is maintained into the future. Any new underpass will be designed with the input of the ECow/Ecologist and signed off by Meath CoCo to ensure that it is an effective and suitable replacement. Any new underpass to be constructed will be located as close to the existing mammal underpass as possible.
	Mitigation 3: Tree Protection Measures 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. The project Arborist will be instructed prior to commencement on Site; to ensure that appropriate tree protection measures are in place. These measures will entail <u>robust fencing</u> around the root protection zones of all trees and hedgerows being retained on Site. An adequate level of signage will also be provided to highlight ‘<u>no work zones</u>’ and <u>ensure that Site creep and damage to retained habitats does not occur</u>. The <u>areas of hedgerow that are to be retained</u> at the Site must be sufficiently protected for the duration of the Construction Phase to ensure maximise their value in the final landscape plan. The <u>drainage ditches and their riparian buffers</u> must also be suitable protected for the duration of the works until their landscaping is to be carried out. The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of hedgerow protected for the duration of the works.
	Mitigation 4: Construction Environmental Management Plan (CEMP) A CEMP based on the mitigation commitments presented in the various EIAR Chapters and this NIS, will be prepared for the Construction Phase. A planning stage CEMP has been prepared for submission with the planning application (PMG, 2025a), which entails an Environmental Management Section. This outline document provides a framework for the contractor to develop further as the project moves into the Construction Phase. The Construction Phase CEMP will collate and set out the environmental control measures required to minimise, and control adverse environmental impacts associated with the Proposed Development. It is intended that the CEMP will be a live document, which will capture all Construction Phase environmental mitigation measures included within the EIAR, NIS and any other measures which become apparent through the EIA consultation process and/or are prescribed through planning conditions etc. The CEMP will include enabling and decommissioning works. • All construction and operations are to be carefully planned and implemented with a series of environmental management and control procedures. The CEMP will detail the general pollution prevention principles and measures which are to be implemented, water and sediment management measures to prevent pollution during the Construction Phase and measures to ensure the potential for pollution fuel, oil, chemicals and other construction materials is minimised. • The Contractor shall engage a suitably experienced ecologist, the Project Ecologist, who will be a full member of a relevant professional institute such as CIEEM, have relevant experience in the management of ecological constraints during construction. The Project Ecologist shall be appointed sufficiently in advance of construction to arrange for any mitigation requirements to be incorporated into the CEMP and any site-specific method statements.

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Aspect	Construction Phase Mitigation
	• The construction management of the Site will take account of the recommendations of the Construction Industry Research and Information Association (CIRIA) guides ‘Control of Water Pollution from Construction Sites’ and ‘Groundwater control - design and practice’ to minimise as far as possible the risk of pollution. • The Contractor shall take all necessary precautions to prevent pollution or siltation of surface or groundwaters from construction activities; with a particular focus on the <u>protection of existing drainage ditches and the River Tolka</u>. The following management, control and mitigation measures will be implemented: » Any groundwater temporarily dewatered during the construction of the attenuation basins and any deep building foundations will be treated via the installation of a temporary <i>in-situ</i> water treatment system. » This system should be designed and sized to ensure that all pumped groundwater water is treated prior to discharge to a selected onsite location (via a temporary soakaway). » The Contractor will be required to provide a site-specific dewatering plan, clearly setting out proposed excavation methodology, estimated dewatering rates, details of the proposed treatment system, and discharge location. » Surface water attenuation measures are to be designed which will not be overwhelmed by one-off adverse precipitation events. » Where practical, cut-off V drains will be utilised to divert water entering Site and reduce the amount of water to be managed on-Site. Attention will be given to the maintenance and protection of all drains and temporary channels to minimise scour and the mobilisation of suspended solids (e.g. lining with hessian or clean stone, check dams, silt fencing etc.). » Mud will be controlled at entry and exits to the site using wheel washes and/or road sweepers, and tools and plant will be washed out and cleaned in designated areas. Wheel washings will be contained and treated prior to discharge. » Runoff will be directed to and intercepted by temporary settlement lagoons. The size of the settlement lagoon will be determined from predicted flow rates and retention times based on sediment particle size and density. » Neither groundwater nor surface water runoff from the working areas will be permitted to discharge directly to the environment (e.g., existing ditches or River Tolka). Runoff generated within the site during construction will be filtered and treated to remove hydrocarbons and sediment. Total Suspended Solids (TSS), pH/EC and colour will be monitored daily and outlets from sedimentation ponds will incorporate a turbidity monitor with alarm at a high level. » Subject to consent, water that is unpolluted, aside from its silt content, may be pumped out over adjacent vegetated ground, where appropriate, with consideration given to groundwater level and saturation, wildlife importance and proximity to drainage channels. » In the event of surface water failing to meet the required standards water will be recirculated to the inlet of the sediment pond to provide further time for settlement. A penstock will be provided on the outlet from the sediment pond to control discharge from the site. » The performance of the surface water drainage network will be maintained and monitored throughout the construction of the Proposed Development, noting that the proposed storm system will include permanent hydrocarbon separators. » Where the Contractor utilises pumping to drain works areas, a back-up pump and generator must be provided on Site for use in the event of the primary pump failing. » Procedures are to be put in place to ensure the identification, remediation and correct reporting of any silt or other pollution incidents that may occur. • During localised construction works along existing drainage ditches (e.g., to facilitate the realignment and culverting of parts of the ditch in the south-west of the Site and construction of headwalls/outfalls), a construction methodology will be drawn up. This will detail the approach to the construction and installation of culverts along the southern drainage ditch that runs along the proposed link-road (both the western and eastern sections) and the slight realignment of the western section of said ditch (See Figure 14-4). • Any such works e.g., realignment/re-profiling of ditch and channel, are to take part in dry weather conditions, when the ditch bed is dry, to minimise sedimentation of watercourses downstream. • Any minor volumes of stripped soils from these works will be stockpiled a minimum distance of 10m from the channel and will be appropriately covered. A temporary stormwater management system will be implemented by the Contractor. • Areas will be designated where stockpiles will be established in order to facilitate the efficient transfers of material within the Site. Stockpiles will be stabilised as soon as possible (e.g. sealed, closed over, seeded or covered using geotextile mats), and bunded by earth or silt fences at the toe to intercept silt-laden runoff during rainfall events. • Appropriate working practices to avoid the repetitive handling of excavated substrates, minimise vehicle movements, limit the size, number and frequency of stockpiles, reduce the compaction and erosion of soils etc. and control the generation of dust. The implementation of a construction traffic management plan and controls on the locations of plant and materials will minimise the compaction and erosion of soil. Excavation is to be restricted during high winds and heavy rainfall to minimise dust generation and contaminated surface runoff. • Excavated materials are to be inspected for signs of possible contamination, such as staining or strong odours. Should any be noticed, substrates are to be segregated and samples analysed for contaminants to determine an appropriate means of disposal to licensed/permitted facilities appropriate for the waste classification. • In order to prevent any potential surface water/groundwater impacts via release of hydrocarbon/chemical contaminants the following standard measures will be implemented:

