

# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

## Environmental Impact Assessment Report

# Volume II



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**Clifton Scannell Emerson  
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# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing Development at  
Barberstown, Barnhill and Passifyoucan, Clonsilla, Dublin 15

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**CHAPTER 1** Introduction to EIAR

**CHAPTER 2** Project Description

**CHAPTER 3** Alternatives Considered

**CHAPTER 4** Landscape and Visual Impact

**CHAPTER 5** Material Assets: Traffic and Transportation

**CHAPTER 6** Material Assets, Service Infrastructure and Utilities

**CHAPTER 7** Land

**CHAPTER 8** Water

**CHAPTER 9** Biodiversity

**CHAPTER 10** Noise and Vibration

**CHAPTER 11** Air Quality

**CHAPTER 12** Climate Change

**CHAPTER 13** Cultural Heritage

**CHAPTER 14** Population and Human Health

**CHAPTER 15** Major Accidents and Disasters

**CHAPTER 16** Significant Interactions of Impacts

**CHAPTER 17** Schedule of Mitigation Measures and Monitoring

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## CHAPTER 1

Introduction to EIAR

# Volume II

Environmental Impact Assessment Report



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# Chapter 1 Introduction to EIAR

## Contents

1	Introduction to EIAR .....	1-2
1.1	Introduction .....	1-2
1.2	Project Description .....	1-2
1.2.1	The Applicant & Land Ownership .....	1-2
1.2.2	Background and Purpose of the EIAR .....	1-4
1.3	Methodology .....	1-5
1.3.1	Study Area .....	1-6
1.3.2	EIAR Structure .....	1-6
1.3.3	EIAR Co-ordination and Study Team.....	1-7
1.3.4	EIAR Study Team Qualifications.....	1-7
1.3.5	Difficulties Encountered in Compiling Information .....	1-7
1.4	Scoping and Public Consultation .....	1-7
1.5	Need for the Scheme .....	1-10
1.6	Cumulative Impacts.....	1-11
1.7	References .....	1-11

## Tables

Table 1.1	EIAR Design Team .....	1-7
Table 1.2	Cumulative Projects .....	1-11

## Figures

Figure 1.1	Application Land ownership Boundaries .....	1-3
Figure 1.2	Lands under Control of FCC highlighted in pink, wayleave in yellow.....	1-4





# 1 Introduction to EIAR

## 1.1 Introduction

This Environmental Impact Assessment Report (EIAR) sets out the results of the environmental assessments which have been completed for a proposed Strategic Housing Development at Barnhill, Clonsilla, Dublin 15, to inform the planning assessment process by An Bord Pleanála.

## 1.2 Project Description

Alanna Homes and Alcove Ireland Four Ltd. are applying for a 10-year permission to An Bord Pleanála under the Planning and Development (Housing) and Residential Tenancies Act 2016 for a Strategic Housing Development (SHD) within the townlands of Barberstown, Barnhill, and Passifyoucan at Clonsilla, Dublin 15. The proposed development will be known as Barnhill Garden Village.

The subject site measures 29.6 ha, a wayleave for twin 110kV lines runs across the north-east corner of the site (highlighted in yellow in Figure 1.2). The proposed development consists of 1,243 residential units, and associated commercial, community and amenity facilities. A detailed description of the proposed development is provided in Chapter 2 of this EIAR.

### 1.2.1 The Applicant & Land Ownership

The application site consists of lands in the sole ownership of Dragonglen Ltd and lands owned jointly by Dragonglen Ltd and Alcove Ireland Four Ltd. (see Figure 1.1), and lands under the control of Fingal County Council (see Figure 1.2 and drawing ref. PLA-11 for more detail).

The application is accompanied by the following consents:

- A letter of consent to include the lands under the control of Fingal County Council (see Figure 1.2).
- A letter of consent from Dragonglen Limited giving consent to Alanna Homes and Alcove Ireland Four Ltd to submit a joint application.
- A letter from Alcove Ireland Four Ltd, noting that Dragonglen Limited have granted consent for the application (on lands within their joint and sole ownership) to be submitted by the joint applicants Alanna Homes and Alcove Ireland Four Limited.

Alanna Homes is an Irish family run property development company, with more than 30 years of experience in building within the Irish and international property sector.

Alcove Ireland Four Ltd. is part of the McGarrell Reilly Group. This family-owned property business was established in 1981 and has extensive experience in the delivery of a broad range of developments, with a particular focus on high quality new homes.

# OSi Land Registry Compliant Map

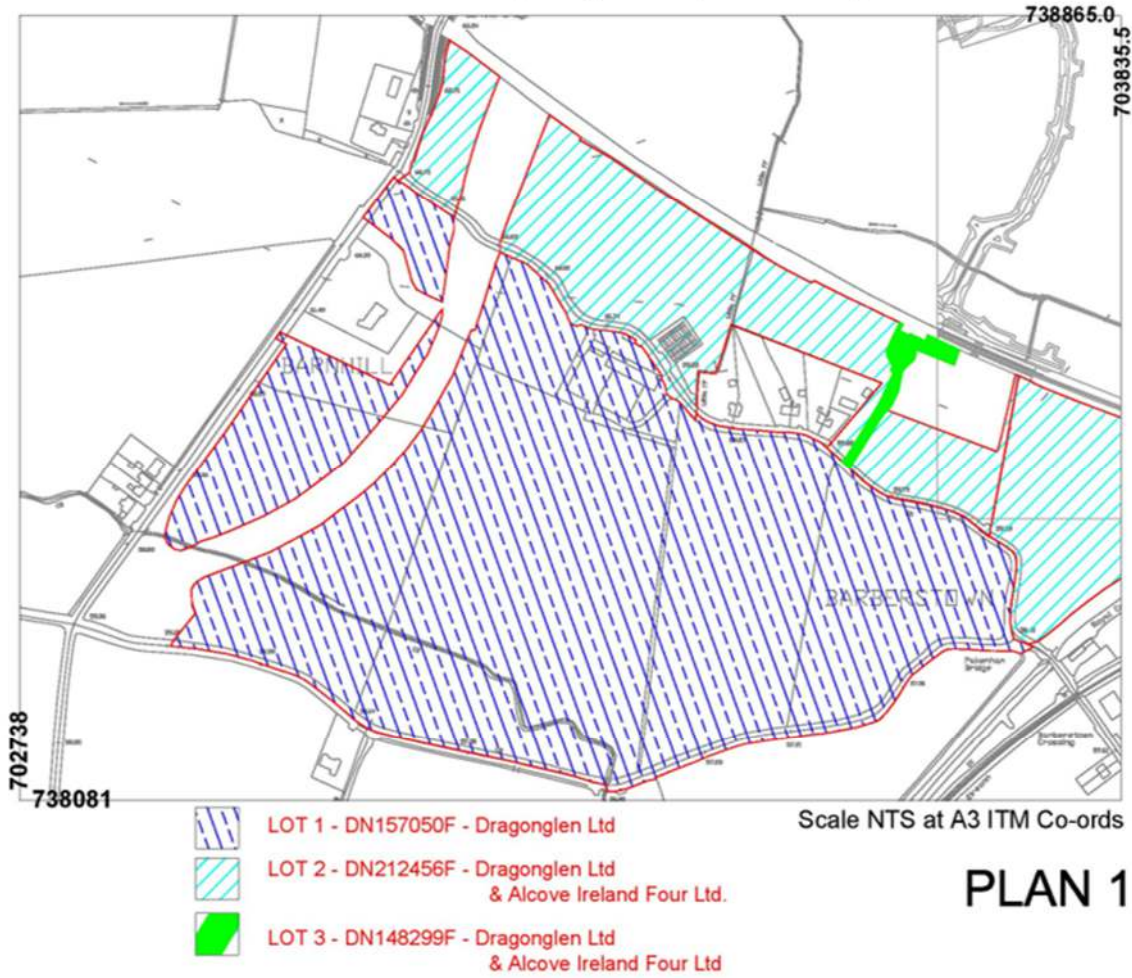


Figure 1.1 Application Land ownership Boundaries



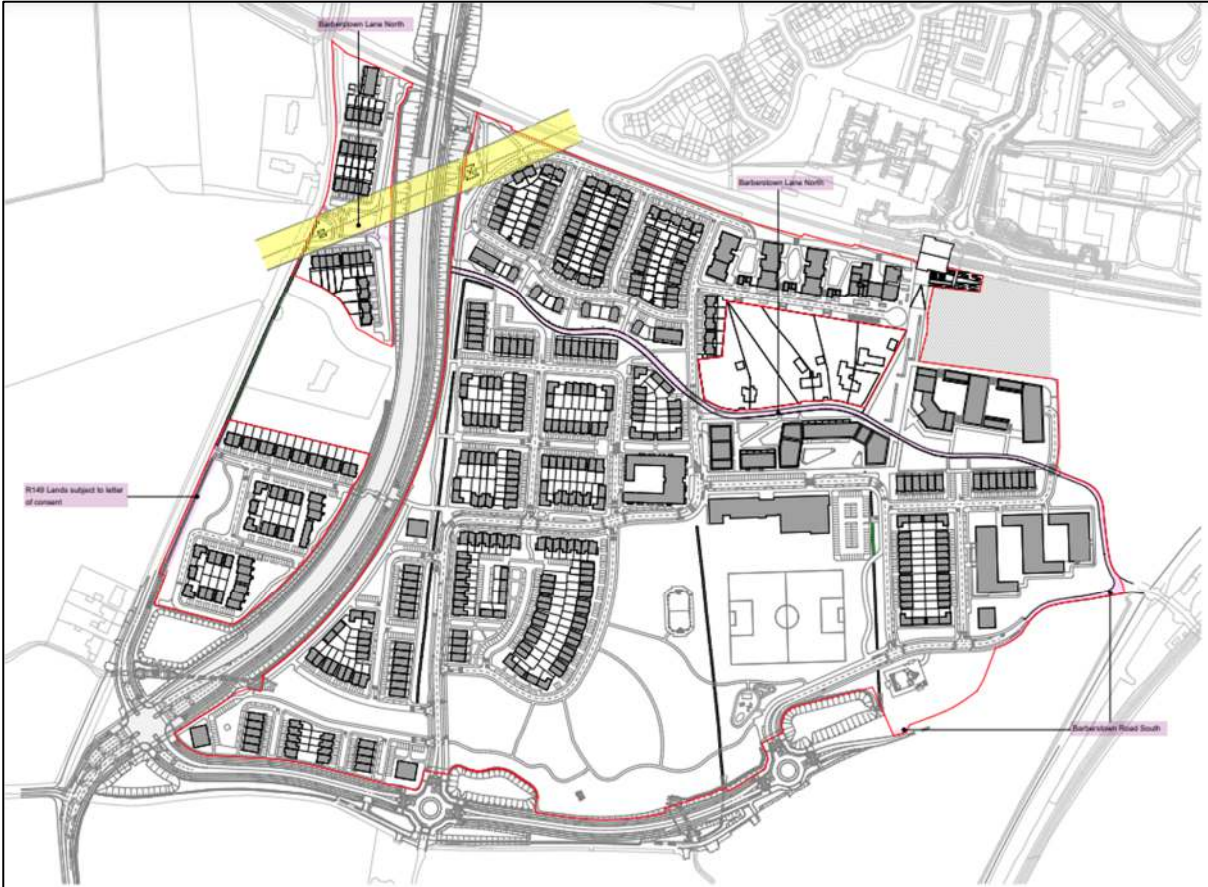


Figure 1.2 Lands under Control of FCC highlighted in pink, wayleave in yellow.

### 1.2.2 Background and Purpose of the EIAR

Where this chapter refers to the ‘amended Directive’ it means the codified Directive 2011/92/EU, as amended by the Directive 2014/52/EU (EIA Directive). The amended Directive has been transposed into the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended).

The proposed development falls within the class of development types requiring an Environmental Impact Assessment (EIA) under Schedule 5 of the Planning and Development Regulations (as amended). The proposed development is subject to Section 10, part 2 of Schedule 5, which deals with infrastructure projects where EIA is required:

*“10. (b) (i) Construction of more than 500 dwellings.*

*(iv) Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and 20 hectares elsewhere.*

*(In this paragraph, “business district” means a district within a city or town in which the predominant land use is retail or commercial use.)”*

It is considered that the Barnhill site constitutes a ‘built-up area’, given its proximity to Hansfield SDZ and therefore the threshold in terms of hectares for requiring an EIA is 10 hectares.

The proposed development includes the construction of 1,243 residential units, on a site area of 29.6 hectares within a built-up area. A mandatory EIAR is therefore required under the provisions of Schedule 5, Part 2, Section 10 (b) (i) and (iv) of the Planning and Development Regulations 2001 (as amended).

EIA is a process for anticipated the effects on the environment caused by a development. Article 1(2)(g) of the amended Directive states that:

*“Environmental impact assessment” means a process consisting of:*

- (i) *The preparation of an environmental impact assess report by the developer, as referred to in Article 5(1) and (2);*
- (ii) *The carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;*
- (iii) *The examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3) and any relevant information received through the consultations under Articles 6 and 7);*
- (iv) *The reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examinations; and*
- (v) *The integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.”*

This EIAR is a presentation of the potential environmental impacts of the proposed development in line with Article 1(2)(g)(i) of the amended Directive.

Annex IX of the amended Directive and Schedule 6 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 specify the information to be contained in an EIAR. These requirements identify a range of prescribed environmental factors, the significant effects of which have been addressed in this EIAR. These include landscape, land and soil, water, air, climate, noise, biodiversity, cultural heritage, and material assets, as well as the inter-relationship between the disciplines.

The preparation of this EIAR was undertaken having regard to the *Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environment Impact Assessment Reports, EPA May 2022* [EPA Guidelines].

Scoping and baseline analysis work on the EIAR was undertaken with regard to the draft version of the EPA guidelines: *Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environment Impact Assessment Reports, EPA draft August 2017*.

Each discipline also has regard to guidelines relevant to its own area of study, as detailed in the respective chapters.

Article 5(1) of the amended Directive states that an EIAR is to contain:

- a. A description of the project comprising information on the site, design, size and other relevant features of the project;
- b. A description of the likely significant effects of the project on the environment;
- c. A description of the features of the project and / or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- d. A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- e. A non-technical summary of the information referred to in points (a) to (d); and
- f. Any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

### **1.3 Methodology**

The EIAR has been prepared in accordance with the requirements set out in the amended Directive as transposed into Irish Legislation, i.e., the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended) and having regard to the Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environment Impact Assessment Reports, EPA May 2022.



### 1.3.1 Study Area

The study area is defined individually for each environmental discipline, according to guidance and the geographic scope of the potential impacts or the information required to assess those impacts. Details are provided by each discipline as part of the description of the existing environment and methodology.

Development boundary lines shown within each chapter of the EIAR are indicative. The 'red-line' development boundary of the planning application is illustrated in Figure 2.2 of Chapter 2, and on the site location and site layout drawings which accompany the application.