Aspect	Construction Phase Mitigation
	RECEIVED: 19/12/2025 • The Contractor will ensure all Site personnel are trained in the handling of materials, the sensitive nature of the receiving environment, the drainage system and the consequences of accidental spillages. » Fuels, lubricants and hydraulic fluids for equipment used on the construction Site, as well as any solvents, oils, and paints, will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to best codes of practice; » Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the Proposed Development for disposal or recycling; » Any spillage of fuels, lubricants or hydraulic oils will be immediately contained and the contaminated soil removed from the Proposed Development and properly disposed of; » All Site vehicles used will be refuelled in bunded and adequately sealed and covered areas in the construction compound area. » Strict supervision of contractors will be adhered to in order to ensure that all plant and equipment utilised on Site is in good working condition. Any equipment not meeting the required standard will not be permitted for use within the Site. This will minimise the risk of groundwater becoming contaminated through Site activity. » All oil stored on Site for construction vehicles will be kept in a locked and bunded area; » Generators, pumps and similar plant will be placed on drip-trays to prevent contamination; » All temporary construction fuel tanks will also be located in a suitably bunded area and all tanks will be double skinned. Relevant Material Safety Data Sheets along with oil absorbent materials will be kept on Site in close proximity to any fuel storage tanks or bowzers during proposed Site development works; and, » All fuel/oil deliveries to on Site oil storage tanks will be supervised, and records will be kept of delivery dates and volumes. » Fixed plant shall be self-bunded; mobile plant shall be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection. Drip trays will be covered, emptied regularly as required and disposed of off Site having regard for local waste management legislation. » Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the Site to reduce the risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points. » Procedures are to be put in place to ensure the identification, remediation and correct reporting of any fuel, oil, chemical or other pollution incidents that may occur. • In order to prevent any potential surface water/groundwater impacts via release of cementitious materials the following measures will be implemented: » No mixing of concrete will be carried in close proximity to existing watercourses or drainage ditches as will be detailed in the CEMP. The measures detailed below will be employed where poured concrete is being used in the construction process; » The production, transport and placement of all cementitious materials will be strictly planned and supervised; » Shutters will be designed to prevent failure. Grout loss will be prevented from shuttered pours by ensuring that all joints between panels achieve a close fit or that they are sealed; » Any spillages will be cleaned up and disposed of correctly; » Where concrete is to be placed by means of a skip, the opening gate of the delivery chute will be securely fastened to prevent accidental opening; » Where possible, concrete skips, pumps and machine buckets will be prevented from slewing over water when placing concrete; » Surplus concrete will be returned to batch plant after completion of a pour; and » The Contractor will dispose of all alkaline wastewaters and contaminated stormwater offsite having regard for local waste management legislation. • The Contractor will implement procurement procedures to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance. • The Contractor will vet the source of aggregate, fill material and topsoil imported to the Site in order to ensure that it is of a reputable origin and that it is “clean” (i.e. it will not contaminate the environment). • All material to be disposed of off Site to a facility licensed having regard for local waste management legislation. Where material is to be stockpiled on site prior to disposal, the Contractor will control all run-off to prevent contamination of surrounding watercourses (via silt-fencing etc.). • The CEMP will include an Emergency Response Plan (ERP) based on the Contractor’s Risk Assessment, to be reviewed and approved by the Project Ecologist. The ERP will include (but not limited to): » Training of relevant staff, including cover staff, in the implementation of the ERP and the use of spill kits; » Procedures to be undertaken in the event of the release of any sediment into a watercourse, or any spillage of chemicals, fuel, oil or other hazardous materials or wastes; » Procedures to be undertaken in the event of any non-compliance incidents with any permit or licence, or other such risks that could lead to a pollution incident, including flood risks; » The number, specification and location of all spill kits which shall be carried/kept on the site; and » Information on clean-up and reporting procedures; etc. While it is expected that the Site drainage system will be installed and commissioned early in the Site construction programme and will therefore be operational for much of the Construction Phase, there will be a period of the construction phase during which the Site drainage system will not be operational. The CEMP is required to cover this period and to deal with other issues during the Construction Phase.

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Aspect	Construction Phase Mitigation
	Mitigation 5: Construction Programme The CEMP will include a section setting out the construction programme and will include all the environmental control measures required to avoid impacts to salmonids and other species, as set out below. All discrete elements involving construction over or within the River Tolka (such as bridge construction, bank works etc) are to be programmed to take place <u>outside the spawning season for salmonids</u> (i.e. these will take place between July and September) to ensure that potential impacts to protected fish species are avoided. Mitigation 6: Bridge Construction The installation of a bridge over the River Tolka will bring works close to the river channel. The proposed bridge has a clear span of 32.712m and traverses a section of the river. Consequently, bridge abutment construction will be several metres away from the channel which will reduce the risk of silt or construction debris entering the watercourse in the event of spillages during the excavation or construction process. During the construction of the bridge, the Contractor will ensure that the river is protected from any inputs of contaminants/pollutants for the duration of the works. To minimise risks, best practise Construction measures for works within, or in the vicinity of watercourses will also be followed as per ‘<i>Guidelines for the crossing of watercourses during the construction of national road schemes</i>’ (TII, 2008) and ‘<i>Control of water pollution from linear construction projects - CIRIA C648</i>’ (CIRIA, 2006). The below measures will be included in the Contractor’s CEMP to prevent the release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters into the receiving surface water network: • A Construction Method Statement for the bridge construction will be prepared by the Contractor and signed off by the Project Ecologist/ECoW. This Method Statement will detail the mitigation/protection measures that will be put in place to protect the river during these works. • All works adjacent to the River Tolka will be carried out in accordance with Inland Fisheries Ireland (IFI), “<i>Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters</i>”. • Prior to commencement on Site, contact will be made with IFI to ensure the works comply with the provisions of the Fisheries Act and Habitats Regulations, and that said works will be in accordance with any detailed operational and construction requirements issued by IFI. • Works will be carried out from the bank side, and in-stream works will be restricted to the period 1st July through 30th September, to comply with the seasonal restrictions in salmonid rivers. • A suitably qualified ECoW will be present on-site during the installation of the bridge and associated bank works. • Wet concrete works in proximity to the watercourse will be avoided as much as practicable and the use of precast elements to form retaining structures and bridge foundations (e.g., segmental retaining walls, driven piles) will form part of the construction specification where feasible in lieu of in-situ concrete alternatives. • It will be ensured that all river protection measures will be maintained in good and effective condition for the duration of the proposed works and checked regularly to ensure that the silt fencing and other mitigation measures are operating effectively. • To prevent elevated levels of erosion and sedimentation at the Site during the Construction Phase, surface water at the Site will be managed and controlled for the duration of the construction works, until the permanent surface water drainage system (including attenuation and storage) for the Proposed Development is complete. • Entry to the river channel by vehicles will be avoided, while vehicle usage along the banks will be restricted as much as practicable. Any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels. • Works involving the breaking of riverbanks e.g., any reprofiling of the riverbank, will be carried out with suitable and effective mitigation in place to minimise/ prevent sediment release to the river i.e., cofferdams, Silt-traps and other suitable in-stream measures for the collection/filtration of sediment. • Suitable temporary erosion control measures will be employed where required, to prevent sedimentation/erosion arising from any newly profiled banks until new vegetation establishes e.g., jute/coir mesh blankets (plastic will be avoided where possible). • Features such as silt fencing and berms, will be installed prior to the commencement of construction to ensure the protection of the river during construction works. A silt fence set back at least 10m from the watercourse will be required, to be constructed of a suitable geotextile membrane to ensure water can pass through, but that silt will be retained. • An interceptor trench will be required in front of the silt fencing where space allows. The silt fence must be capable of preventing 425µ (micron) and above sediment from passing through. It should also be resistant to damage during deformation resulting from loading by entrapped sediment. • The silt fences will be monitored to ensure that they remain functional throughout construction of the Proposed Development. Where necessary, maintenance will be carried out on the fences to ensure that they continue to be effective. This will be particularly important after heavy rainfall events. The checks will be undertaken by a suitably qualified person. The frequency of monitoring will depend on the stage of works, and local environmental conditions. Daily checks may be appropriate during the initial site clearance, during works in the vicinity of the watercourse, and during and after storm events. Weekly or bi-weekly checks may be appropriate at other times. • When cofferdams are being kept dry by pumping, the discharge must be routed to an approved settlement facility before return to the river. • Every care must be taken to insure against spillage of concrete or leakage of cement grout within cofferdams if being used. • In a worst-case scenario where a spillage of pollutants or cement grout etc into the river occurs during the construction of the bridge, the source of the pollution will be addressed immediately and works will cease until the situation has been rectified. • Should such a spillage occur, the project ECoW, Meath CoCo and Inland Fisheries Ireland (IFI) will be contacted and informed immediately.

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	Mitigation 7: Timing of Vegetation Clearance												
	To ensure compliance with the Wildlife Act 2000 as amended, the removal of areas of vegetation <u>will not take place</u> within the nesting bird season (March 1 st to August 31 st 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 14-21 provides guidance for when vegetation clearance is permissible. Information sources include The Herpetological Society of Ireland, British Hedgehog Preservation Society’s <i>Hedgehogs and Development</i> and <i>The Wildlife (Amendment) Act, 2000</i> .												
	Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
	Breeding Birds	Vegetation clearance permissible (Sept - Feb)		Nesting bird season. No clearance of vegetation unless confirmed to be devoid of nesting birds by an ecologist. (Mar - Aug)						Vegetation clearance permissible (Sept - Feb)			
	Bats	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist. (Jan - Aug)								Preferred period for tree-felling (Sep - Oct)		Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist (Nov - Dec)	
	Hibernating mammals (e.g., Hedgehog)	Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. (Jan - Mar)			Vegetation clearance permissible (Apr - Oct)						Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. (Nov - Dec)		
Amphibians	Habitat clearance permissible (Jan - Feb)		Amphibian breeding season (estimated). No habitat destruction (Ponds, drainage ditches) unless confirmed to be devoid of tadpoles and other signs of amphibians. (Mar - June)				Habitat clearance permissible if devoid of tadpoles and signs of amphibians (July - Dec)						
Mitigation 8: Bat Precautions when felling Trees													
Although all trees on Site set for felling have been assessed and confirmed to be of low-negligible bat roost suitability, harm to individual bats is possible should they be present during the felling process. It is also possible that trees can become damaged in the time between the original PBRA survey and the tree felling taking place, and this can sometimes increase the bat roost suitability of a tree, providing new roost features e.g., cracks, holes etc.													
As such, a pre-felling check will be conducted by a suitably qualified Ecologist of all trees to be felled at the Site prior to felling taking place; to ensure that no changes have occurred and that no individual bats will be harmed. In the unlikely event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat.													
It is important to note that permission for the Proposed Development can be granted without any reliance on the potential grant of a derogation licence, and that any references to the potential need to obtain a licence are purely precautionary, as detailed above, and therefore not integral to the decision on whether to grant permission.													

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Aspect	Construction Phase Mitigation
	Mitigation 9: Construction Phase Lighting Any night-time lighting required during the Construction Phase for security etc., will be directed away from the boundary vegetation at the Site (i.e., away from hedgerows and woodland areas), and will not be directed skyward. Lighting will be focused into the centre of the Site and only on equipment and machinery that needs to be illuminated. The Project Ecologist acting as ECoW for the project will review the Construction Phase lighting with the Contractor regularly during their site visits and make recommendations as required to ensure the lighting is maintained as bat friendly for the duration of the works. Mitigation 10: Construction Site Management for Mammals As best-practise all construction-related rubbish on site e.g., plastic sheeting, netting 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. Trenches/pits must be either covered at the end of each working day or include a means of escape for any animal falling in e.g., a plank or objects placed in the corner of an excavation. (Species such as 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 animals gaining access as may happen when contractors are off Site. Mitigation 11: Protection of Drainage Ditches/ Amphibian Habitat For the duration of the Construction Phase, the contractor will ensure that the sections of open drainage ditch that are being retained at the Site will be protected by way of terram silt-fencing and/or staked hay bales along their length. These measures will be located inside the robust protective tree fencing required to protect the hedgerows and the ditches’ riparian buffer. The above measures will be put in place before soil stripping/ excavation activities begin on Site; to protect the drainage ditches from construction related pollutants/ sediments/ oils/ which will undoubtedly be generated on the construction Site nearby once it is operational. The project ECoW will inspect and ensure that these measures are in place and operational for the duration of the works Mitigation 12: Noise Control Noise generated during the Construction Phase of the Proposed Development could cause temporary disturbance to a number of faunal species in the vicinity of the Site of the Proposed Development. To mitigate this disturbance, noise control measures will be adhered to as detailed in the CEMP (PMG, 2025a). Mitigation 13: Dust Control Dust control measures will be adhered to as detailed in the CEMP (PMG, 2025a).