### 1.3.2 EIAR 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 relevant specialists.

The EIAR is divided into three Volumes as follows:

- Volume I: Non-Technical Summary
- Volume II: Main Environmental Impact Assessment Report
- Volume III: Appendices to the Main Environmental Impact Assessment Report

#### 1.3.2.1 Volume 1: Non-Technical Summary

The Non-Technical Summary provides an overview of the project and the EIAR in non-technical terms. The summary is presented in the grouped format structure, with each environmental topic addressed individually.

#### 1.3.2.2 Volume II: Environmental Impact Assessment Report

The EIAR volume provides the detailed information on the proposed development and the relevant environmental topics, with technical and detailed investigations of the discipline areas as appropriate. This volume is prepared in the grouped format structure, as it allows specialist studies to be completed for each environmental discipline. Chapter 16 considers significant interactions between disciplines.

The following chapters are provided in the EIAR:

1. Introduction
2. Project Description
3. Alternatives Considered
4. Landscape and Visual Impacts
5. Traffic and Transport
6. Material Assets
7. Land & Soils
8. Water
9. Biodiversity
10. Noise & Vibration
11. Air Quality
12. Climate Change
13. Cultural Heritage
14. Population & Human Health
15. Risk of Major Accidents & Hazards
16. Significant Interaction of Impacts
17. Schedule of Mitigation Measures

#### 1.3.2.3 Volume III: Environmental Impact Assessment Report (EIAR)

The Appendices volume contains supporting documentation and information on the EIAR. The Appendices are numbered to align with the relevant main chapter discipline.

### 1.3.3 EIAR Co-ordination and Study 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 is set out in Table 1.1.

**Table 1.1 EIAR Design Team**

<b>Consultant</b>	<b>Chapters Prepared / Contributed</b>
McCutcheon Halley Planning Consultants, 6 Joyce House, Barrack Square, Ballincollig, Cork. Email: <a href="mailto:info@mhplanning.ie">info@mhplanning.ie</a>	Chapter 1: Introduction Chapter 2: Project Description Chapter 3: Alternatives Considered Chapter 14: Population and Human Health Chapter 16: Significant Interaction of Impacts Chapter 17: Schedule of Mitigation Measures.
Delphi Architects, Unit 13, The Seapoint Building, 44-45 Clontarf Road, Clontarf, Dublin 3. Email: <a href="mailto:info@Davey-smith.com">info@Davey-smith.com</a>	Chapter 2: Project Description Chapter 3: Alternatives Considered
Clifton Scannell Emerson & Associates, Consulting Engineers, 3 <sup>rd</sup> Floor The Highline, Bakers Point, Pottery Road, Dun Laoghaire, Co. Dublin. Email: <a href="mailto:info@csea.ie">info@csea.ie</a>	Chapter 2: Project Description Chapter 5: Traffic and Transport Chapter 6: Material Assets
AECOM, 9 <sup>th</sup> Floor, the Clarence West Building 2 Clarence St. W Belfast, Northern Ireland, BT2 7GP Email: <a href="mailto:info@aecom.com">info@aecom.com</a>	Chapter 7: Land & Soils Chapter 8: Water Chapter 9: Biodiversity Chapter 15: Risk of Major Accidents and Hazards
SLR Consulting, 7 Dundrum Business Park, Windy Arbour, Dublin, D14 N2Y7 Phone: +353 1 296 4667	Chapter 4: Landscape & Visual Impact Chapter 10: Noise Chapter 11: Air Quality Chapter 12: Climate Change
John Cronin & Associates, 3a Westpoint Trade Centre, Ballincollig, Co. Cork Email <a href="mailto:info@johncronin.ie">info@johncronin.ie</a> , and  John Purcell, Archaeological Consultancy, Balinvalley, Killeigh, Tullamore, Co. Offaly Email: <a href="mailto:jparchaeology@gmail.com">jparchaeology@gmail.com</a>	Chapter 13: Cultural Heritage

### 1.3.4 EIAR Study Team Qualifications

The qualifications of consultants responsible for each discipline is provided in the introduction to the relevant chapter. Production of the EIAR has been coordinated by Mairi Henderson, BA(Hons) Housing, MRTPI and MIH, Associate Director with McCutcheon Halley Planning Consultants; Michelle O'Shea BA(Hons) Geography, MA Sustainable Development & Planning, MIPI, Senior Planner with McCutcheon Halley Planning Consultants; Peter O'Connor, MRICS, MCIWM, MIQ, Associate Director with AECOM and Amy Dunne BSc, MSc, Senior Environmental Consultant with AECOM.

### 1.3.5 Difficulties Encountered in Compiling Information

No difficulties were encountered in compiling information for this chapter of the EIAR.

## 1.4 Scoping and Public Consultation

The EIAR was scoped following appraisal of the draft EPA guidelines of information to be contained within the EIAR, through design team meetings with the specialist consultants. The EIAR was also

informed by the formal s.247 meeting held with Fingal County Council on 5 October 2021, the Fingal County Council opinion on the pre-application documentation submitted to An Bord Pleanála on 22<sup>nd</sup> November 2021, and the Inspector's Report and Board Opinion received from An Bord Pleanála following the pre-application consultation process (ref: ABP-312005-21).

Prior to lodging this application, notification 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.

Confirmation of the EIAR Portal notification accompanies the application.

A dedicated website ([www.barnhillgardenvillageshd.ie](http://www.barnhillgardenvillageshd.ie)) has been created for this proposed development:

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

### **Prescribed Bodies / Agencies**

1. Department of Housing, Local Government and Heritage (Development Applications Unit)
  - a. National Parks and Wildlife Service
  - b. National Monuments Service
2. Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
3. Transport Infrastructure Ireland
4. National Transport Authority
5. Irish Water
6. Irish Rail
7. Commission for Railway Regulation
8. Waterways in Ireland
9. Heritage Council
10. Health & Safety Authority
11. Health & Safety Executive
12. An Taisce
13. Department of Education and Skills
14. Coras Iompair Éireann
15. Fingal Childcare Committee
16. Meath County Council
17. Kildare County Council
18. An Taisce
19. Bat Conservation Ireland
20. Birdwatch Ireland
21. Geological Survey Ireland
22. Inland Fisheries Ireland
23. Office of Public Works

The following responses were received and taken into account in the preparation of the EIAR. A copy of consultation responses received is provided in Appendix 1.1

### **National Transport Authority**

The NTA noted that the development is located directly south of the Hansfield railway station and will be well served by public transport. They noted that the Maynooth line will be subject to future upgrades associated with the DART+ West project.

It was noted that the nature and character of the Ongar-Barnhill Distributor Road will be critical for the future sustainable development of these lands and sought clarification on the safe and efficient movement of pedestrians and cyclists in this area.

Noted that the internal road layout was designed to facilitate the through movement of cars and that it would facilitate a circulatory drop-off facility to the proposed primary school. Welcomed the position of the land set-aside for the primary school but recommended that further consideration be given to the NTA's Safe Routes to School guidance.

Noted that there were multiple vehicular entrances to small residential groupings where greater use of filtered permeability could be applied to lessen the impact of through-traffic and create safer street environments.

*In response to the NTA comments, further consideration was given to internal road layout and a public transport only route serving the village centre and future primary school. Further revisions were made to the layout to provide filtered permeability to residential groups and to ensure that pedestrians and cyclists will be given priority of movement within the development. The amendments to the layout included:*

- Amending the road through the village centre to be a public transport only route. This revision removes the 'circulatory' nature of the route running through Barnhill Garden Village, while retaining a one-way route for future bus transport. It also provides easy access to the Village Centre and proposed public school by public transport, while providing priority in this area to pedestrian and cycle movements.
- Reducing the number of vehicle entrances to residential groupings, while ensuring that pedestrian and cycling permeability was retained and enhanced throughout the development.

*The Traffic and Transportation Assessment which accompanies this application provides more detailed information on the design response to the NTA's comments.*

### **Transport Infrastructure Ireland (TII)**

TII provided the following comments on the proposed development:

1. As set down in the DoECLG Spatial Planning and National Roads Guidelines (2012) it is in the public interest that, in so far as is reasonably practicable, that the national road network continues to serve its intended strategic purpose. The EIAR should identify the methods/techniques proposed for any works traversing and/or in proximity to the national road network in order to demonstrate that the development can proceed complementary to safeguarding the capacity, safety and operational efficiency of that network.
2. Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes.
3. The Environmental Assessment should have regard to previous Environmental Assessment Statements/Reports and conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area.
4. Where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting construction and operational traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the TII TTA Guidelines which addresses requirements for sub-threshold TTA.
5. TII Standards should be consulted to determine the requirement for Road Safety Audit (RSA) and Road Safety Impact Assessment (RSIA).
6. Assessments and design and construction and maintenance standards and guidance are available at [TII Publications](#) that replaced the NRA Design Manual for Roads and Bridges (DMRB) and the NRA Manual of Contract Documents for Road Works (MCDRW).
7. Environmental Impact Assessment shall include provision for travel planning / mobility management planning in the interests of protecting national roads capacity in the interests of sustainable travel policy.
8. The developer, in conducting Environmental Impact Assessment, should have regard to TII Environment Guidelines that deal with assessment and mitigation measures for varied environmental factors and occurrences. In particular, evidenced assessment of the protection of the strategic function of the national road in relation to the following matters is required:
  - i. TII's Environmental Assessment and Construction Guidelines, including the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2006),
  - ii. The EIAR should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* (1<sup>st</sup> Rev., National Roads Authority, 2004)).

*TII comments were taken into account in the preparation of Chapter 5, Traffic and Transportation and in the preparation of the Transport and Transportation Assessment and Mobility Management Plan, prepared by Clifton Scannell Emerson and Associates and which accompany this application.*



## Development Applications Unit (Archaeology)

The applicants should engage the services of a suitability qualified archaeologist to contribute to the archaeological component of the EIAR. Given the extent and nature of the lands involved, the archaeological assessment should include the results of an archaeological geophysical survey and reference to any previous archaeological testing.

*In response, the Cultural Heritage Chapter has been prepared by John Cronin Associates (Conservation Consultants) which includes an archaeological impact assessment. Archaeological survey work was undertaken by John Purcell Archaeological Consultants. Extensive test trenching was carried out within the site and Chapter 13 of the EIAR provides an assessment of significant impacts.*

## Bat Conservation Ireland

Noted that it was not possible to comment in detail on the application but requested that best practice guidelines are followed in relation to the development.

*In response, it is noted that Bat Surveys were carried out in compliance with Collins, J (ed) (2016). Bat Surveys: Good Practice Guidelines (3<sup>rd</sup> Edition). Bat Conservation Trust, London.*

## Geological Surveys Ireland (GIS)

GIS noted that they encouraged use of and reference to their relevant data sets in the preparation of the EIAR, in particular data sets on:

- Geoheritage
- Groundwater
- Geological Mapping
- Geotechnical Database Resources
- Geothermal Energy
- Natural Resources (Minerals / Aggregates)

GIS also noted that the following guidelines may also be of assistance:

- Institute of Geologists of Ireland, 2013. Guidelines for the Preparation of the Soils, Geology and Hydrogeology Chapters of Geology in Environmental Impact Statements.

*In response – the Land Chapter of the EIAR has been prepared with reference to the GIS datasets and with regard to the Institute of Geologists of Ireland 2013 Guidelines, and other relevant guidelines as detailed in the references section of Chapter 7.*

## 1.5 Need for the Scheme

The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Region has identified that the North-West corridor (Maynooth / Dunboyne line and DART expansion) will provide strategic development areas, to support sustainable development within a strong focus on the use of public transport.

Fingal County Development Plan 2017 has outlined a target for the development of approximately 40,000 new residential units by 2023. The draft Fingal County Development Plan 2023 – 2029 (draft FDP) provides a projected target of approximately 16,245 new residential units from 2023 to 2029 and provides a target for Blanchardstown (which includes the Barnhill LAP lands) of 5,742 units by 2029. The draft FDP notes that it will continue to implement the Local Area Plans (LAPs) currently in place at the time of adoption the Development Plan, including the Barnhill LAP 2019.

The draft Plan notes that the Hansfield Strategic Development Zone (SDZ) continues to provide for new sustainable communities' service by a new train station on the Clonsilla to M3 Parkway. It notes that:

*“Future new sustainable communities within Barnhill and Kellystown will also benefit from direct access to high-capacity rail transport, with significant provision also made for active travel options. Recently adopted Local Area Plans in these areas provide land use frameworks to guide a range of housing, community infrastructure and high-quality recreation opportunities, creating distinctive new communities.” (Draft Fingal Development Plan 2023-2029, p.71)*

It is evident that there is a shortage in supply of residential units in Fingal County, evidenced by continuing rise in house prices, rental rates, and demand for social housing. The proposed development is in accordance with the zoning objective of Fingal County Development Plan 2017 (FDP) to:

*“Residential Area: Provide for new residential communities subject to the provision of the necessary social and physical infrastructure.” (FDP 2017, Chapter 11, p. 390).*

The Statement of Consistency, which accompanies this application, details how the proposed development complies with national, regional, and local policy objectives. The proposed development will provide 1,243 residential units to serve the planned growth of approximately 3,400 to 3,700 people, with direct access to high-capacity rail transport and significant provision for active travel options.

The proposed development will make a significant contribution to addressing the current shortage of housing supply in Fingal County, including the shortage of social housing. In line with the requirements of the Planning and Development Act 2000 (as amended), a portion of the residential units within the site shall be transferred for social housing. A ‘Part V’ proposal for the transfer of social housing units accompanies this application.

## 1.6 Cumulative Impacts

The existing environment for the proposed development consists of the existing residential units immediately adjacent to the proposed development, including recent development in Hansfield SDZ. At the time of the preparation of the EIAR, several other developments were permitted within Hansfield SDZ, as detailed in Table 1.2.

**Table 1.2 Cumulative Projects**

<b>Project</b>	<b>Applicant</b>	<b>Reference</b>	<b>Development</b>
Hansfield SDZ	Mulberryglen Ltd.	FW15A/0161	206 units in Zone 2
	Mulberryglen Ltd.	FW16A/0117	47 units in zone 2
	Garlandbrook Ltd	FW16A/0123	219 units in zone 2 and zone 6
	Hansfield Investment Ltd	FW15A/0032	128 units in Zone 4
	Firth Development Unlimited Company	FW17A/0234	155 units in Zone 6
	Garlandbrook Ltd	FW18A/0021	95 units in zone 6
	Hansfield Investment Ltd	FW18A/0161	247 units in Zone 7
	Hansfield Investment Ltd	FW18A/0162	62 Units in Zone 1
	Hansfield Investment Ltd	FW18A/0197	200 units in Zone 7
	Garlandbrook Ltd	FW18A/0110	618 units in zone 7,
	Hansfield Investment Ltd.	FW20A/0084	15 units in Zone 1 and 7
	Garlandbrook Ltd.	FW20A/0059	83 units in Zone 7
	Firth Development UC	DAC/048/20	10 units in Zone 6
	Firth Development UC	DAC/047/20	22 units in Zone 6
	Firth Development UC	DAC/046/20	12 units in Zone 6

The Ongar-Barnhill Distributor Road has been approved under Part 8 and will be complete prior to the commencement of the proposed development. The Ongar-Barnhill Road has therefore been considered to form the ‘future existing environment’ and each discipline has assessed relevant impacts on the basis of the road being in place.