Aspect	Construction Phase Mitigation
Cultural Heritage	There are no extant archaeological sites listed in the SMR/RMP located within the proposed development site. There are also no Protected Structures or structures/gardens listed in the NIAH within the proposed development site, and it is not located within, or in the close environs of, an Architectural Conservation Area. No mitigation measures for the architectural heritage resource are, therefore, required. The programme of geophysical survey was followed by targeted archaeological test trenching within lands on the west side of the Dunboyne Link Road has confirmed the presence of the sub-surface remains of a previously unrecorded enclosure (Anomaly 1) located within the boundary of the proposed development (see Figure 15.10 and Appendix 15.4). In addition, a geophysical survey of lands on the east side of the Dunboyne Link Road, which was carried out as part of the assessment of the proposed Phase 1 development in this area, identified a potential ringfort site (Anomaly M4:4) within the line of a foul sewer which was also included in the Phase 1 and 2 developments (see Figure 15.9 and Appendix 15.5). Following a grant of planning, and in advance of the construction phase, a suitably qualified archaeologist will be appointed to prepare and submit a licence application to the National Monuments to preserve by record (through archaeological excavation) the full extent of the archaeological sites/features located within the boundary of the proposed development. The extent of identified archaeological sites/features that extend outside the boundary of the proposed development (i.e. Anomalies M3:3 and M4:4 in the eastern area) will be securely fenced off for the duration of the construction phase and no works, storage or site traffic will occur at their locations (see Figures 15.8 and 15.9). All archaeological excavation works to preserve by record identified archaeological remains will be carried out under licence by the National Monuments Service and in advance of construction works at their locations. All required archaeological excavation works, including post-excavation analyses and reporting, will be carried out in accordance with the archaeological method statement submitted to the National Monuments Service and the National Museum of Ireland as part of the licence application. An archive containing stratigraphic records (including all associated digital and hard copy records and reports) will be submitted to the National Monuments Service upon completion of archaeological works. Any archaeological objects and relevant environmental material retrieved during archaeological excavation works, as well as all relevant reports, including post-excavation analysis reporting, will be provided to the National Museum of Ireland upon completion of all archaeological works. The results of all excavation works will also be published in the Database of Irish Excavation Reports and dependent on the nature of the results, the potential for additional publication in appropriate periodicals/journals will also be appraised. The appointed archaeologist will also carry out further programmes of archaeological test trenching of other green field areas within the proposed development site as a confirmatory measure. This will be carried out in advance of the construction phase under licence by the National Monuments Service and will comprise test trenching of 10-12% of the green field areas. This will include test trenching at the locations of two geophysical anomalies located within a sports pitch area (Anomalies 6 and 7; see Figure 15.8) and the section of the townland boundary between Bennetstown and Dunboyne within the proposed development site. This townland boundary will also be subject to a written and photographic record. Any archaeological remains identified during the test trenching investigations will be cordoned off, recorded in written, drawn and photographic formats and the National Monuments Service notified A report on the test trenching results, including written, illustrative and photographic records, will be submitted to the National Monuments Service, per licensing requirements, who will then be consulted to determine appropriate mitigation measures in the event that previously unrecorded archaeological remains are identified. This will entail either total/partial preservation <i>in situ</i> by avoidance or preservation by record by systematic archaeological excavation of any identified archaeological remains where direct impacts are predicted. An Archaeological Impact Assessment will be produced following the completion of the pre-development mitigation measures, this will also detail proposals for short term (construction phase) and long term (operation phase) preservation measures for any previously unrecorded archaeological remains identified during testing that will be preserved <i>in situ</i>.

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Table 17.3 Operational Mitigation

Aspect	Mitigation
Population & Human Health	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.
Land & Soils	There are no required mitigation measures associated with the operational phase of the proposed development.
Hydrology	Surface Water Quality The proposed development stormwater drainage network design includes sustainable drainage systems (SuDS) these measures by design ensure the stormwater leaving the site is to be attenuated and treated within the new development site boundary to ensure suitable quality. SuDS measures such as Detention Bains will be used to provide attenuation of stormwater runoff and also facilitate some settling of particulate pollutants. Other SuDS measures include Modular Permeable Paving, Swales, Petrol Interceptors and Hydro brake Flow Control. The quality of discharged water to the foul and storm network is expected to be compliant with respective licence conditions following treatment and management. In case of any exceedances of parameters stipulated by discharge permit conditions, water will be retreated on site, or disposed of to a licenced facility. The discharges to storm water and foul water network shall comply with the requirements established in the discharge licence to Meath County Council (for storm water network) and/or Irish Water (for foul water network). Foul Water Drainage A review of the Ringsend Annual Environmental report (2022) confirmed that there is adequate capacity for foul water. The average effluent discharge (Design Flow as constructed), for the Proposed Development is 1.59 l/s which would only equate to 0.014% of the licensed discharge at Ringsend WWTP [peak hydraulic capacity]). Riparian buffers will be implemented in compliance with INF OBJ 30 (Meath County Development Plan 2021-2027). Human Health and Populations On a precautionary basis, the operational mitigation measures for Hydrology and Hydrogeology set out in Section 6.9.4 of the EIAR will be implemented during the operational phase for the protection of human health and populations. There are no proposed discharges to ground as part of the surface water drainage strategy and all surface water is discharged to the existing storm water network via SuDS implementation and foul water discharge is sent to existing the foul sewer network. Therefore, as there are no effects on the hydrogeological and hydrological environment at the proposed development, no mitigation is required. Potential Impacts on Water Framework Directive Status The water framework directive (WFD) assessment is included in Appendix 6.2. Even in the absence of the mitigation measures detailed above, there will be no predicted degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and third cycle river basin management plan (2022-2027) i.e. Water Action Plan 2024 - A River Basin Management Plan for Ireland. There are appropriately designed mitigation measures which will be implemented during the operational phase to protect the hydrological environment. There is a potential of accidental discharges during the operational phase, however these are temporary short-lived events that will not impact on the water status of waterbodies long-term and as such will not impact on trends in water quality and over all status assessment. There are no untreated discharges of wastewater during the operational phase to any open waterbody / watercourse. The discharge to surface water sewer will be adequately treated via SuDS measures, hydro-brake (or equivalent) and oil/water interceptor / separator to ensure there is no long-term negative impact to the WFD water quality status of the receiving watercourse. The SuDS and proposed measures have been designed in detail with the ultimate aim of protecting the hydrological (& hydrogeological) environment. The SuDS and project design measures will be maintained correctly as per specifications to ensure long-term / on-going integrity of same.
Air Quality	The impact of the operational traffic associated with proposed development on air quality is predicted to be not significant with respect to the operational phase in the long term. Therefore, no site-specific mitigation measures are required.