## 1.7 References

- Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification), as amended by: Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, the European Parliament, and the Council of the European Union.
- Planning and Development Act 2000 (as amended)
- Planning and Development Regulations 2001 (as amended)

- Revised Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA (Draft August 2017)
- Guidelines on Information to be Contained in Environmental Impact Assessment Reports, EPA, May 2022.
- National Planning Framework, Project Ireland 2040
- Eastern Midlands Regional Assembly, Regional Spatial and Economic Strategy, EMRA, 2019
- Fingal County Development Plan 2017 – 2023, Fingal County Council, 2017
- Draft Fingal County Development Plan 2023-2029, Fingal County Council, 2022
- Barnhill Local Area Plan 2019, Fingal County Council, 2019





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## CHAPTER 2

### Project Description

# Volume II

Environmental Impact Assessment Report



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## Chapter 2 Project Description

### Contents

2	Project Description .....	2-3
2.1	Introduction .....	2-3
2.1.1	Overview .....	2-3
2.1.2	Author Information and Competency .....	2-3
2.1.3	Reference to Guidelines Relevant to Discipline .....	2-3
2.1.4	Methodology .....	2-3
2.1.5	Difficulties Encountered .....	2-3
2.2	Description of Existing Environment .....	2-3
2.2.1	Site Context .....	2-3
2.2.2	Existing Site .....	2-4
2.3	Proposed Development .....	2-5
2.3.1	Development Area .....	2-5
2.3.2	Overview of Proposed SHD Development .....	2-6
2.3.3	Character Areas .....	2-8
2.3.4	Building Height .....	2-9
2.4	Construction Processes .....	2-12
2.4.1	Site Compound .....	2-13
2.4.2	Demolition and Cut and Fill Volumes .....	2-13
2.4.3	Construction Traffic Management, Site Accesses, and Parking .....	2-14
2.4.4	Construction Traffic Volumes .....	2-15
2.4.5	Deliveries to site and storage of works materials .....	2-15
2.4.6	Environmental Management .....	2-15
2.4.7	Waste Management .....	2-15
2.5	Operational Stage Waste Management .....	2-16
2.5.1	General Principles of Operational Waste Management Plan .....	2-16
2.5.2	Estimated Waste Arisings Generated by the Proposed Development .....	2-16
2.5.3	General Principles of Operational Waste Management Plan .....	2-17
2.5.4	Waste Collection .....	2-17

### Tables

Table 2.1	Residential Unit Breakdown by Character Area .....	2-8
Table 2.2	Residential Unit Mix .....	2-9
Table 2.3	Building Height .....	2-10
Table 2.4	Proposed Phasing .....	2-11
Table 2.5	Cut and Fill Volumes .....	2-13
Table 2.6	Cut and Fill Volumes .....	2-14
Table 2.7	Estimate Waste Generated per Week .....	2-16

### Figures

Figure 2.1	Site Location, approximate boundary outlined in red. ....	2-5
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Figure 2.2 Development Site Boundary outlined in Red..... 2-6  
Figure 2.3 Building Heights in Proposed Development ..... 2-7  
Figure 2.4 Character Areas within Proposed Development Housing Mix..... 2-9



## 2 Project Description

### 2.1 Introduction

#### 2.1.1 Overview

Alanna Homes and Alcove Ireland Four Ltd are applying for a 10-year planning permission to develop 1,243 residential units and associated commercial, community and amenity facilities within the townlands of Barberstown, Barnhill, and Passifyoucan at Clonsilla, Dublin 15. The proposed development will be known as Barnhill Garden Village.

This chapter provides a description of the proposed development, phasing and construction activities and provides a summary of the Construction and Environmental Management Plan which accompanies the planning application.

#### 2.1.2 Author Information and Competency

This chapter has been prepared by planning consultant, Màiri Henderson of McCutcheon Halley Planning Consultants (BA Hons, Housing MRTPI, MIH); project engineer, Conor Philips of Clifton Scannell Emerson & Associates (BSc. Hons Civil Engineering); and lead project architect, Greg Davey of Delphi Architects (DIP Arch Tech, B Arch Hons, MRIAI).

#### 2.1.3 Reference to Guidelines Relevant to Discipline

The proposed development has been designed with regard to the national, regional and local policy objectives and guidelines relevant to the built environment, including:

- National Planning Framework 2040
- Eastern Midlands Regional Economic and Spatial Strategy 2019
- Fingal County Development Plan 2017 - 2023
- Barnhill Local Area Plan 2019
- Sustainable Residential Development in Urban Areas 2009
- Urban Design Manual – A Best Practice Guide, 2009
- Design Manual for Urban Roads and Streets, 2013
- Urban Development and Building Heights, 2018
- Sustainable Urban Housing: Design Standards for New Apartments, December 2020
- The Planning System and Flood Risk Management, 2009
- Childcare Facilities Guidelines, 2001
- Regulation of Commercial Institutional Investment in Housing, May 2021

#### 2.1.4 Methodology

The methodology used to prepare this chapter has involved

- Review of the detailed design of the proposed development.
- Review of reports and drawings prepared as part of the planning application process.

#### 2.1.5 Difficulties Encountered

There have been no difficulties encountered in the preparation of this chapter.

## 2.2 Description of Existing Environment

### 2.2.1 Site Context

The application site is located in the townlands of Barberstown, Barnhill, and Passifyoucan, at Clonsilla, Dublin 15 and is situated approximately 3 km to the west of Blanchardstown Centre and approximately 12.4 km to O'Connell Street, Dublin.

As noted in the Barnhill Local Area Plan 2017 (Barnhill LAP), the lands are situated close to the western boundary of Fingal, where the administrative areas of Meath, Kildare, and Fingal meet. Hansfield Train Station is located between the Hansfield SDZ and the development site. The railway line provides suburban services to Dublin City Centre to the east, and Dunboyne to the west. The lands are also

strategically located approximately 10km south-west of Dublin Airport and 2.6 km south of the M3 / N2 link with direct access to the strategic national road network.

There are no Natura 2000 sites within or adjacent to the Barnhill lands. The nearest site with environmental designation is the Rye Water Valley / Carton SAC, located approximately 2.7km to the south-west.

The Barnhill LAP has provided for the necessary road improvements, which will improve the accessibility of Barnhill to adjoining areas and Hansfield / Ongar in particular. The proposed Ongar-Barnhill Road has been approved under Part 8 of the Planning and Development Regulations (as amended). Construction work on the new road is due to commence in 2023 and be complete by October 2024. The proposed Barnhill Garden Village development will commence following completion of the Ongar-Barnhill Road. The Ongar-Barnhill Road will form the 'future existing environment'.

Drawings detailing the future Ongar-Barnhill Road layout and connectivity with the internal road network accompany the planning application. See drawing references 16\_053\_00\_1050 to 1052. The future road layout is also described in the accompanying Traffic and Transportation Assessment Report, prepared by Clifton Scannell Emerson & Associates.

### 2.2.2 Existing Site

The site is bounded to the north by the Dunboyne to Clonsilla Rail Line and Hansfield train station and to the east by the Royal Canal and Dublin-Maynooth Railway Line. Hansfield Strategic Development Zone (SDZ) is located to the north of the railway line.

To the west of the application site is the R149 Clonee-Lucan Road and to the south by Barberstown Lane South. A portion of Barberstown Lane North local secondary road (L-7010-0) runs through the northern section of the site, providing local access, and linking with the R149 to the west and the Barberstown Lane South to the east.

Within the southern portion of the lands, is a stream running in a west to east direction to a lake in Luttrellstown Demesne. This lake drains into the River Liffey.

The existing site comprises of a number of parcels of land that are demarcated by hedgerow and trees; The overall lands are characterised by relatively flat terrain and the majority of the application site is predominantly used for agricultural purposes.

A cluster of vacant buildings, originally a former piggery and most recently used for industrial use, is situated to the south of Barberstown Lane North, Within the LAP lands, but falling outside the proposed application site, are seven residential houses to the north of Barberstown Lane North, and one residential house with access from the R149.

Twin 110kV lines cross the lands in the north-west corner. Two steel pylons servicing this line are located on the lands. This line is the primary power supply serving both Leixlip (Intel) and the Dublin Enterprise Zone. The Barnhill LAP notes that buildings must not be constructed within 23m of the pylon tower legs.

In respect of existing parklands and amenity, the Royal Canal Greenway is located to the east of the Barnhill lands. St Catherine's Park is located 3km to the south-west and comprises of approximately 80 ha of recreational amenity, Beechpark in Clonsilla is located to the east. A village park in the form of 2.35 ha of public open space is to be provided within the Hansfield SDZ, approximately 300m to the north of Hansfield rail station.

The site location, with approximate site boundary outlined in red, is illustrated in Figure 2.1.



Figure 2.1 Site Location, approximate boundary outlined in red.

## 2.3 Proposed Development

### 2.3.1 Development Area

The proposed development consists of the majority, but not all the Barnhill LAP lands. The lands to the south-east of the Barnhill LAP (identified as Development Area 4 on the LAP) are not included in the proposed development.

The total site area is 29.6 hectares, and the development site boundary is outlined in red in Figure 2.2 (location of site notices are marked by an X in the figure). See site layout drawings which accompany the application for further detail, including the Overall Site Layout drawing reference, PLA-05.



**Figure 2.2 Development Site Boundary outlined in Red.**

### 2.3.2 Overview of Proposed SHD Development

The proposed development will consist of:

- (a) the demolition of the existing vacant industrial buildings.
- (b) the construction of 1,243 residential units comprising:
  - 322 dwelling houses comprising a mix of 3 and 4 bedroom detached, semi-detached and terraced units ranging in height from two to three storeys.
  - 117 duplex units comprising a mix of 1-, 2- and 3-bedroom units
  - 804 apartments comprising a mix of 1-, 2-, 3- and 4-bedroom units ranging in height from three to twelve storeys:
- (c) The construction of commercial and community facilities including one creche; one medical centre; one café; one convenience retail unit; five commercial units; a community centre; and an Office Hub.
- (d) Land set aside for a primary school to accommodate a minimum of 16 classrooms.
- (e) Provision of four new vehicular accesses with two from the approved Part 8 Barberstown Lane South Upgrade and two from the R149; the creation of a pedestrian and cycling priority route along Barberstown Lane North, with vehicle use restricted to local access, and provision of a pedestrian access plaza from the site to the Hansfield train station to the north.
- (f) The provision of landscaping and amenity areas to include neighbourhood playgrounds; pocket parks with play areas; and park comprising a multi-use games area (MUGA), large field, playing pitch; skateboard park; play areas; and amenity trails.
- (g) Proposed diversion and undergrounding of all 10/20kv overhead ESB power lines.
- (h) All associated infrastructure and ancillary development works to include the construction of electrical substations; construction of pumping station; drainage and services connections; internal roads; pedestrian footpaths, pedestrian bridges and cycle lanes, public lighting, landscaping and boundary treatments, bicycle and car parking including basement parking, bike storage and bin storage.

The residential units consist of a mix of unit types as detailed in Table 2.2. Buildings range in height from 2-storeys to 12-storeys, as illustrated in Figure 2.3. Also see drawing reference PLA-10 – Overall Site Layout Apartment & Duplex Heights, which accompanies the planning application. The Planning



and Design Statement, which accompanies the planning application provides further detail of the height strategy.



**Figure 2.3 Building Heights in Proposed Development**

The proposed development will also provide a park of 5.6 hectares, and a series of pocket parks distributed between character areas. The recreational and amenity facilities provided within the development include:

- Playing pitch of 7,770 m<sup>2</sup> (100m by 77m)
- Multi-use games area,
- Skateboard Park,
- Playgrounds providing for approximately 3,600 m<sup>2</sup> of areas equipped for play.
- Natural play areas of approximately 3,051 m<sup>2</sup>.
- Walking / jogging routes
- Wetland area

A detailed description of the recreation and amenity facilities proposed by the development is provided in the accompanying Green Infrastructure Masterplan, prepared by Gannon & Associates. Please refer to the Landscape Masterplan and associated drawings which accompany the planning application for further details.

The ancillary development works associated with the proposed development includes:

- Ground works and laying out of internal roads, cycle paths and pedestrian paths, including access to public crossings of the new Ongar Barnhill Road.
- Undergrounding of 10/20kv power lines
- Provision of car and bicycle parking, as detailed on site layout drawings.
- Provision of bin-storage areas, as detailed on site layout drawings.
- Boundary fencing and walls.
- Pumping station and provision of all water infrastructure services
- Provision of services and utilities
- Provision of street lighting



- Provision of electricity sub-stations throughout the development.
- Connection to the external road network of the upgraded Ongar / Barnhill Road.
- Provision of footpath connection to Royal Canal Greenway

The proposed development is to commence following the completion of works to develop the new Ongar / Barnhill Road. As the works to the Ongar / Barnhill Road will be complete prior to the commencement of the Barnhill Garden Village development, the road will form the 'future existing environment' and is not assessed as a cumulative construction process within this EIAR.

A Natura Impact Statement has been prepared in respect of the proposed development and accompanies the application.

### 2.3.3 Character Areas

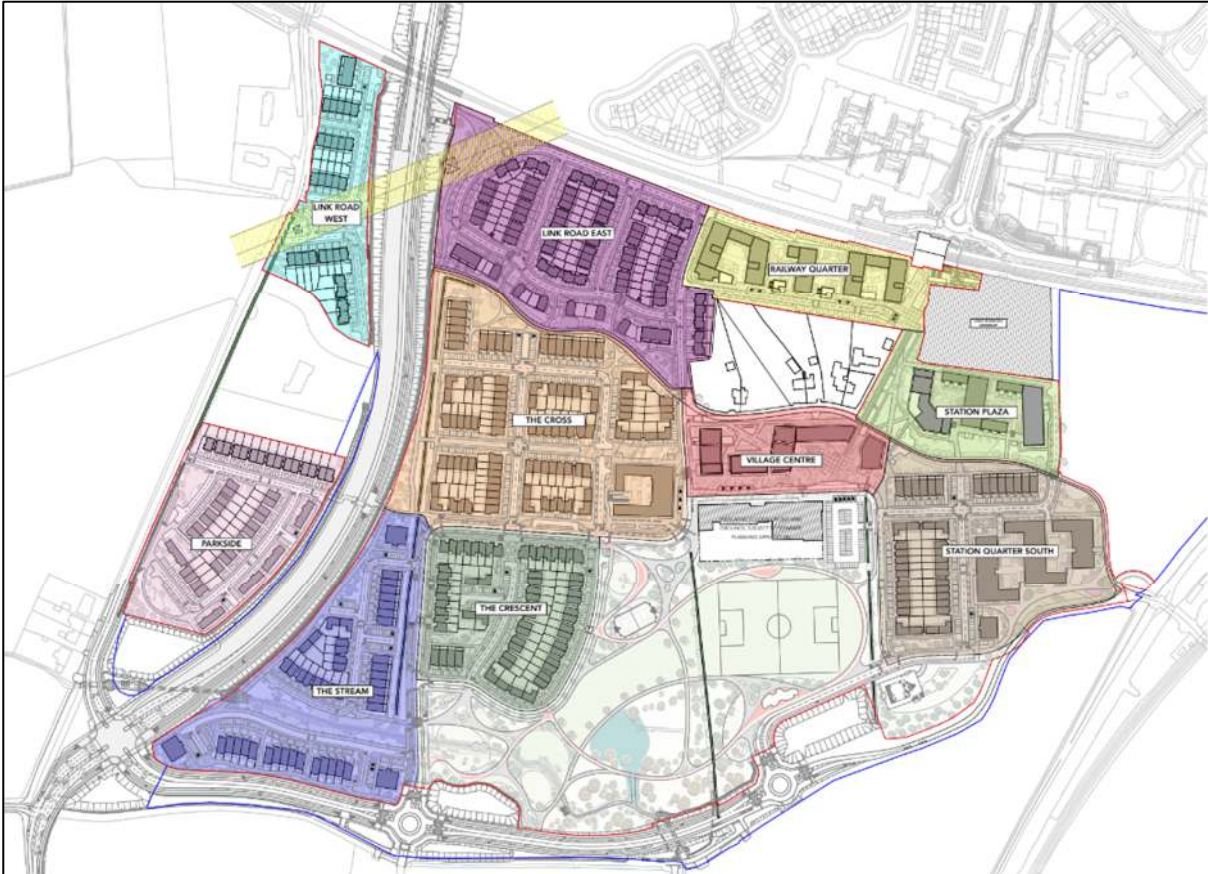
The proposed development has been designed in ten distinct character areas. Table 2.1 provides a summary of the number of units provided within each character area:

**Table 2.1 Residential Unit Breakdown by Character Area**

Character Area	Designer	Total Number of Residential Units	Total Residential Area in m2
Barnhill Stream	CWOB Architects	98	9,493
Barnhill Cross	CWOB Architects	195	19,029
Barnhill Crescent	CWOB Architects	77	8,311
Station Quarter South	CWOB Architects	201	18,041
Parkside	CDP Architects	53	5,950
Railway Quarter	Delphi Architects	211	14,611
Station Plaza	Delphi Architects	166	12,897
Village Centre	Delphi Architects	118	9,411
Link Road East	Delphi Architects	91	10,408
Link Road West	Delphi Architects	33	3,604
Total Residential Development		1,243	111,759

Figure 2.4 details the location of the character areas. Also see drawing reference PLA-06, Overall Site Layout – Character Areas, which accompanies the planning application.

The Planning and Design Statement, which accompanies the application provides a detailed description of each character area.



**Figure 2.4 Character Areas within Proposed Development Housing Mix**

The proposed development provides for a mix of unit types and sizes, as detailed in Table 2.2. Please refer to the accompanying Statement of Consistency for comparison with the housing mix objectives set out in the Barnhill Local Area Plan 2017 – 2023 (Barnhill LAP).

**Table 2.2 Residential Unit Mix**

Unit Type	No. of Units	% of total Development	Total SQM	Average SQM per unit type.
1-bed Apartment	148	11.9%	7,610	51
2-bed Apartment	589	47.4%	46,396	79
3-bed Apartment	63	5.1%	6,521	104
4-bed Apartment	4	0.3%	594	148
1-bed Duplex	5	0.4%	296	59
2-bed Duplex	20	1.4%	1,736	87
3-bed Duplex	92	7.4%	11,010	120
3-bed House	286	23.0%	32,607	114
4-bed House	36	2.9%	4,989	139
TOTALS	1,243	100%	111,759	90

### 2.3.4 Building Height

Building heights range throughout the development from 2 storey to 12 storey, as illustrated in Figure 2.3. Table 2.3 provides details of the range of building heights by character area. Further analysis of the building height strategy is providing in the Planning and Design Statement.

**Table 2.3 Building Height**

<b>Character Area</b>	<b>Range of Building Height</b>	<b>Landmark Buildings</b>
Barnhill Stream	3 -4 Storey	Four storey apartment blocks placed to the west, east and north of the character area.
Barnhill Cross	2-9 storey	Apartment block to the south-west of the character area, providing gateway to village centre.
Barnhill Crescent	2-3 storey	-
Station Quarter South	2-9 storey	Apartment block to the east of the character area, with 9 and 8 storey height forming urban edge to eastern part of SHD development.
Parkside	2 to 3 storeys	-
Railway Quarter	2-8 storey	Apartment block to east of character area, with 8-storey height forming urban edge to the Railway Plaza & train station.
Station Plaza	2 -9 storey	Apartment block to the west of the character area presenting frontage to Railway Plaza
Village Centre	3-12 storey	Twelve storey apartment block to east of village centre, acting as the main landmark building of the development, and the connection point from the village centre to the railway station.
Link Road East	2-3 storey	-
Link Road West	2-3 Storeys	Three storey apartment block to the north of the character area.

**Table 2.3 – Building Height Diagram Phasing**

Planning permission is being sought for a 10-year period. It is intended that any prior to commencement compliance agreements will be finalised with Fingal County Council during the construction of the new Ongar / Barnhill Road. Construction works are projected to commence on Barnhill Garden Village in October 2024 and be complete in July 2032, an active construction period of approximately 7-years and 10 months.

Table 2.4 provides a summary of the proposed phasing of the development. Figure 2.4 illustrates the phasing. A detailed phasing strategy is provided in the outline Construction Environmental Management Plan.

**Table 2.4 Proposed Phasing**

<b>Phase</b>	<b>Timeline</b>	<b>Residential and Commercial Development</b>	<b>Supporting Infrastructure</b>
Commencement	October 2024 to August 2025	Enabling Works	Railway station access Access road Sewerage pumping station and associated works (rising main, gravity main etc.) School site accessible and available.
Phase 1A	Feb 2025 to October 2026	152 residential units - Link Road East - Station Plaza	Railway station access Access road Sewerage pumping station and associated works (rising main, gravity main etc.) Preliminary landscaping as detailed in Green Infrastructure Masterplan – including provision of main park and associated facilities School site accessible and available.
Phase 1B	March 2025 to May 2029	316 residential units plus creche - Station Plaza - Railway Quarter	Creche in Station Plaza Landscaping as detailed in Green Infrastructure Masterplan, including provisions of playing pitch and local pocket parks.
Phase 2	March 2027 to June 2029	182 Residential Unit Commercial / Community units in Village Centre - Station Quarter South - Village Centre	Landscaping as detailed in Green Infrastructure Masterplan. Market Square Civic Space and Barnhill Village Retail, Community & Amenity spaces.
Phase 3	Sept 2028 to Jan 2030	195 residential units - Barnhill Cross	Landscaping as detailed in Green Infrastructure Masterplan.
Phase 4	March 2029 to July 2030	214 residential units - Barnhill Crescent - Station Quarter South	Landscaping as detailed in Green Infrastructure Masterplan.
Phase 5	Sept 2030 to July 2032	184 residential units - Barnhill Stream - Parkside - Link Road West	Landscaping as detailed in Green Infrastructure Masterplan.
Total Construction Phase	October 2024 to July 2032	Enabling works; 1,243 Residential Units, Creche and commercial / community units.	As detailed

Connection to the external road network will be provided on a phased basis, as described in the accompanying Traffic and Transportation Report, prepared by CSEA Consulting Engineers, and detailed in accompanying road layout drawings.

## 2.4 Construction Processes

As noted in section 2.3.6, the construction stage for the proposed development is projected to commence in by the 3<sup>rd</sup> quarter of 2024 following the completion of the Ongar to Barnhill Distributor Road Scheme (by Fingal County Council. The project is assumed to be completed, on a phased basis, over a 10-year construction timeline, with construction of the scheme estimated to be completed by the middle of 2032. Planning permission is being sought for a period of 10 years to allow for finalisation of any prior to commencement conditions with Fingal County Council and to allow some flexibility should the construction phase require to be extended slightly.

Construction works are envisaged to take place between 8am and 7pm Mondays to Fridays inclusive, and between 8am and 2pm on Saturdays. No works shall take place on Sundays or Public Holidays (unless in exceptional circumstances which are agreed via written approval from the Planning Authority).

The construction stages will be as follows:

### 1. **Site Mobilisation:**

The works contractor will secure the site and establish safe site accesses. The works contractor shall also set up the main site compound and the smaller satellite site compounds (separate smaller satellite each phase of the works) comprising of site offices, parking areas, canteen, welfare facilities, storage areas and temporary utilities / services. The works contractor shall also establish internal traffic routes and haul routes and mobilise plant, equipment, and materials during this initial phase of the development construction. The works contractor will highlight all hazards including overhead power lines and establish safe working zones near overhead power lines, existing watercourses, and other hazards.

### 2. **Demolition and Site Clearance works:**

The works contractor shall remove existing topsoil and stockpile for re-use onsite. All stockpiles will be located at a distance from existing watercourses. The internal site layout has been designed to closely reflect the existing topography in order to minimise the amount of cut and fill during the construction works. Cut and fill volumes are detailed in Table 2.5. The works contractor shall survey and set out the various elements of the construction works as required. The vacant industrial buildings on site will be demolished. Where suitable, rubble from the demolition works will be re-used on-site as hardcore. All rubble unsuitable for re-use will be disposed of in a licenced waste facility. Table 2.6 provides details of the volume of materials arising from demolition of the existing industrial units.

### 3. **Development of Site Infrastructure:**

The works contractor shall install the roads, footways, and cycle tracks during this stage of the development. Works during this stage will include the installation of the surface water drainage network and associated SUDs elements, Foul sewer network and associated foul pumping station and rising main and all other key ancillary services.

### 4. **Construction of Housing Units and Village and delivery of site infrastructure:**

This stage of the scheme shall comprise of the delivery of the 1,243 residential units, the proposed village centre and its associated retail units, commercial units and creche. This phase shall also incorporate the construction of the train station plaza. This phase of the works will also include the construction of all the proposed development boundary conditions. The delivery of the housing and commercial units for the proposed development shall be in accordance with the proposed construction phasing arrangement of the development. The delivery of each phase of the development will also include the internal roads network and utilities / services associated with each of the phases. Key site SuDS storage elements such as the infiltration basin beneath the proposed football pitch and the wetland pond in the main open space area shall be delivered during the first phase of the development. The foul sewer pumping station and its associated rising main will also require to be constructed in the initial construction phase of the proposed development.

### 5. **Landscaping:**

Landscaping for the proposed development will be delivered to coincide with the phased delivery of the proposed development, as described above.



## 6. **Site Demobilisation:**

All machinery, equipment, materials and residual waste shall be removed from site during this phase of the works. The site compound and all associated temporary utilities / services, site offices, parking areas etc. shall be decommissioned and removed from site. This phase of the works shall also incorporate the removal of all site fencing and signage prior to final site reinstatement / remediation works.

### 2.4.1 Site Compound

The proposed site compounds shall be located within the red-line boundary of the proposed development. It is proposed that the main site compound shall be within the site of the existing farm buildings / sheds (to be demolished) given its central location within the development lands.

The main compound will downsize over the lifetime of construction works as the various phases are completed. The location of smaller satellite site compounds shall vary as the phased development works progress over the lifetime of the construction stage. Compounds shall be erected at an acceptable minimum clearance from environmentally sensitive features that are to be maintained within the existing site such as the existing hedgerows and ditches and the existing Barnhill Stream that traverses through the southern part of the site.

The positioning of the site compounds shall also take into consideration the existing dwellings and properties in the area. In accordance with ESBI requirements, site compounds are prohibited from being located within the hazard zone of the existing 110kV overhead power lines that crosses the northern part of the Barnhill SHD lands to the west of the Ongar – Barnhill Distributor Road and the northwest of the Barnhill SHD lands to the east of the Ongar – Barnhill Distributor Road. The site compounds shall also be kept clear of any of the existing overhead 10/20kV power lines and telecoms lines that traverse across the northern part of the development site.

### 2.4.2 Demolition and Cut and Fill Volumes

The internal site layout of the Barnhill SHD has been designed to follow, as closely as possible, the existing topography of the site so as to minimise the amount of cut and fill during the construction works. Where possible excavated material (cut) will be reused on-site as fill for construction purposes such as ground raising, berm construction, landscaping, and grading. It may also be reused offsite, subject to approval of an Article 27 application by the EPA. Material which cannot be re-used will be required to be transported off-site and will require disposal at appropriately licensed/permitted facilities subject to waste classification in accordance with relevant waste legislation

It is expected that there will be a requirement for c. 90,000 m<sup>3</sup> of geotechnically-suitable imported fill material for beneath buildings, roads and hardstanding areas comprising general fill material and structural fill. The source of imported fill material will involve careful selection and vetting in order to ensure that it is of a known origin and that it is 'clean' (i.e., will not cause contamination to the local environment).

**Table 2.5 Cut and Fill Volumes**

<b>Item</b>	<b>Cut (m3)</b>	<b>Fill (m3)</b>
Topsoil	88,260	88,260
Subsoils from roads and footpaths	24,500	
Subsoils from underground services	45,000	
Subsoils from excavation of foundations and basements	71,000	
Subsoils from SUDS detention areas	7,200	
Subsoils from foul sewer pumping station	3,600	
Imported fill		90,000
<b>TOTAL</b>	<b>239,560</b>	<b>178,260</b>

The estimated volume of materials to be generated from the demolition of the existing industrial units on site is provided in Table 2.6. It is proposed that concrete and stone arising from the demolition of the

buildings will be reused on site. Metals will either be reused or recycled. Cementitious roof sheet will be tested before removal and disposal by a licenced contractor.

**Table 2.6 Cut and Fill Volumes**

<b>Demolition Material</b>	<b>Volume (Tonnes)<sup>1</sup></b>
Concrete Hardstanding	6,131
Concrete	5,683
Compacted Stone / Rubble	781
Metalliferous Materials	102
Cementitious Roof Sheet	192
Other (plastics etc)	2
<b>Total</b>	<b>12,891</b>

**Volumes of Demolition Material**

**2.4.3 Construction Traffic Management, Site Accesses, and Parking**

The construction of the proposed development shall generate traffic, which will require to be appropriately managed during the construction stage. The most onerous construction period with regards to traffic generation and associated impacts upon the local road network is expected to be associated with the volume and size of HGVs during the following work elements:

- Excavation stage where material is removed from site.
- Bringing construction materials to site.
- Bringing concrete / steel to site for Superstructure.
- Waste collections.

The Primary accesses for construction traffic and machinery to the main Barnhill SHD development site shall be via the two roundabouts that are to be constructed as part of the future realigned Barberstown Lane South Road. This future realigned Barberstown Lane South Road forms part of the overall proposed Ongar-Barnhill Distributor Road Scheme to be constructed for Fingal County Council, which shall be delivered prior to the commencement of the Barnhill SHD development.

Construction access for the Parkside and Link Road West Character areas will be from the R149 Regional Road. Construction vehicles shall access the R149 via the main junction of the Ongar to Barnhill Distributor Road.