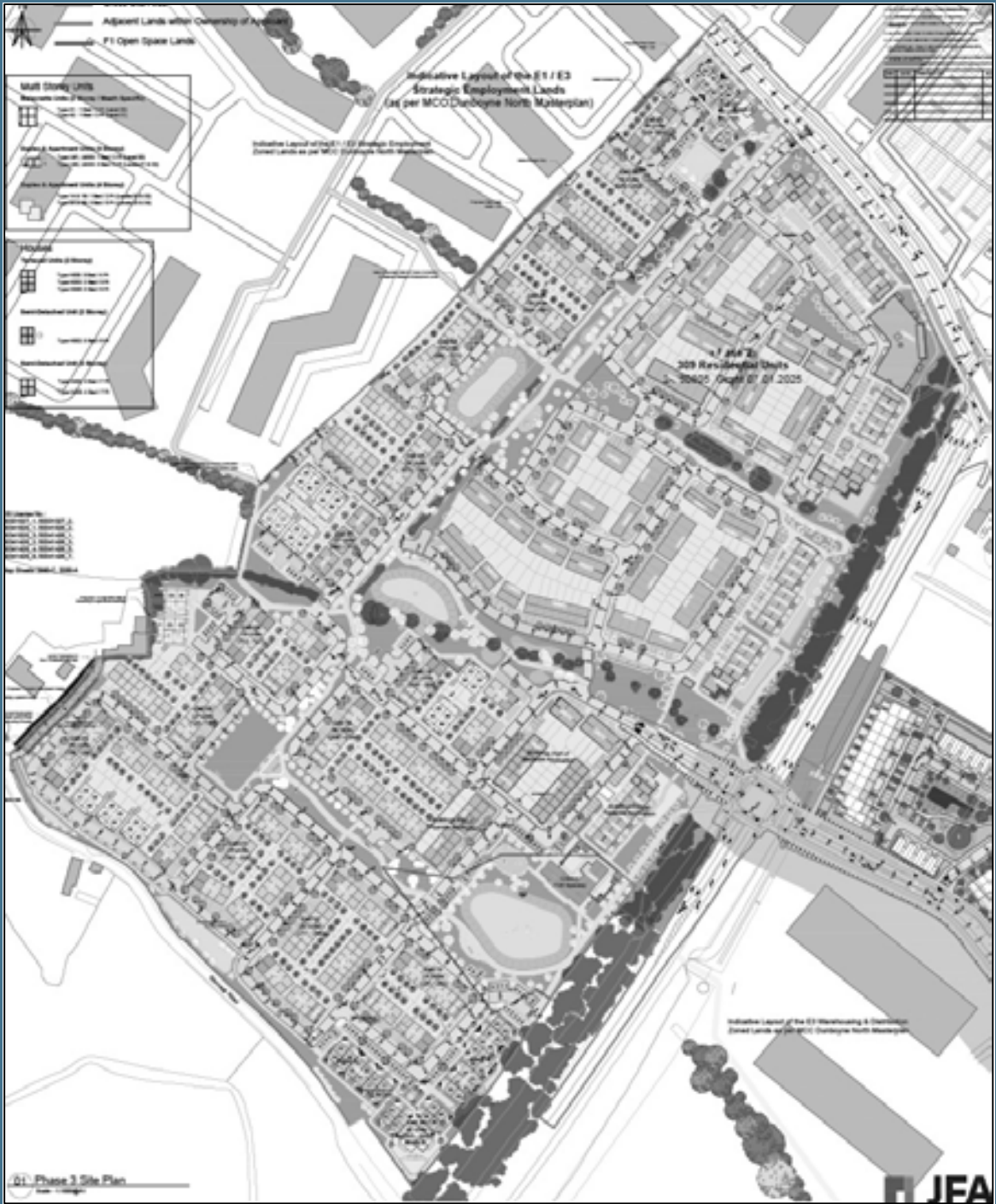
Aspect	Mitigation
Climate	A number of incorporated design mitigation measures have been incorporated into the design of the development to reduce the impact on climate wherever possible. The development will be in compliance with the requirements of the Near Zero Energy Building (NZEB) Standards and will achieve a Building Energy Rating (BER) in line with the NZEB requirements. Such measures included in the proposed development to reduce the impact to climate from energy usage are: • The residential units will aim to achieve a Building Energy Ratio (BER) of A2 (25-49 kwh/m²/yr).; • Achieve air tightness standards of 3 m³/m²/hr; • Ensure thermal bridging details are designed to achieve thermal bridging factors of 0.08W/m²K for the residential units and 0.15 W/m²k for the apartment units; • Energy Performance Coefficient (EPC) < 0.30; • Carbon Performance Coefficient (CPC) < 0.35; • Renewable Energy Ratio (RER) > 0.20; • Meet or exceed minimum U-Value standards identified in Part L 2022 Dwellings; • A combination of low energy strategies such as air to water heat pumps, mechanical ventilation heat recovery and/or natural ventilation will be decided and implemented to achieve A2 BER Rating; • Provide an appropriate combination of technologies to ensure energy consumption is in line with Part L 2022 Dwellings requirements; • Use of natural daylight will be maximised to reduce the need for artificial lighting; • Where artificial lighting is required, this will be in the form of energy efficient LED lighting within in the dwellings and common areas. • Bicycle parking has been incorporated into the development to provide an alternative, more sustainable mode of transport compared to private vehicles. 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. Further details on some of the incorporated design measures can be found in the Climate Action Energy Statement prepared by ENX in respect of this planning application. A number of measures have been incorporated into the design of the development in order 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. These measures have been considered when assessing the vulnerability of the proposed development to climate change (see Section 8.8.2.2).

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Aspect	Mitigation																														
Noise & Vibration	Inward Noise Impact The British Standard BS EN 12354-3: 2000: Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths. The Standard allows the acoustic performance of the building to be assessed taking into account the following: Construction type of each element (i.e. windows, walls, etc.); Area of each element; Shape of the façade, and; Characteristics of the receiving room. The principles outlined in BS EN 12354-3 are also referred to in BS8233 and Annex G of BS8233 provides a calculation method to determine the internal noise level within a building using the composite sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS8233 has been adopted here to determine the required performance of the building facades. This approach corrects the noise levels to account for the frequency content of the source in question. In this instance, rail and road traffic noise, depending on the buildings in question. For properties with cumulative impacts from both rail and road, the frequency content of the dominant source has been used for calculations. As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. Table 9.21 and Table 9.22 provide the calculated specification for glazing and ventilation, respectively.																														
	Table 9.21 Sound Insulation Performance Requirements for Glazing, SRI (dB)																														
	<table><tr><th rowspan="2">Facade</th><th colspan="6">Octave Band Centre Frequency (Hz)</th><th rowspan="2">R_w</th></tr><tr><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr><tr><td>RED</td><td>28</td><td>29</td><td>33</td><td>42</td><td>45</td><td>53</td><td>39</td></tr><tr><td>All Other Facades</td><td>27</td><td>26</td><td>33</td><td>39</td><td>39</td><td>47</td><td>37</td></tr></table>	Facade	Octave Band Centre Frequency (Hz)						R _w	125	250	500	1k	2k	4k	RED	28	29	33	42	45	53	39	All Other Facades	27	26	33	39	39	47	37
	Facade		Octave Band Centre Frequency (Hz)							R _w																					
		125	250	500	1k	2k	4k																								
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All Other Facades	27	26	33	39	39	47	37																								
Table 9.22 Sound Insulation Performance Requirements for Ventilation, SRI (dB)																															
<table><tr><th rowspan="2">Facade</th><th colspan="6">Octave Band Centre Frequency (Hz)</th><th rowspan="2">D_{ne,w}</th></tr><tr><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr><tr><td>RED</td><td>46</td><td>44</td><td>38</td><td>43</td><td>43</td><td>55</td><td>42</td></tr><tr><td>All Other Facades</td><td>30</td><td>33</td><td>38</td><td>37</td><td>36</td><td>36</td><td>38</td></tr></table>	Facade	Octave Band Centre Frequency (Hz)						D _{ne,w}	125	250	500	1k	2k	4k	RED	46	44	38	43	43	55	42	All Other Facades	30	33	38	37	36	36	38	
Facade		Octave Band Centre Frequency (Hz)							D _{ne,w}																						
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All Other Facades	30	33	38	37	36	36	38																								