Warning signage will be provided for pedestrians and other road users on all approaches to the site accesses in accordance with Chapter 8 of the Traffic Signs Manual and the Contractor’s Traffic Management Plan.

All construction activities will be managed and directed by a Construction Traffic Management Plan (CTMP) prepared by the main contractor. Details of the final CTMP are to be agreed with Fingal County Council prior to the commencement of construction activities on site.

Parking will only be permitted within the construction compounds during construction works. Staff are not permitted to park on the local road network. It is anticipated that there will be c. 150 -200 employees working on site at the peak of construction. 85 no. staff car parking spaces are to be provided within the compound. The number of car parking spaces provided will reduce over the lifetime of construction as the number of site employees reduces.

All operatives shall be encouraged to use sustainable travel options when traveling to / from the subject site. Secure bicycle storage will be provided with the site compound. Additionally given the proximity to the Hansfield Train Station construction workers will be encouraged to use public transport as much as possible.

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<sup>1</sup> A factor of safety of 30% has been applied for bulking.

#### 2.4.4 Construction Traffic Volumes

Volumes and rates of construction traffic have been calculated on the basis of the extent of the excavation, earthworks and demolition works involved for the proposed development as well as materials arising from the demolition of the existing buildings within the development site and the taking up of their associated yards. Topsoil and subsoil will be excavated to accommodate elements of the development including roads, paths, services, housing and basements as required (see section 2.4.2 for a breakdown of cut / fill and demolition volumes).

Based on the projected cut/fill and demolition volumes, as well as recent experience garnered during the construction of the nearby Hansfield development (approx. 1,250 units) it is estimated that there will be, on average, a maximum of nine HGV loads per working day which equates to 234 HGV loads per month. Allowing for increased rates of HGV movements during peak excavation periods it is estimated that the average will increase to eighteen HGV loads per day with further fluctuations for seasonal and holiday periods.

Measures will be put in place to minimise the volume of construction traffic generated by the development. These measures will include the storage of all excavated topsoil on site for re-use within the completed development. Similar efforts will be made to re-use excavated subsoil where possible.

The construction methodologies to be utilised in this development by the contractor will involve the use of prefabricated systems. This will result in lower numbers of construction workers on site which will result in less traffic than traditional construction methodologies.

During the 'fit out' period of the construction programme construction vehicles is likely to be dominated by LGVs with only the occasional rigid HGV.

Construction traffic will not be permitted to park on the public roads or within the general area outside the main site. Furthermore loading / unloading of all delivery / collection vehicles will not be permitted to be undertaken whilst the vehicle is parked on the public road network. All construction related traffic will be required to park within the site boundary. Construction traffic overspill concerns will be addressed immediately.

#### 2.4.5 Deliveries to site and storage of works materials

Unloading bays are to be provided for deliveries to the site within the hoarding perimeter. They will be accessible by mobile crane and forklifts. Appropriately demarcated storage zones will be used to separate and segregate materials.

#### 2.4.6 Environmental Management

The construction of the proposed development will be in accordance with the Outline Construction and Environmental Management Plan (CEMP) which accompanies this planning application (and will take into account the Schedule of Environmental Commitments presented within this EIA document). The CEMP will be a live document and is to be further developed by the appointed works contractor in advance of the commencement of the construction of the development. The CEMP will be fully implemented on site for the entire duration of the project construction phase. Environmental monitoring will be carried out during the construction phase as detailed within the Schedule of Environmental Commitments presented in Chapter 17.

The outline CEMP details the appropriate measures that will be implemented during construction of the proposed development to avoid, reduce or mitigate against the following:

- Excess Removal of Existing Trees, Hedgerows and Vegetation.
- Noise Pollution.
- Air Quality and Dust Pollution.
- Excess Surface Water Runoff from Site to adjacent watercourses and Water Pollution.
- Litter and Organic Waste Pollution.

#### 2.4.7 Waste Management

The construction of the proposed development will be carried out in adherence with the Outline Construction and Demolition (C&D) Waste Management Plan (WMP) which is incorporated into the CEMP which accompanies the application. The C&D WMP has been prepared in accordance with the

relevant guidance, in particular the “Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects”, published in 2021, by the Environmental Protection Agency (EPA).

The Outline C&D WMP will assist in providing a method for monitoring and auditing waste management performance and compliance for the duration of the construction of the development.

## 2.5 Operational Stage Waste Management

### 2.5.1 General Principles of Operational Waste Management Plan

An Outline Operational Waste Management Plan (OWMP) has been prepared and accompanies the Barnhill Strategic Housing Development (SHD) planning application. The OWMP considers the key resource and waste management policy and planning documents, including:

- Waste Management: Changing our Ways (1998)
- Preventing and Recycling Waste: Delivering Change (2002)
- Taking Stock & Moving Forward (2004)
- National Strategy on Biodegradable Waste Management (2006)
- A Resource Opportunity – Waste Management Policy in Ireland (2012)
- A Waste Action Plan for a Circular Economy (2020)
- Eastern Midlands Region Waste Management Plan 2015 – 2021
- Fingal County Council Segregation Storage, Presentation of Household and Commercial Waste Byelaws (2020)

The OWMP aims to provide a strategy to ensure maximum recycling, reuse, and recovery of waste with diversion from landfill, wherever possible.

Municipal waste is the waste type that will be most relevant to the operational phase of the proposed development. Municipal waste includes the following waste types:

- Residual waste, i.e., waste that cannot be recycled.
- Recyclable waste, e.g., plastic, paper and cardboard, metals, glass.
- Organic waste, i.e., compostable food and green / garden waste
- Bulky waste, e.g., waste that cannot fit in a wheelie bin.
- Waste Electric and Electronic Equipment (WEEE).
- Waste Liquids, i.e., oils, chemicals (paints adhesives, resins, detergents etc.)

A number of different residents and businesses will use the waste management facilities on site, including:

- Residential units
- Convenience Retail Unit
- Retail and Retail Services Units
- Café
- Community Centre
- Mobility Hub

### 2.5.2 Estimated Waste Arisings Generated by the Proposed Development

The OWMP provides calculations for the estimated waste to be generated by each use within the development on a weekly basis (measured in litres), summarised in Table 2.7.

**Table 2.7 Estimate Waste Generated per Week**

<b>Use Category</b>	<b>Estimated Litres of Waste Generated per Week</b>
Houses	80,620
Duplex	24,610
Apartments	132,530
Commercial	16,790

### 2.5.3 General Principles of Operational Waste Management Plan

The estimate of waste to be generated (see Table 2.7 above) has informed the design of waste management facilities within the proposed development, which consists of provision of individual waste storage areas for houses, and shared waste storage areas for apartments and commercial / community units. Shared waste storage areas will be managed by a property management company. All shared waste storage areas are contained either within building footprints or, where adjacent to public areas, are appropriately designed to ensure bins are screened from view.

All waste storage areas provide space for the segregation of residual, recyclable, and organic waste types.

A more detailed description of the waste storage arrangements for the housing and duplex units, the apartments and the commercial units / crèche is given in the Outline Operational Waste Management Plan that accompanies this planning application.

### 2.5.4 Waste Collection

There are numerous private contractors that provide waste collection services in the Fingal County area. It will be ensured that the various waste contractors servicing the proposed development hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered/permited/licensed facilities only.

All residential waste from shared WSAs, requiring collection by the appointed waste contractor will be transferred from the WSAs by personnel nominated by the building management company to the collection point. All commercial waste from shared and individual WSAs, requiring collection by the appointed waste contractor will be transferred from the WSAs by personnel nominated by the building management company to the collection point. Residents with individual WSAs will be responsible for transferring their own bins to/from their WSAs to the street for collection.





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Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 3

### Alternatives Considered

# Volume II

Environmental Impact Assessment Report



**AECOM**

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HOMES

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**SLR**

July 2022

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CHARTERED PLANNING CONSULTANTS



## Chapter 3 Alternatives Considered

### Contents

3	Alternatives Considered .....	3-2
3.1	Introduction .....	3-2
3.1.1	Author Information and Competency .....	3-2
3.1.2	Reference to Guidelines Relevant to Discipline .....	3-2
3.1.3	Methodology .....	3-2
3.1.4	Difficulties Encountered .....	3-3
3.2	Do-nothing Alternative .....	3-3
3.3	Alternative Locations .....	3-3
3.4	Alternative Layout .....	3-3
3.5	Alternative Design .....	3-7
3.6	Mitigation Measures .....	3-9
3.7	Conclusion .....	3-9
3.8	References .....	3-9

### Tables

Table 3.1	Summary of Design Alternatives .....	3-8
-----------	--------------------------------------	-----

### Figures

Figure 3.1	Barnhill: Alternative 1 .....	3-4
Figure 3.2	Barnhill Layout – Alternative 2 .....	3-5
Figure 3.3	Barnhill Layout – Alternative 3 – the Preferred Option .....	3-7





## 3 Alternatives Considered

### 3.1 Introduction

This chapter of the EIAR addressed alternatives considered for the proposed development. The proposed development consists of 1,243 residential units, plus commercial, community and associated uses. A detailed project description is provided in chapter 2.

#### 3.1.1 Author Information and Competency

This chapter has been prepared by planning consultant, Màiri Henderson of McCutcheon Halley Planning Consultants (BA Hons, MRTPI, MIH); and lead project architect, Greg Davey of Delphi Architects (Dip Arch Tech, B Arch(Hons) MRIA).

#### 3.1.2 Reference to Guidelines Relevant to Discipline

The development of the proposed design was undertaken with regard to the following planning policy and guidance documents:

- National Planning Framework 2040
- Eastern Midlands Regional Economic and Spatial Strategy 2019
- Fingal County Development Plan 2017
- Barnhill Local Area Plan 2019
- Sustainable Residential Development in Urban Areas 2009
- Urban Design Manual – A Best Practice Guide, 2009
- Design Manual for Urban Roads and Streets, 2013
- Urban Development and Building Heights, 2018
- Sustainable Urban Housing: Design Standards for New Apartments, December 2020
- The Planning System and Flood Risk Management, 2009
- Childcare Facilities Guidelines, 2001
- Regulation of Commercial Institutional Investment in Housing, May 2021

The assessment of alternatives has been assessed in accordance with the requirements set out in the EIA Directive (2011/92/EU, amended by 2014/52/EU) as transposed into Irish Legislation, i.e., the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended) and having regard to the Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environment Impact Assessment Reports, EPA May 2022 [EPA Guidelines].

#### 3.1.3 Methodology

The methodology used to prepare this chapter has involved:

- Review of the detailed design of the proposed development.
- Review of reports and drawings prepared as part of the planning application process.
- Review of iterative designs developed during the preparation of the planning application

The amended EIA Directive requires an EIAR to contain:

*“A description of the reasonable alternatives (for example in terms of project design, technology, 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 EPA Guidelines emphasize that the amended Directive refers to ‘reasonable alternatives...’ which are relevant to the proposed project and its specific characteristics. The EPA Guidelines sets out the following alternatives which may be considered, but also note that in some instances, some of the alternatives described will not be applicable to every project:

- ‘Do-nothing’ Alternative’
- Alternative Locations
- Alternative Layouts
- Alternative Designs
- Alternative Process

As the proposed development does not involve any industrial processes, 'alternative process' are not considered within this chapter. Each of the other alternatives are considered in turn.

### 3.1.4 Difficulties Encountered

There have been no difficulties encountered in the preparation of this chapter.

## 3.2 Do-nothing Alternative

The subject site is zoned in the Fingal County Development Plan 2017-2023 as RA (Residential Areas). The objective for RA lands is to "...provide for new residential communities subject to the provision of the necessary social and physical infrastructure."

The Barnhill Local Area Plan 2019 (Barnhill LAP) sets out a vision for the zoning objective to: "*Ensure that provision of high quality new residential environments with good layout and design, with adequate public transport and cycle links and within walking distance of community facilities. Provide an appropriate mix of house sizes, types, and tenures in order to meet household needs and to promote balanced communities.*"

Given the fact that the lands are zoned for Residential Development and that there is a shortage of housing supply in Fingal County Council's administrative area, should the proposed development not proceed it is likely that an alternative residential development proposal would be brought forward for consideration.

If no residential development proposal were to be brought forward, the lands would remain in agricultural use. The continued use of the lands for agriculture would be inconsistent with the policy objectives of the Fingal County Development Plan 2017 and the Barnhill LAP 2019. It would also result in lower patronage of the Hansfield Railway station and the Dunboyne to Clonsilla rail line, and would therefore be inconsistent with national, regional, and local policy objectives for enhanced use of sustainable transport modes.

## 3.3 Alternative Locations

The National Planning Framework 2040 (NPF) has a vision to facilitate the population growth of Ireland of approximately one million extra people, in a sustainable manner, with a focus on compact growth and sustainable travel options. The Regional Spatial and Economic Strategy for the Eastern Midlands Region identifies Blanchardstown (which includes the Barnhill LAP lands) as one of the development areas to deliver strong residential and employment growth along key public transport corridors.

As noted, the subject site is zoned in the Fingal County Development Plan 2017-2023 to provide for a new residential area. The Barnhill LAP sets out a vision for the site to develop a high quality new residential environment. The lands are adjacent to Hansfield SDZ and to the new Hansfield Railway station providing excellent sustainable transport links on the Dunboyne to Clonsilla rail line.

Given that the development of the lands is consistent with national, regional, and local planning policy, an alternative location for the proposed development was not considered.

## 3.4 Alternative Layout

The design approach for the proposed development is detailed in the Planning & Design Statement which accompanies the planning application. In summary, the proposed, layout was designed to function as a sustainable and successful residential neighbourhood. The layout, density and design approach were prepared in the context of the Barnhill LAP. The Statement of Consistency, which accompanies the planning application details how the proposed layout is consistent with the objectives of the Barnhill LAP.

The principles of the layout of the proposed development were informed by the objectives of the Barnhill LAP and established by:

- Site Analysis
  - Review of Existing Features
  - Topography & flooding
  - Existing Hedgerows and Trees
  - Existing Residential Units and road network
  - Location of Railway station.

- **Development Principles**
  - Response to development constraints, avoiding flood risk areas, set back from existing residential units etc.
  - Orientation – maximising the benefits of passive solar gain and ensuring adequate daylight and sunlight to the proposed units.
  - Movement Strategy & Linkages – providing priority to pedestrian and cycle linkages throughout the development and providing connective to the railway station.
  - Greenways & Landscaping – development of effective public amenity areas and retention of existing hedgerows and trees where possible.
  - Sustainable Development – achieving appropriate density levels within the site, while maximising residential amenity.
  - Housing Mix and Character Areas – ensuring that the development provides an appropriate mix of units and distinctiveness between different character areas.

An early iteration of the proposed layout was presented to Fingal County Council and An Bord Pleanála under Strategic Housing Development pre-planning consultations (reference ABP-306988-20), as detailed in Figure 3.1.

The proposed layout under pre-planning reference ABP-306988-20, provided for 1,155 residential units, a creche, village centre, and a railway plaza rising gradually from the village centre to the railway station, and lands set aside for a 16-classroom primary school. The proposal also included a public park of approximately 5.4 hectares and a series of pocket parks throughout the development.