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Aspect	Mitigation
	Figure 9.6 highlights the RED façades that require the higher level of noise mitigation, all other façades will require the lower level of mitigation.  Figure 9.6 Façade Mitigation

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Aspect	Mitigation
	The assessment is performed for both the residential buildings as well as the childcare facilities located on site. The overall R_w and $D_{ne,w}$ outlined above are provided for information purposes only. The over-riding requirement is that the internal noise criteria is achieved, other combinations of upgraded glazing and ventilation may provide the same or better performance than those outlined within this report. In the context of the acoustic performance specification the ‘glazing system’ is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc. The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses. <i>Wall Construction</i> In general, all wall constructions (i.e. block work or concrete) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50 dB R_w for this construction. Internal Noise Levels Taking into account the external façade levels and the specified acoustic performance to the building envelope, the internal noise levels have been calculated. For all buildings within the development site, the good internal noise levels are achieved with windows closed.
Material Assets: Waste	The following mitigation measures will be implemented during the operational phase of the proposed development: - All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site. As previously stated, a project specific OWMP has been prepared and is included as Appendix 10.2. The mitigation measures outlined in the OWMP will be implemented in full and form part of the mitigation strategy for the site. Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the NWMPCE, Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland and the MCC Waste Bye-Laws. The facilities management company, residents and creche tenants will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse and recovery at the site of the proposed development. In addition, the following mitigation measures will be implemented: • On-site segregation of all waste materials into appropriate categories including (but not limited to): - » Organic waste; » Dry Mixed Recyclables; » Mixed Non-Recyclable Waste; » Glass; » Waste electrical and electronic equipment (WEEE); » Batteries (non-hazardous and hazardous); » Cooking oil; » Light bulbs; » Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.); » Furniture (and from time-to-time other bulky waste); and • All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. • Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials. • The facilities management company, residents and creche tenants will ensure that all waste collected from the site will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and • The facilities management company, residents and creche tenants will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities. These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, the Litter Pollution Act 1997, The NWMPCE and the MCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Aspect	Mitigation
Landscape & Visual	The retained boundary vegetation and proposed planting along the boundaries and areas where existing hedgerows are being removed is contributing to the reduction of the magnitude of change and therefore significance of the assessed impacts. For this reason, it should be followed as submitted.
Material Assets: Traffic & Transport	The proposed development is consistent with all national, regional and local policies. In particular, those policies and objectives aligned with active and sustainable travel and transportation. Some of the mitigation measures proposed by the local and national authorities in the future include the following: • The upgrades of road infrastructure were proposed in the future such as R147/R157 roundabout upgrade to Signalised junction, Signalisation along R147, Signalisation of R157 and Access Junctions, Dunboyne Business Park link to the R157, Eastern Distributor Road (EDR) between Station Road and Dunboyne Business Park and Link between the R157 and the Old Navan Road • The DART + expansion programme, as set out in the Greater Dublin Area Transport Strategy 2016 -2035 (NTA, 2016), it is planned to deliver additional carriages, followed in the longer term by electrification, upgrade and more frequent rail services which will see a train depart every 12 minutes in the peak hour. Customer capacity and train service frequency on these lines will be significantly increased as a result of the programme, delivering a more efficient transport system that allows more people to make sustainable travel choices to meet the goals set out in the State's Climate Action Plan • BusConnects Scheme, N3 Navan Corridor is seen as a 'spine' route which will operate between Blanchardstown and Dublin City Centre with continuous bus priority. Once implemented, Dunboyne will be served by routes 70 and 270 (renamed 364 and 264 respectively) which shall be extended from Dunboyne Town Centre to M3 Parkway to create a multi-modal interchange. These routes will become high frequency feeder routes to a major bus interchange at the Blanchardstown Centre, • The development takes cognisance of the NTA's plans to redesign the bus network and provide a more efficient network with high frequency spines, new orbital routes and increased bus services • The National Remote Work Strategy was published by the Department of Enterprise Trade and Employment which lays out the long-term strategy to promote home and remote working for public sector and private sector employees. The strategy mandates that 20% of the public sector workforce move to home and remote working in 2021. Furthermore, the strategy notes that more than 25% of the private sector workers in Ireland have the ability to work remotely, • The development is adjacent and accessible to Routes DB1, DB2 and M14 of the N5 Greater Dublin Area Cycle Network Plan. Also, the Dunboyne North Masterplan document includes high walking and cycling permeability offering direct routes to local destinations and public transport stops. As per the document, connections will be facilitated through the introduction of north/south links between Dunboyne Town Centre and the Dunboyne North lands through the revitalisation of the Old Navan Road, provision of new pedestrian and cycle routes and in the form of a Linear Park along the Tolka River creating a new amenity for the area and • The propensity for car ownership and car use is managed through measures that include reduced residential parking provision and increased cycle parking provision in line the 'Design Standards for New Apartments'. The provision of car club parking spaces will facilitate a lower level of car ownership. The above mitigation measures will provide alternatives to the private car for making trips and are envisaged to promote low car ownership which will in turn ensure that the level of traffic generation and thus the traffic impact on the local road network is mitigated.
Built Services	• All new foul and surface water drainage pipes to be pressure tested and CCTV to identify any possible defects. • Water conservation measures to be implemented, which include water metering, recycling vehicle wash waters, rainwater capture, low flush, waterless urinals, spray taps, efficiency attachments. • Ensure that all Hydrobrakes are designed to limit the flow of water from the development to the greenfield run off. • All watermain pipes to be pressure tested in accordance with Uisce Eireann details.

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Aspect	Mitigation
Biodiversity	<i>Mitigation 14: Post Construction Bat Lighting Check</i> A post construction check of the proposed lighting will be carried out by a suitably qualified bat ecologist once the development is complete; to ensure that it is operating effectively and that impacts to bats through operational lighting at the Proposed Development are minimised and mitigation has been successful. Where necessary the bat ecologist will make recommendations to address any problem areas for bats and lighting. The bat ecologist will provide the Biodiversity officer/Parks Department of Meath CoCo with a report detailing the survey results and mitigation installed once complete.
	Enhancement Measures
	<i>Enhancement 1: Hedgerow Management Plan</i>
	The existing hedgerows proposed to be retained within the south of the Site, along with any reinstated 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 and the River Tolka riparian corridor to the east.
	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.
	To ensure the retained and newly planted hedgerows provide an adequate replacement of continuous habitat for the hedgerows to be removed at the Site, a Hedgerow Management Plan (HMP) will be prepared by a suitably qualified Ecologist. The HMP will specify the management of the retained and newly planted hedgerows for the party who will take charge of the operational landscape management of the Site. The HMP will be prepared in line with the recommendations made in the Hedgerow Appraisal Report (Enviroguide, 2024c) appended to this Chapter (provided in Appendix 14.5).
	This low-intervention management approach may not be appropriate for internal ornamental hedgerows planted within the main residential component of the Proposed Development, due to aesthetic or logistical reasons, however, it is best suited for the retained existing hedgerow sections within the linear open spaces and the external hedgerows located along the margins of the Site. In the case of this Proposed Development, the retained existing farmland hedgerows are ideal areas for the provision of these semi-natural, high biodiversity value hedgerows <u>The goal of the HMP will be to ensure a semi-natural, network of wildlife corridors is created throughout the Site.</u>
	To mitigate and compensate for the impact of the Proposed Development on hedgerows at the Site, it is recommended that areas of new hedgerows planted at the Site will be maintained in such a way that they achieve the <u>same or higher condition</u> scores as those hedgerows that will be lost as a result of the Proposed Development, namely:
	• Condition Score: Higher than 2- Favourable. • Significance (Ecology) Score: Higher than 2- Moderately Significant.
	In practice, to achieve these scores the new hedgerows should be ultimately have the following characteristics:

- A minimum 2.5m in height.
- A minimum of 2m in width.
- Have a dense base (regardless of whether they are to be topped or ‘escaped’ (un-topped) hedgerows).
- Have >2m meadow margin on one side at least.
- Have <5% gaps.
- Support <20% noxious species and no invasive species.

Generally, hedgerows with high ecological value can be divided into two types of profiles, namely: escaped hedges which remain un-topped but can be side-trimmed, and topped hedges which are trimmed into an A-shaped cross-section with a wide base excluding occasional trees. Both should have a flowering canopy. Although the original hedgerows have the profile of escaped hedges without the dense base, the choice will depend on the feasibility with the Proposed Development.

The period, frequency and intensity of management will depend on the choice of whether escaped hedges, managed with coppicing and laying, or topped hedges are being proposed. In any case, it is desirable that partial cutting/laying is carried out every year, e.g., a third of the entire length of the hedge annually and done in multi-year (three years at the minimum) rotation, and that the management and maintenance is continued in perpetuity, with monitoring conducted until the new hedges achieve the targeted overall scores (for details see Appendix 14.5 –Hedgerow Appraisal Report).

Aspect	Mitigation
	The following measures will also be included in the HMP: • 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. • 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 wildlife. The earlier this is cut; <u>the less food will be available</u> 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 (Blackthorn 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. <i>Methods to Avoid</i> 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. <u>Red-listed bird species Yellowhammer (recorded on Site) in particular nest up until the end of August.</u> 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. <i>Enhancement 2: Bat Boxes</i> By way of enhancement a set of 5 bat boxes will be erected at the Site, on suitably mature trees located along the Site’s boundaries under the guidance of the Project Ecologist. The bat box type installed will be the 2F Schwegler Bat Box or a similar durable woodcrete make. It is understood that Schweglars can be particularly difficult to source in Ireland and so suitable alternatives can be used provided they meet the following criteria: • The bat boxes must be made from a durable, and sufficiently insulated material such as woodcrete. • The bat boxes must be open bottomed or contain their entrance point near the bottom of the bat box so that a build-up of droppings will not prevent the box being used as a long-term roost. The location of bat boxes will be advised by a suitably qualified ecologist but must meet the following criteria: • Be placed a minimum of 4m off the ground. • The bat boxes will not be placed in areas that are subject to lighting, particularly at night. Consideration should be given to placement of bat boxes on trees that are likely to lose their foliage in winter, and how this might increase light levels on boxes that may be harboured by hibernating bats. • Bat boxes should ideally face southeast or southwest, provided they are not exposed to light disturbances in doing so. <i>Enhancement 3: Log Piles for Invertebrates and Fauna</i> Piles of logs and other woody vegetation arising from the proposed tree felling will be left in suitable secluded corners/margins of the Site as advised by the Project Ecologist; to provide habitat for common Frog and small mammals such as Hedgehog. These areas of woody debris will also benefit local invertebrate species through provision of shelter and food sources.
Cultural Heritage	All of the mitigation measures identified in Section 15.4.1 will be enacted and completed prior to and during the construction phase and, therefore, no mitigation measures during the operational phase of the proposed development are predicted.

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CHAPTER EIGHTEEN

SCREENING FOR MAJOR ACCIDENTS



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CHAPTER EIGHTEEN

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CHAPTER 18 | Screening For Major Accidents

18.1 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 (Environmental Impact Assessment) Directive specifies that the EIAR (Environmental Impact Assessment Report) 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.

The HSA does not 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.

18.2 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 6 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, Alternatives, and Population and Human Health chapters.

- Dunboyne Phase 1 Large Scale Residential Development, Dunboyne, Co. Meath
- Rathgowan Large Scale Residential Development, Mullingar, Co. Westmeath
- Parkside 5B Strategic Housing Development, Belmayne, Dublin.

18.3 Proposed Development

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

18.4 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.

18.4.1 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).

18.4.2 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 Atkins and Paul McGrail Consulting Engineers.
- Site plans and drawings prepared and submitted with the planning application.

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18.4.3 Consultation

The Health Safety Authority (HSA) was contacted regarding the proposed development and were notified that an EIAR was being completed. The Authority responding noting that they do not have any observations to forward on the proposed development.

18.5 Difficulties Encountered

There were no difficulties encountered during the compilation of this chapter.

18.6 Baseline Environment

The description of the site context and proposed development is presented in detail in Chapter 2 – Project Description.

18.6.1 Site Description

The site is a greenfield site, located to the north of Dunboyne town centre and west of the R157. The M3 Parkway train station and car park are to the north-east of the site. The surrounding lands comprise primarily agricultural lands which have been zoned for development.

18.6.2 Flood Risk

A Site-Specific Flood Risk Assessment of the site was carried out by IE Consulting (2025). The most immediate and significant hydrological feature in the vicinity of the proposed development site is the River Tolka located 215m to the north and located beyond the eastern boundary of the site (where there is a proposed bridge over the River). There is also a Drainage Channel location in the western area of the site, which converges with the Naulswood Stream at a point located approximately 120m south of the site. There are a number of field drains located within the vicinity of the site that drain into the watercourses described above. These drains generally do not perform a significant drainage function in the vicinity of the site and are mainly agricultural type drains that collect runoff from the adjacent agricultural lands only. There is also an earth bund located along the eastern bank of the River Tolka, which acts as a flood defence to the lands to the east.

The primary potential flood risk to the proposed development site can be attributed to an extreme fluvial flood event in the River Tolka, the Drainage Channel and the Naulswood Stream located in the vicinity of the site. Secondary and residual flood risk can be attributed to a potential pluvial flooding from surface water runoff from adjacent lands, surcharge due to potential blockage of the bridge on the River Tolka 240m downstream of the site, and blockage of existing culverts under the R157.

A detailed flood risk assessment was carried out for potential fluvial flooding and potential pluvial flooding with detailed modelling using flood modeller software, topographical survey data, and LiDAR data for the wider catchment area.