**Figure 3.1 Barnhill: Alternative 1**

The following points were raised during the pre-planning consultation for further consideration by the application:

- That the village centre would benefit from a straight road alignment, rather than a diagonal route suggested in the LAP.

- That active building frontage should be maintained along the Barberstown Lane North pedestrian / cycling priority route,
- That active building frontage should be provided where possible onto both the Link Road and the upgraded Barberstown Lane South.
- That further clarification of how access would be provided to the train station platform and how this would inform the plaza route to the station.
- FCC sought further information on the proposed recreation and amenity provision and layout of same.

The applicant reviewed the feedback from Fingal County Council and An Bord Pleanála, and the layout was redesigned to provide:

- 1,248 Residential units, a creche in Station Plaza character area and commercial unit in the Village Centre.
- A realigned road in the village centre
- Active building frontage along Barberstown Lane North.
- Active building frontage, where feasible, onto both the Link Road and the upgraded Barberstown Lane South.
- An alternative design approach to accessing the Railway Station, with level access from the Village Centre to within 20m of the station.
- Repositioning of active amenity uses within the main park to provide the skateboard park adjacent to the playing pitch.

The revised layout was presented to Fingal County Council and An Bord Pleanála under pre-consultation reference ABP-312005-21, as detailed in Figure 3.2.



**Figure 3.2 Barnhill Layout – Alternative 2**

An Bord Pleanála issued an opinion on the proposed development on 1<sup>st</sup> April 2022. In respect of the layout the Board noted that:

- Further consideration should be given to the creation of a strong urban edge and streetscape to the Ongar-Barnhill Road and to Barberstown Lane South and on key routes within the development.
- Further consideration should be given to the mix of uses and level of local and community service provision proposed on the lands.
- Further clarification should be provided on the proposed pedestrian connection to Hansfield train station.
- Further information was required on the residential amenity of existing properties, by reason of overlooking and overshadowing.

As part of the consultation on the EIAR the following comments were also received from the National Transport Authority (NTA) in respect of the design and layout of the development:

- That the internal road layout provided a circulatory route through the development, designed to facilitate the through movement of cars. They recommended that further consideration be given to the NTA's Safe Routes to School Guidance.
- That there were multiple vehicular entrances to small residential groupings where greater use of filtered permeability could be applied.

In response to the issues raised during the pre-planning consultation and EIAR consultation phase the layout was redesigned to provide:

- A stronger urban edge and streetscape to the Ongar-Barnhill Road and to Barberstown Lane South. Key routes within the development were also reviewed to ensure that they provided a strong urban edge.
- An increase in the mix and level of local and community services proposed on the lands. The layout now provides for:
  - A creche of 942 m<sup>2</sup> to be delivered in Phase 1 of the development, within Station Plaza character area.
  - A convenience retailing unit of 370 m<sup>2</sup>
  - A medical centre of 344 m<sup>2</sup>, (GP/dental services) with 8 consulting rooms
  - Five independent retailing / retailing services units (with capacity for amalgamation to larger units if required).
  - A café of 158 m<sup>2</sup>.
  - A community centre of 359 m<sup>2</sup>.
  - An Office Hub of 501 m<sup>2</sup>. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
  - Land set aside for a primary school, to accommodate a minimum of 16 classrooms.
- Clear pedestrian and cycling priority routes to Hansfield Station. An area for commuter bike parking has also been provided adjacent to the railway station.
- Further set back of some of the apartments at Railway Quarter to reduce overlooking and overshadowing of existing residential units.
- A revision to the road layout within the scheme, by reducing the vehicular entrances to small residential groupings.
- A revision to the road layout to provide a through route for public transport vehicles only through the village centre. This removes the circulatory route through the development for private cars. However, it allows a circulatory route for public buses, ensuring easy public transport access to the village centre, railway station and future primary school.

The proposed layout also provided for a public park of 5.6 hectares and a series of pocket parks throughout the development. The public park, as detailed on the accompanying landscape masterplan layout and detailed drawings, includes the following amenities:

- Wetland area provided passive recreation and biodiversity benefits.
- Skateboard Park
- Playing pitch
- Multi-use games area
- Extensive walking / jogging routes through the park
- Active playing areas.

The revised site layout (Alternative 3 – the preferred option) is shown in Figure 3.3, and on development layout drawings which accompany the planning application.





**Figure 3.3 Barnhill Layout – Alternative 3 – the Preferred Option**

### **3.5 Alternative Design**

The applicant appointed three separate architectural practices to contribute to the design of the proposed development. This approach was used to enhance the level of distinctiveness between different character areas within the development. The proposed development consists of the following ten separate character areas:

- Barnhill Stream (designed by CWOB Architects)
- Barnhill Cross (designed by CWOB Architects)
- Barnhill Crescent (designed by CWOB Architects)
- Station Quarter South (designed by CWOB Architects)
- Parkside (designed by CPD Architects)
- Railway Quarter (designed by Delphi Architects)
- Station Plaza (designed by Delphi Architects)
- Village Centre (designed by Delphi Architects)
- Link Road East (designed by Delphi Architects)
- Link Road West (designed by Delphi Architects)

Delphi Architects acted as the architectural project lead to ensure a coherence and connectivity throughout the development. The landscape masterplan and detailed landscaping design was undertaken by Gannon & Associates Landscape Architects, which also ensured coherence across the development.

The design rationale for each character area is provided in the Planning and Design Statement which accompanies the planning application.

The design of individual units and landscaping proposes was refined and revised within each character area having regard to issues raised throughout the design process, as summarised in table 3.1.

**Table 3.1 Summary of Design Alternatives**

<b>Design Issue</b>	<b>Design Response</b>
Layout changes to create a more urban edge	<p>Units in Parkside character area amended from houses to duplex units fronting the Ongar-Barnhill Road.</p> <p>Units in Barnhill Stream amended from houses to duplex units fronting Barberstown Lane South</p> <p>Units at Barnhill Cross amended from houses and duplex units to apartment block to provide stronger interface with Village Centre character area.</p> <p>Unit design in Link Road East revised to provide direct overlooking of Barberstown Lane North</p> <p>Units at Link Road West were redesigned to have dual frontage onto external local road.</p>
Strengthen Pedestrian Linkages to Hansfield Railway Station	Units in the Village Centre were redesigned to remove arched access to Railway Plaza – providing a clearer through route to the station.
Overlooking and Over-shadowing of existing residential Units	Apartment blocks at Railway Quarter were redesigned to provide further separation between units and existing residential units.
Greater mix of commercial and community uses within the development.	Units within the village centre were redesigned from residential to commercial units, to provide a greater mix of commercial and community uses.
Micro-wind analysis of layout	Additional design measures were introduced to mitigate areas subject to distress from micro-wind flows. Design measures included the provision of additional landscaping, appropriate placing of wind breaking features (such as cycle bays, pergolas) and rearrangement of layout to provide wind breaks where needed. The Micro-Wind Climate Report which accompanies this application provides further detail.
Sunlight and Daylight analysis of layout.	Measures had been incorporated into the design and layout of the apartments across the scheme to maximise an optimum outcome of a sunlight and daylight analysis. These measures were informed by early testing and included considerations for orientation, balcony placement, apartment layout arrangements and layout of adjacent open spaces. The resulting analysis found the scheme to be above optimum using the latest BRE guidance. The Daylight and Sunlight Assessment Report which accompanies this application provides further detail.

### **3.6 Mitigation Measures**

The preferred layout option is as detailed in Figure 3.3 and accompanying planning drawings and particulars. The significant impacts and appropriate mitigation measures associated with the proposed development are detailed in the relevant discipline chapters throughout the EIAR. Chapter 17 provides a schedule of all mitigation measures proposed.

### **3.7 Conclusion**

The preferred layout for the proposed development of Barnhill Garden Village was chosen as it was considered to respond most effectively to:

- Policy objectives for Barnhill LAP,
- Topography and constraints of the site,
- Opportunities to provide sustainable development focused on active and public transport modes,
- Issues raised through pre-consultation with Fingal County Council, An Bord Pleanála, and
- Issues raised during the EIAR consultation process.

The proposed development is consistent with national, regional, and local planning policy and will create a new urban community, which has a strong distinct identity, excellent public transport links and high-quality recreation and amenity facilities.

The Planning and Design Statement which accompanies the planning application provides further details and analysis of the proposed layout. The accompanying Statement of Consistency details compliance of the proposed development with national, regional, and local planning policy and guidelines.

### **3.8 References**

National Planning Framework 2040, Government of Ireland

Eastern Midlands Regional Economic and Spatial Strategy 2019, Eastern and Midlands Region

Fingal County Development Plan 2017, Fingal County Council

Barnhill Local Area Plan 2019, Fingal County Council

Sustainable Residential Development in Urban Areas 2009, Department of Environment, Heritage, and Local Government

Urban Design Manual – A Best Practice Guide, 2009, Department of Environment, Heritage, and Local Government

Design Manual for Urban Roads and Streets, 2013, Government of Ireland

Urban Development and Building Heights, 2018, Department of Housing, Planning and Local Government

Sustainable Urban Housing: Design Standards for New Apartments, December 2020, Department of Housing, Local Government and Heritage

The Planning System and Flood Risk Management, 2009, Department of Environment, Heritage, and Local Government

Childcare Facilities Guidelines, 2001, Government of Ireland

Regulation of Commercial Institutional Investment in Housing, May 2021, Department of Housing, Local Government and Heritage

Guidelines on the Information to be Contained in Environment Impact Assessment Reports, EPA May 2022, Environmental Protection Agency (EPA)



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## CHAPTER 4

Landscape and Visual Impact

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 4 Landscape & Visual Impact

### Contents

4	Landscape & Visual Impact .....	4-3
4.1	Introduction and Methodology.....	4-3
4.1.1	Background .....	4-3
4.1.2	Assessment Methodology .....	4-3
4.1.3	Difficulties Encountered .....	4-5
4.1.4	Significant Risks.....	4-5
4.2	Policy Context .....	4-5
4.2.1	Legislation .....	4-5
4.2.2	County Development Plans .....	4-5
4.2.3	Landscape Related Designations .....	4-8
4.3	Description of Existing Environment .....	4-8
4.3.1	Landscape Baseline.....	4-8
4.3.2	Visual Baseline.....	4-10
4.3.3	Sensitive Receptors .....	4-13
4.4	Impact assessment .....	4-15
4.4.1	Aspects of the Development Which Have the Potential to Cause Landscape and Visual Effects 4-15	
4.4.2	Do-Nothing Scenario.....	4-18
4.4.3	Landscape Effects.....	4-18
4.4.4	Visual Effects .....	4-20
4.4.5	Direct/Indirect Effects .....	4-22
4.4.6	Cumulative Impacts.....	4-22
4.4.7	Unplanned Events (i.e. Accidents).....	4-23
4.4.8	Transboundary Impacts .....	4-23
4.4.9	Interaction with Other Impacts .....	4-23
4.5	Mitigation Measures; and Residual Impacts .....	4-23
4.5.1	Mitigation Measures .....	4-23
4.5.2	Residual Impacts.....	4-24
4.6	References .....	4-24

### Plates

Plate 4.1	View east from the crossroads 1km west of the Development Site, near the border triangle of Counties Dublin, Kildare and Meath (note: typical view over the flat agricultural landscape, with viewing distance restricted by intervening hedgerows) .....	4-11
Plate 4.2	View south from a similar location to Viewpoints 1 & 2, to the front of the existing residential properties along Barberstown Lane North (note: the Dublin Mountains are partly visible in the distance, above the recently cut roadside hedgerow).....	4-11
Plate 4.3	View north from the location of Viewpoint 3 on Pakenham Bridge towards the Hansfield SDZ (note: the Royal Canal Way footpath is at a lower level).....	4-12
Plate 4.4	View south from a location on the road just north-west of Hansfield Railway station (note: the Dublin Mountains are partially visible in the distance, but there are many manmade elements visible in the foreground, reducing the scenic amenity).....	4-13
Plate 4.5	Map showing the location of the different character areas within the Site .....	4-16

## Figures (included at the end of the chapter)

Figure 4.1 Landscape Baseline and Viewpoint Locations

## 4 Landscape & Visual Impact

### 4.1 Introduction and Methodology

#### 4.1.1 Background

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the likely significant effects of the proposed Strategic Housing Development (SHD) at Barnhill, Dublin 15, to be known as Barnhill Garden Village, on the environment in respect of Landscape and Visual Amenity.

The findings of this assessment have been based on the detailed project description contained in Chapter 2 of this EIAR and the Landscape Design Statement which accompanies the planning application.

The development area, which is 29.6 ha in total, covers the majority of the lands covered by the Barnhill Local Area Plan (LAP), February 2019, and will hereafter be referred to as 'the Development Site' or 'the Site'. The Barnhill SHD / Barnhill Garden Village will be referred to as 'the Proposed Development'.

This chapter should be read in conjunction with the following plates/appendices, which have been used to inform the EIAR chapter:

- **Figure 4.1:** Landscape Baseline and Viewpoint Locations; and
- **Appendix 4.1:** Photomontages and CGI Booklet.

It is accepted best practice to acknowledge that whenever you place built development into green field land it will generate significant landscape and visual effects. This doesn't mean that development is inappropriate, it simply means that built form is being introduced into an area that has few or limited structures and will inevitably result in at least localised, significant, landscape and visual effects.

#### 4.1.2 Assessment Methodology

The Environmental Protection Agency (EPA) Guidelines on the information to be contained in EIARs (May 2022) suggest the following typical headings that may be included in respect of the prescribed environmental factor 'The Landscape'. These were incorporated in this assessment, as appropriate:

- Landscape Appearance and Character;
- Landscape Context;
- Views & Prospects; and
- Historical Landscapes.

However, in the absence of more detailed Irish guidance, the assessment contained within this Chapter is based on the Third Edition of the Guidelines for Landscape and Visual Impact Assessment issued by the Landscape Institute and Institute of Environmental Management and Assessment (hereinafter referred to as 'GLVIA3'). These guidelines are widely accepted as best practice for Landscape and Visual Assessment (LVIA) in Ireland.

GLVIA3 emphasises that landscape and visual effects are related but independent issues; landscape effects are changes in the landscape, its character and quality; while visual effects relate to the appearance of these changes and the resulting effect on visual amenity.

The assessment of overall landscape and visual effects and their significance is defined in terms of the relationship between the sensitivity of the landscape/visual receptors and the magnitude of the change.

As GLVIA3 (paragraph 2.23) states, professional judgement is an important part of the LVIA process: whilst there may be some scope for objective measurement of landscape and visual changes, much of the assessment must rely on qualitative judgements. It is critical that these judgements are based upon a clear and transparent method so that the reasoning can be followed and examined by others.

GLVIA3 sets out a framework for making judgements about the level of effects that may result from a change or development. It describes a step by step approach in which:

- judgements about the value and susceptibility of the receptor are combined into a judgement about sensitivity;
- judgements about the size/scale of the effect, its geographical extent and its duration and reversibility are combined into a judgement about the magnitude of the effect; and finally,
- the judgements about sensitivity of the receptor and the magnitude of the effect are combined to judge the level of the effect. If the assessment forms part of an EIA, a threshold may then be identified to show which effects are significant or not.

GLVIA3 is not prescriptive about exactly how the various judgments required in this framework should be made. This is a matter for individual practitioners to decide and explain. In this document it has been assessed that Major or Major/Moderate levels of effect are significant.

The full LVIA methodology used by SLR Consulting Ireland, the authors of this Chapter, is described in **Appendix 4.2**. Please note that much of the terminology used in assessing the landscape and visual effects is in accordance with the above-mentioned EPA Guidelines. However, the terminology used in the SLR LVIA methodology to describe the level of effects (= "significance of effects" in the EPA Guidelines) differs slightly from said EPA Guidelines, based on examples provided in GLVIA3.

#### 4.1.2.1 Consultations

Please refer to Chapter 1 Introduction of the EIAR for a detailed description of the consultation process carried out. In its Pre-Application Consultation Opinion, dated April 2022, An Bord Pleanála (ABP) requested that a detailed LVIA be provided, as part of the planning application. ABP noted that the development strategy for the lands and the height and scale of the Proposed Development should consider key views into the development, including those from the east at Pakenham Bridge, as well as key internal vistas, such as views east and west along the proposed village centre / main street.

#### 4.1.2.2 Author (s)

The LVIA including site work and completion of baseline plates was carried out by Anne Merkle, an Associate Landscape Architect with SLR Consulting Ireland. Anne graduated from the University of Applied Sciences in Nürtingen (Germany) in Landscape Architecture (Dipl.-Ing. (FH)), in 2002. She has 20 years' experience working for landscape consultancies in Ireland, specialising in Landscape and Visual Impact Assessments for a wide range of projects, including mixed developments, quarries, waste recovery facilities, wind farms and powerlines. In 2017, Anne successfully completed an MSc in Biodiversity and Land Use Planning (NUIG). She is a full member of the Irish Landscape Institute (ILI) since 2005.

A technical review of the LVIA was carried out by Maritta Boden, a Technical Director for Landscape Architecture at SLR. Maritta holds a BA Hons in Landscape Architecture, a MSc in Environmental Impact Assessment and is a Chartered Member of the Landscape Institute (CMLI). She has over 20 years of professional experience in Landscape and Visual Impact Assessment.

#### 4.1.2.3 Technical Standards

All photography and photomontages were carried out/produced by 3D Design Bureau. Please refer to the 'Methodology for Verified View Montages' provided in the Photomontages and CGI booklet in **Appendix 4.1**.

No specific technical standards were referred to as part of this LVIA.

#### 4.1.2.4 Sources of Information

The assessment is based upon a desk top assessment of relevant plans, guidance and landscape character assessments, as well as thorough site assessments carried out in May 2019 and May 2022. The conditions during both site visits were overcast, but with good visibility. The assessment concentrated on publicly accessible locations such as the road and public footpath networks, and residential and outdoor recreational areas.

The desktop study and field work were informed by:

- the Fingal Development Plan 2017-2023;
- the Draft Fingal Development Plan 2023-2029;
- the Barnhill Local Area Plan February 2019;
- the Kildare County Development Plan 2017-2023;
- the Draft Kildare County Development Plan 2023-2029
- the Meath County Development Plan 2021-2027;
- digital and paper (Ordnance Survey Ireland) mapping at different scales and;
- information available on the internet (such as information on recreational facilities and nature conservation sites).

#### 4.1.2.5 Study Area

The general EIAR study area includes the Site to be developed and immediate boundaries / adjacent roads (refer to **Figure 4.1**). For the purpose of the LVIA and to provide landscape context, the study area was extended to an area of up to 2 km surrounding the general EIAR study area. Following the

desktop study and field survey, a larger study area greater than 2 km was not found necessary, due to the visual enclosure of the local area, owing to the flat topography surrounding the Site and abundance of hedgerows in the local landscape to the west, south and east, as well as the urban environment to the north of the Site. It should be noted that the visual envelope, i.e. the area from where the Development Site is actually visible, is much smaller than the study area.

#### 4.1.3 Difficulties Encountered

No difficulties were encountered during the desktop study, field survey or in the preparation of this assessment.

#### 4.1.4 Significant Risks

There are no known significant risks to human health or environmental effects, which may occur in relation to the Proposed Development in landscape and visual terms.

## 4.2 Policy Context

The following paragraphs set out the regulatory background regarding LVIA in Ireland in general and the site-specific policy context relevant to the Proposed Development in particular.

### 4.2.1 Legislation

In 2002, Ireland ratified the European Landscape Convention which promotes the protection, management and planning of landscapes. The National Landscape Strategy for Ireland 2015-2025 was published “to ensure compliance with the European Landscape Convention and establish principles for protecting and enhancing the landscape while positively managing its change”.

Article 1a of the European Landscape Convention defines landscape as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors”. This definition has been included in the Planning and Development (Amendment) Act 2010, along with the requirement that objectives relating to landscape shall be included in development plans.

There is no Irish legislation specifically governing the preparation of LVIA's.

### 4.2.2 County Development Plans

The following documents have been considered as part of the policy review:

- The Fingal Development Plan (FDP) 2017-2023;
- The Draft FDP 2023-2029;
- The Barnhill Local Area Plan (LAP), February 2019;
- Kildare County Development Plan (Kildare CDP) 2017-2013;
- The Draft Kildare CDP 2023-2029; and
- The Meath County Development Plan (Meath CDP) 2021-2027.

The Fingal Development Plan (FDP) 2017-2023 is the statutory plan detailing the planning policies/objectives of the authority, covering the Development Site. The Barnhill LAP, February 2019, which forms part of the current FDP, provides details on the development strategy for the lands in question. Designations/policies/objectives, contained in these two documents, of relevance to this assessment are listed below. The Draft FDP 2023-2029 was also checked for any relevant likely changes to the current designations/policies/objectives.

Co. Kildare and Co. Meath's administrative boundaries lie within 500m to the west of the Development Site. Therefore, the Kildare County Development Plan (Kildare CDP) 2017-2013, the Draft Kildare CDP 2023-2029 and Meath County Development Plan (Meath CDP) 2021-2027 were also checked for any relevant designations/policies/objectives.

Refer to **Figure 4.1** – Landscape Baseline and Viewpoint Locations for the location and extent of the relevant designations within the study area.

#### 4.2.2.1 The Fingal Development Plan 2017-2023 and Draft Fingal Development Plan 2023-2029

##### Landscape / Views & Prospects

Section 9.4 - Landscape of the current FDP provides the following Landscape Character Assessment Objectives, relevant to this assessment.



- Objective NH33: *“Ensure the preservation of the uniqueness of a landscape character type by having regard to the character, value and sensitivity of a landscape when determining a planning application.”*
- Objective NH34: *“Ensure development reflects and, where possible, reinforces the distinctiveness and sense of place of the landscape character types, including the retention of important features or characteristics, taking into account the various elements which contribute to their distinctiveness such as geology and landform, habitats, scenic quality, settlement pattern, historic heritage, local vernacular heritage, land-use and tranquillity.”*
- Objective NH35: *“Resist development such as houses, forestry, masts, extractive operations, landfills, caravan parks and large agricultural/horticulture units which would interfere with the character of highly sensitive areas or with a view or prospect of special amenity value, which it is necessary to preserve.”*
- Objective NH36: *“Ensure that new development does not impinge in any significant way on the character, integrity and distinctiveness of highly sensitive areas and does not detract from the scenic value of the area. ...”* (Note: The remainder of Objective NH36 refers to “new development in highly sensitive areas” and is therefore not applicable to the Development Site.)
- Objective NH37: *“Ensure that new development meets high standards of siting and design.”*
- Objective NH38: *“Protect skylines and ridgelines from development.”*

The Draft FDP 2023-2029 contains identical objectives in a slightly different order (refer to Section 9.6.14 Landscape Character Assessment), except for Objective NH37, which appears to have been removed.

Section 9.4 - Landscape of the current FDP further provides information on the Views and Prospects to be protected within Fingal and sets out the following objective.

- Objective NH40: *“Protect views and prospects that contribute to the character of the landscape, particularly those identified in the Development Plan, from inappropriate development”.*

Within 2km of the Development Site, the following views requiring protection are identified on Green Infrastructure Map 1 (Sheet No.14) of the current FDP. As these views are not numbered or described in writing in the FDP, the views below are SLR’s numbering and descriptions (also refer to **Plate 4.1**):

- View 1: Views from the local roads east of the Royal Canal, in the vicinity of Collins Bridge.
- View 2: Views from the roads immediately north of the River Liffey, from St. Edmondsbury in the west to Palmerstown Lower in the east.

The Draft FDP 2023-2029 contains an identical objective and identifies the same views on the Green Infrastructure maps.

The Development Site is not visible in any of the two views identified. Further to that, the proposed tall buildings are highly unlikely to become visible in these views, due to abundant intervening vegetation, as well as topography. These views are therefore not be considered further, as part of this assessment.

### **Fingal Zoning Objectives**

Section 11.8 of the current FDP lists the zoning objectives for the plan area. The Development Site is fully located within an area zoned “RA” Residential Area. The objective for this zoning is set out as:

*“Provide for new residential communities subject to the provision of the necessary social and physical infrastructure.”*

The vision for this zoning is set out as:

*“Ensure the provision of high quality new residential environments with good layout and design, with adequate public transport and cycle links and within walking distance of community facilities. Provide an appropriate mix of house sizes, types and tenures in order to meet household needs and to promote balanced communities.”*

In the Draft FDP 2023-2029 the Development Site is proposed to include some areas zoned “OS” Open Space, in addition to the Residential Area zoning. This is based on the provisions made in the Barnhill LAP.

#### **4.2.2.2 Barnhill Local Area Plan, February 2019**

The Barnhill LAP contains the following information/objectives/guidelines, which are of relevance to this LVIA.

Road Network (2.8):

*“The LAP has provided for the proposed Ongar-Barnhill access road, approved by the Council as Local Authority own development under Part 8 of the Planning and Development Regulations (as amended)*

in 2007. The approved road traverses the western part of the lands crossing the railway line in a north-south direction, with a spur at its southern end into the Plan lands broadly along the alignment of the existing rural road, Barberstown Road South.” It should be noted that this road forms part of the future baseline for the Site, as it will be constructed, prior to the commencement of the Proposed Development.

#### Green Infrastructure and Barnhill (7.3) / Landscape (7.3.1):

- *“GI5 Protect, insofar as is possible, existing trees and hedgerows which are of amenity or biodiversity value and/or contribute to landscape character and ensure that proper provision is made for their management.*
- *GI6 Ensure that any development in proximity to hedgerow or a hedgerow which forms a link with other habitats retains such features or replaces such features with equal or greater areas of native trees, hedgerows and shrubs.*
- *GI7 Ensure that townland boundaries are maintained and designed into development proposals where feasible. At all times townland boundaries should be demarcated as part of a design layout.*
- *GI8 Ensure that adequate measures are taken to protect residential amenities adjacent to roads and the train line. Ensure that plans, designs, detailed schedules and specifications of work including management plans, where privately managed, for all public open spaces and green infrastructure are integral to all planning applications.”*

#### Building Heights and Landmark Buildings (7.5):

- *“BH1 Building height will primarily range between 4-6 storeys (or greater subject to high quality design and visual impact) along the rail line and canal and between 2-3 storeys elsewhere on the LAP lands.*
- *BH2 Accept local landmark and feature building elements over the stated building heights at key locations, where they contribute to the visual amenity, civic importance, quality design and legibility of the area. The locations are to be agreed with the Planning Authority at application stage and will be subject to relevant government guidelines.”*
- *The “Urban Development and Building Heights: Guidelines for Planning Authorities”, December 2018, (UDBH Guidelines) also apply to the Barnhill SHD planning application.*  
The UDBH Guidelines state that in the event of making a planning application the applicant shall demonstrate to the satisfaction of the Planning Authority / An Bord Pleanála that the proposed development satisfies development management criteria:
  - At the scale of the relevant city / town.
  - At the scale of the district / neighbourhood / street.
  - At the scale of the site / building

SPPR 3 of the UDBH Guidelines states that:

*“It is a specific planning policy requirement that where:*

- (A) 1. An applicant for planning permission sets how a development proposal complies with the criteria above; and*
- 2. the assessment of the planning authority concurs, taking account of the wider strategic and national policy parameters set out in the National Planning Framework and these guidelines; then the planning authority may approve such development, even where specific objectives of the relevant development plan or local area plan may indicate otherwise...”*

The Material Contravention Statement and the Planning & Design Statement which accompanies the planning application set out how the proposed development complies with the relevant development management criteria set out in the UDBH Guidelines.

#### Urban Design Guidelines - Views and Prospects (10.9):

- *“Protect and enhance views and panoramas to key local vantage points particularly views and general prospects towards the Dublin mountains to create a sense of place, coherence and appreciation for the overall setting of the lands.”*

#### 4.2.2.3 Meath County Development Plan 2021-2027

Section 8.18 of the current Meath CDP sets out the following objective regarding views and prospects.

- Objective HER OBJ 55: *“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.”*

No such views are located in the vicinity of or directed towards the Development Site.

#### 4.2.2.4 Kildare County Development Plan (Kildare CDP) 2017-2013 and draft Kildare CPD

Section 14.9 of the current Kildare CDP sets out the following policies regarding Scenic Routes and Protected Views.

- Policy SR1: “Protect views from designated scenic routes by avoiding any development that could disrupt the vistas or disproportionately impact on the landscape character of the area, thereby affecting the scenic and amenity value of the views.”
- Policy WV2: “Preserve and enhance the scenic amenity of the river valleys and canal corridors and the quality of the vistas available from designated views.”

None of the Kildare designated scenic routes are located within 2km of the Development Site. One of the designated views is located just over the 2km to the south-west, i.e. RC2 – Views to and from Cope Bridge Newtown/Leixlip.

The Draft Kildare CDP 2023-2029 lists the same designated view RC2 but the policies regarding scenic routes and protected views appear to have been omitted.

The Development Site is not visible in view RC2. Further to that the proposed tall buildings are highly unlikely to be visible in this view, due to abundant intervening vegetation, as well as topography. This view was therefore not be considered further, as part of this assessment.

### 4.2.3 Landscape Related Designations

Landscape related designations of relevance to the LVIA, together with recreational facilities are shown on Figure 4.1 and detailed below. It should be noted that the LVIA only considers nature conservation assets where they are distinct local landscapes or tourist/visitor attractions and where views are an important contributory factor to the experience and/or to inform the assessment of landscape value. In terms of recreational facilities, these have been identified to inform the selection of viewpoints.

#### 4.2.3.1 Protected Nature Conservation Sites

The following nature conservation sites are located within the Study Area:

- Site code 02103: Royal Canal Proposed Natural Heritage Area (pNHA)
- Site code 00128: Liffey Valley Proposed Natural Heritage Area (pNHA).