The proposed link road required to accommodate the development under the Dunboyne North Masterplan partially falls within a predictive 1% AEP (1 in 100 year) fluvial Flood Zone 'A' and a 0.1% AEP (1 in 1000 year) fluvial Flood Zone 'B'. The proposed residential development is not at risk of fluvial flooding and is located within Flood Zone 'C'.

In terms of the proposed bridge over the River Tolka, there is no notable impacts on flood levels downstream due to the proposed development including any impacts due to the proposed link road connecting the R157 road to Navan Road.

18.6.3 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 18.1 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.

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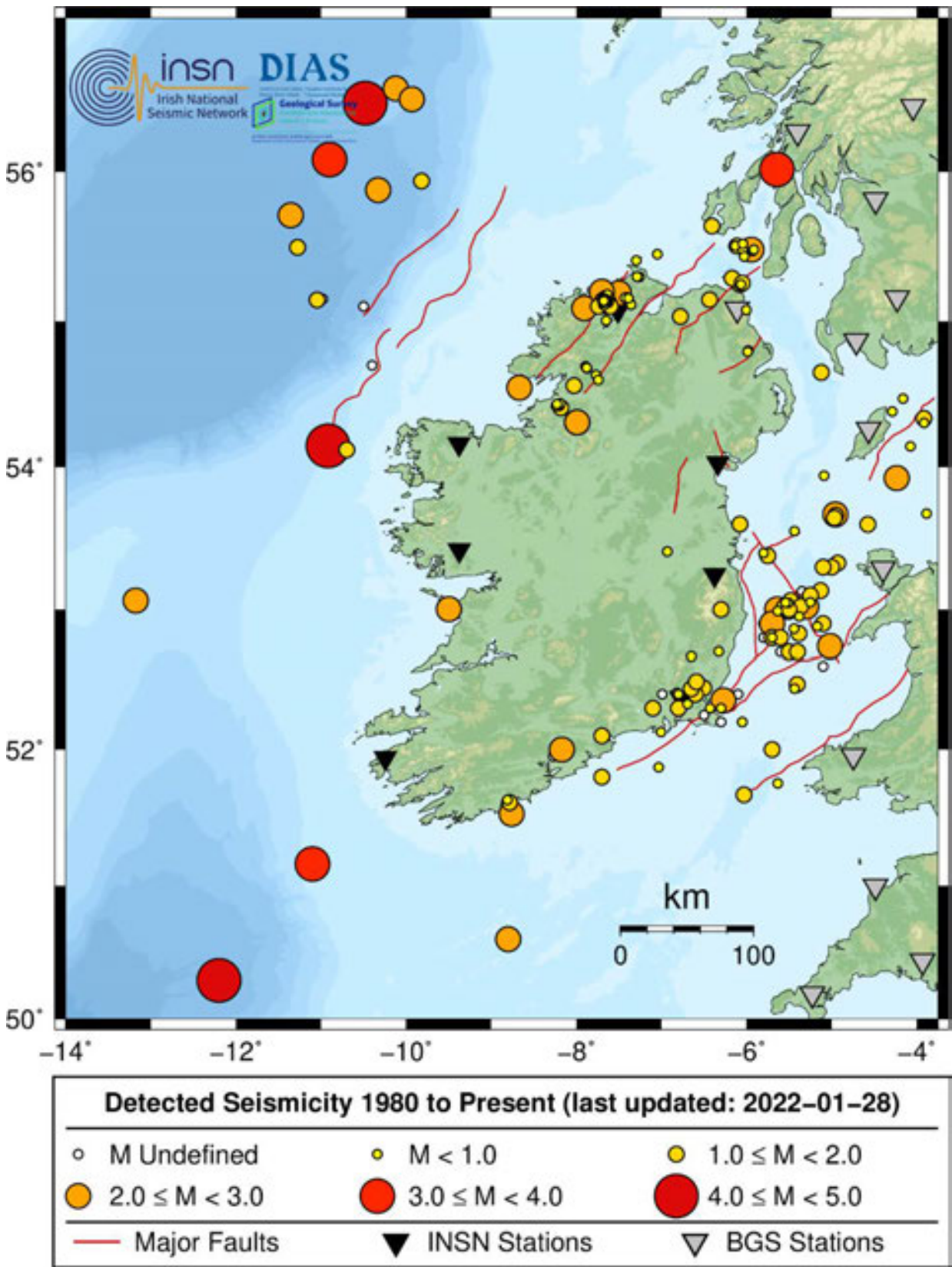


Figure 18.1 Seismic Movements. Source: Irish National Seismic Network

18.6.4 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 seven Seveso sites located in the Damastown Industrial Park and Northwest Business Park in Huntstown which is in the administrative area of Fingal County Council. The closest to the subject site is the Guerbet Ireland ULC Ltd site which is located c. 6.2km from the subject site. This is a ‘Upper tier establishment’ and has a consultation distance of 1,000m. One Seveso site is in the administrative area of Kildare County Council; Intel Ireland Ltd is 10.3km from the subject site. The details of these eight sites are provided in the table below.

Given the distances between the subject site and these Seveso sites, 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.

Table 18.1 Seveso Sites

Site	Tier	Consultation Distance	Distance to Site
Astellas Ireland Co., Ltd.	Lower Tier	1,000m	6km
Clarochem Ireland Ltd., (formally Helsinn),	Lower Tier	1,000m	5.9km
Chemco (Ire) Ltd. T/A Macetown North	Upper Tier	700m	7.8km
Contract & General Warehousing Ltd.	Upper Tier	700m	7.3km
Barclay Chemicals Manufacturing Ltd	Upper Tier	1,000m	7.2km
Guerbet Ireland ULC Damastown	Upper Tier	1,000m	6.2km
Gensys Power Ltd.	Lower Tier	300m	9.1km
Intel Ireland Ltd	N/A	1000m	10.3km

18.7 The 'Do nothing' Scenario

The site will remain as underutilized greenfield area.

18.8 Potential Significant Effects

18.8.1 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.

18.8.2 Operational Phase

The red line boundary includes a portion of land located within the flood zone. None of the proposed residential units or the creche are located within this area and mitigation works will be carried out as part of the proposal to minimise the potential for future flooding events at the subject site as a result of climate change.

The proposed development is not located in 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.

18.8.3 Cumulative Effects

Cumulative impacts are considered imperceptible and neutral.

18.9 Mitigation

18.9.1 Construction Phase Mitigation

No mitigation measures necessary.

18.9.2 Operational Phase Mitigation

Mitigation measures have been designed into the proposal. No further mitigation measures necessary.

18.9.3 Cumulative Mitigation

No mitigation measures necessary.

18.9.4 Monitoring

No monitoring proposed.

18.10 Residual Impact Assessment

18.10.1 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.

18.10.2 Operational Phase

Once the mitigation measures designed into the scheme are implemented correctly, the predicted impact as a result of flooding is long term, imperceptible and neutral.

18.10.3 Cumulative Impact

Cumulative impacts are considered imperceptible and neutral.

18.11 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 Paul McGrail Consulting Engineers and Atkins.

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