#### 4.2.3.2 Outdoor Recreational Facilities

The following recreational facilities lie within the Study Area:

- The Royal Canal Way long distance walking route follows the Royal Canal, just east of the Development Site.
- The Westmanstown Golf Club, the Golf Course at Luttrellstown Castle, the Luttrellstown Castle Resort and the Beechpark public park are located within 2km to the south-east of the Development Site, all to the east/south of the Royal Canal.

## 4.3 Description of Existing Environment

### 4.3.1 Landscape Baseline

#### 4.3.1.1 Existing Relevant Landscape Character Assessments

Three Landscape Character Assessments, contained within the Development Plans for Fingal, Co. Meath and Co. Kildare, cover the Development Site and associated study area. Based on these assessments, the landscape is described as follows:

#### **Fingal – Landscape Character Assessment of Fingal**

Section 9.4 - Landscape of the current FDP provides information on the Landscape Character Assessment of Fingal. It classifies six Landscape Character Types (LCT), each of which is assigned a value and sensitivity. The Development Site is fully located within the ‘River Valleys and Canal Character Type’, which is categorised as having high value and high sensitivity to development.

Areas within this high sensitivity character type “*which have a low capacity to absorb new development are identified as highly sensitive areas on the Green Infrastructure Maps*”. The nearest such ‘highly sensitive’ area is located immediately south of Barberstown Lane South, which marks the southern boundary of the Development Site.

The Fingal River Valleys & Canal Character Type, which covers the south-western tip of the Fingal area, i.e. the area south of the N3, is described in the FDP as follows:

*“The Tolka and Liffey valleys together with the Royal Canal Corridor are the main landscape features in this area. The Tolka and Liffey valleys are characterised by areas of grassland along meandering river valleys which, especially in the case of the Liffey, are well wooded at the edge of the floodplain and along the valley slopes. Areas of both valleys support recreational facilities along their corridors. A number of institutional and private demesnes along the valley edges maintain a rural and wooded character to the areas. However, housing estates are beginning to encroach into corridor areas. In recognition of the special amenity value of this area a Special Amenity Area Order (SAAO) was made for the Liffey Valley between Lucan and Chapelizod in 1990. This designation includes specific controls over development. The River Liffey is also a proposed Natural Heritage Area (pNHA). The Royal Canal corridor is also included in this zone. The canal and its corridor provide valuable habitat for fish and other species and is a pNHA. The canal itself and the many bridges and other structures associated with it are an integral part of the County’s architectural heritage. This Character Type is categorised as having a high value, due to the visual and recreation qualities contained therein. This is evident by virtue of the High Amenity zoning and SAA designation in the area in addition to the dense tree belts and steep river valley slopes. The river valleys and the canal are also important for their ecology and biodiversity.”*

### **Co. Meath – Meath Landscape Character Assessment**

The boundary with Co. Meath is located 250m to the north-west of the Development Site. The current Meath CDP contains the Meath Landscape Character Assessment in Appendix 5, which places the area to the west of the county boundary in Landscape Character Area (LCA) 11 - South East Lowlands.

LCA 11 is categorized as being of very high landscape value, medium landscape sensitivity and regional landscape importance. Medium sensitivity is defined as *“a landscape that can accommodate a certain amount of change without affecting the overall character. There are unlikely to be large numbers of people using or viewing this landscape.”*

The description of LCA 11 in the Meath Landscape Character Assessment includes the following:

*“The South East Lowlands encompass the area between the Hill of Tara to the southern border and the Dunboyne environs. The landscape is predominantly rolling lowland with large areas dominated by attractive estate landscapes with associated parkland, particularly surrounding Dunsany, Dunboyne and the north of Dunshauglin. This parkland has a mix of smaller estates and stud farms that create a distinctive character. ...*

*The land is extensively used for pasture in the north, with arable land more prominent further south particularly in the Ratoath environs. The landscape condition gradually deteriorates to the south of Dunshauglin where development pressure from the Dublin metropolitan area becomes more evident (particularly around Ratoath and Dunboyne.)*

*The landscape is relatively enclosed due to the topography and wooded hedgerows although longer views are afforded at the top of many drumlins. Many of the views in the lowlands are restricted to those along the road corridors and the immediate hinterland.”*

### **Co. Kildare – Landscape Character Assessment from the Kildare CDP.**

The boundary with Co. Kildare is located 500m to the south-west of the Development Site. The current Kildare CDP contains a section on Landscape Character Assessment, which places the area west of the boundary in the ‘Northern Lowlands LCA’. This is classed as being of low sensitivity, i.e. *“Areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area”*. No description of the Northern Lowlands LCA is provided in the Kildare CDP.

#### **4.3.1.2 The Landscape of the Site and its Context**

The Development Site comprises several flat agricultural fields under pasture, bound by dense hedgerows, which are typically lined with mature trees. Eight existing residential properties and one industrially use building complex are located within the Barnhill LAP lands but will not form part of the planning application site. The lands to the east, south and west beyond the Development Site have similar landscape characteristics.

To the north, the Site is bordered by the Dunboyne-Clonsilla railway line with the emerging urban centre associated with the Hansfield Strategic Development Zone (SDZ) located beyond. There is no hedgerow along the boundary with the railway line and the Hansfield SDZ, parts of which are still under construction, giving the northern end of the Site a slightly degraded appearance.

The Site is located on the settlement edge, and at the interface with rural agricultural land, resulting in a transitional local character. No prominent natural features exist in the local landscape.

**Vegetation / Enclosure:** The agricultural landscape to the west, south and east of the Development Site is in a good condition with well-managed fields and hedgerows. Hedgerows, whilst well-maintained, are not typically cut very low and in combination with the many hedgerow trees restrict views in many locations. As a result, the scale of the landscape feels enclosed in many locations. This can however change dramatically, where views open up, in particular where distant views of the Dublin Mountains are available, in a southern direction. While located in close proximity to many urban centers the majority of the Development Site has a rural character.

**Topography / waterbodies:** Levels within the Development Site are around 60m Above Ordnance Datum (AOD), falling very slightly from north to south. Barnhill stream crosses the southern portion of the lands in an east-west direction, without causing discernible level changes. The topography surrounding the Development Site is similarly flat for many kilometers, except for 2km to the south-east, where levels drop steeply by up to 30m towards the River Liffey.

**Infrastructure:** The Royal Canal is located east of the Development Site. It is enclosed in character, as it is set at a slightly lower elevation than the surrounding land and is flanked, for the most part, on both sides by tall hedgerows. The Dublin-Maynooth Railway line runs parallel to the canal on its eastern side but is well screened from the canal by the canal-side hedgerows.

The R149 Clonee to Leixlip Regional Road is the main transport route through the study area, passing the western boundary of the Development Site. The R121 Clonsilla to Lucan road passes 300m to the south-east of the Site, east of the Royal Canal and the Dublin-Maynooth railway line. The N3/M3 National Road can be accessed via the R149, just outside Clonee and, within 3km north of the Development Site.

These higher-class roads are connected by a dense network of local roads, including Barberstown Lane North, which crosses the northern half of the Site in a north-west/south-east direction and Barberstown Lane South, which marks the southern boundary of the Site. The two roads meet in the eastern corner of the Site, with a road continuing south-east, crossing over the Royal Canal at Pakenham Bridge and the adjoining railway line, before meeting the R121 a further 200m south-east.

A new road, the Ongar to Barnhill Distributor Road, is permitted and will be constructed prior to any works taking place as part of the Proposed Development. This road will cut through the western half of Site, linking the existing Ongar Distributor Road beside the Hansfield Educate Together National School to the north, with the R149 in the south-western corner of the Site.

Another sign of the manmade influences in the local landscape is a high voltage electricity line, which crosses the north-western corner of the Development Site, with two steel pylons located within the Site.

**Settlement:** As mentioned, the Hansfield SDZ is located immediately to the north of the Development Site, with the neighbourhood of Ongar located to the north of Hansfield and the Dublin suburbs of Clonsilla and Blanchardstown to its east. The Kildare town of Leixlip is located 2km to the south-west and the Meath town of Dunboyne 3km to the north-west. Ribbon development and one-off housing is found frequently along the roads within the agricultural landscape between these urban centres.

**Aesthetic / Perceptual:** The southern section of the Site is generally tranquil with some noise apparent from adjacent roads. This changes along its western boundary with the busy R149 and along its northern boundary, where the adjoining railway line and Hansfield SDZ present strong urban influences, including increased movement and noise. The lands immediately adjoining the railway line to the north, currently are under construction

**Local Landscape Character:** It is considered that the Site and the lands adjoining to the south and west are not consistent with the description of the River Valleys and Canals LCT, as these lands do not contain well wooded meandering river valleys with sloping sides and are visually separated from the Royal Canal by the mature hedgerows running along its corridor. The flat agricultural pastoral landscape with well managed hedgerows lined with trees is more akin to the description of County Meath LCA11 – South East Lowlands.

#### 4.3.2 Visual Baseline

The visibility of the Development Site was initially assessed by a desktop study of OSI Discovery Maps (1:50,000) and aerial/satellite photography, followed by verification in the field. It was found that views towards the Development Site are fully screened from the vast majority of locations within the study area, beyond the boundaries of the Site. This is due to the flat topography in combination with tree-lined hedgerows present within the local landscape (refer to **Plate 4.1** below).



Except for intermittent locations along the R149 within 1.3km to the south-west there are no views towards the Site from locations within the agricultural landscape to the south and west. To the east, there are no views from any locations east of the Royal Canal, due to the dense vegetation along the canal corridor. To the north, there are no views from locations beyond the first row of buildings within the Hansfield SDZ.

Eight viewpoints were selected to represent the range of visual receptors present within and surrounding the Development Site, i.e. residential receptors, rail and road users, as well as recreational users of the Royal Canal. When the photography was taken, the final viewpoint locations were adjusted to avoid screening vegetation, as far as was practicable, in order to represent the most open views towards the Site. The location of the selected viewpoints is illustrated on **Figure 4.1** and the viewpoint photography, as well as the associated Verified View Montages (VVM) in **Appendix 4.1**.



**Plate 4.1** View east from the crossroads 1km west of the Development Site, near the border triangle of Counties Dublin, Kildare and Meath (note: typical view over the flat agricultural landscape, with viewing distance restricted by intervening hedgerows)

**Viewpoints 1 & 2** represent views from the front of the seven existing residential properties at the centre of the Development Site, as well as views from Barberstown Lane North. Views into the neighbouring fields and the wider landscape are restricted by the roadside hedgerows. Although, it should be noted that when the roadside hedgerows are newly trimmed, views towards the Dublin Mountains in a southern direction are possible (as was the case during the 2019 field survey, refer to **Plate 4.2** below). Such views are also expected to be available from the upper floors of the properties along this road at all times, as there is little vegetation in their front gardens, which would restrict views.



**Plate 4.2** View south from a similar location to Viewpoints 1 & 2, to the front of the existing residential properties along Barberstown Lane North (note: the Dublin Mountains are partly visible in the distance, above the recently cut roadside hedgerow)

**Viewpoint 3** represents views from Pakenham Bridge (Royal Canal at Barberstown), immediately east of the Development Site. Due to the slightly elevated location on the bridge, as well as a break in the line of mature trees along Barberstown Lane North, a small section of the easternmost agricultural field within the Site is visible. The remainder of the Site is screened by intervening vegetation.

When looking in a northern direction from the same location as Viewpoint 3 on Pakenham bridge, the buildings within the Hansfield SDZ, including some of the tall apartment blocks, are visible in the background (refer to **Plate 4.3** below). These have resulted in an urban influence on the otherwise rural setting of the Royal Canal in this area. Views from the Royal Canal Way footpath are restricted along the canal corridor, as it is at a lower elevation and views are typically blocked by tall hedgerows along the canal. There are no residential properties in the vicinity of Viewpoint 3.



**Plate 4.3** View north from the location of Viewpoint 3 on Pakenham Bridge towards the Hansfield SDZ (note: the Royal Canal Way footpath is at a lower level)

**Viewpoint 4** represents views from locations along Barberstown Lane South, including two residential properties along this road. As with Viewpoints 1 and 2, views into the neighbouring fields and wider landscape are restricted by the roadside hedgerows. Both residential properties along this road have mature vegetation along and within their property boundaries, further restricting views (including during winter months) towards the Development Site, which is located to the north of the road. Potential views towards the Dublin Mountains from this road, are in the opposite direction (i.e. south) to that of the Site (i.e. north).

**Viewpoints 5 & 6** represent views from the R149, along the western boundary of the Development Site, including 7 residential properties, along this section of the road. Again, views into the neighbouring fields and wider landscape are restricted by the roadside hedgerows.

Four properties on the western side of the R149, to the north of the junction with Barberstown Lane South, have little vegetation to the front of the properties. However, since they are all single storey properties, the hedgerow along the eastern boundary of the road provides a dense screen towards the Site (refer to Viewpoint 5). It should be noted that parts of this hedgerow are likely to be removed to facilitate the construction of the Ongar to Barnhill Distributor Road, prior to the Proposed Development being commenced.

Two residential properties on the western side of the R149, to the north of the junction with Barberstown Lane North, have ample screening along their boundary with the road and therefore little views towards the Site. The one property on the eastern side of the R149 is surrounded by dense hedgerows and many trees. However, views of the Site through gaps within the trees from the upper floor of this property are highly likely.

**Viewpoint 7** represents views towards the Development Site from the R149 in the vicinity of the bridge over the Dunboyne-Clonsilla railway line, as well as views from the Hansfield SDZ to the north of the Site in general (also refer to **Plate 4.4** below, taken from outside the Hansfield railway station). There are no hedgerows along the railway corridor, which facilitates views into the agricultural fields forming the northern section of the Site. The Dublin Mountains are distantly visible, partially screened by intervening vegetation. The scenic amenity of these views is however reduced markedly by the many manmade elements visible, such as electricity pylons, the fencing along the railway line and in adjoining field, lighting poles and existing buildings.





**Plate 4.4** View south from a location on the road just north-west of Hansfield Railway station (note: the Dublin Mountains are partially visible in the distance, but there are many manmade elements visible in the foreground, reducing the scenic amenity)

**Viewpoint 8** represents intermittent views towards the Development Site from the R149 within 1.3km to the south-west of the Site (i.e. an approximately 1.5km long section of the road). The available views from this section of the R149 are the only longer distance views towards the Site. They are facilitated by a lack of tall trees and tightly cut hedgerows along some sections of the road in this area. While the existing agricultural fields within the Development Site are not visible in these views, tall structures within the Site would potentially become visible, as are some of the taller buildings within the Hansfield SDZ in the background of these views.

While there are a number of residential properties along this section of road, views towards the Site are screened by ample vegetation along the property boundaries and/or the main windows of these properties do not appear to be angled towards the Site.

### 4.3.3 Sensitive Receptors

#### 4.3.3.1 Landscape Receptors

The landscape receptors potentially affected by the Proposed Development and therefore considered as part of the assessment of landscape effects, are:

- the individual landscape elements making up the Development Site, i.e.
  - agricultural fields; and
  - mature hedgerows with associated hedgerow trees;
- the main aesthetic and perceptual aspects associated with the Site, i.e.
  - visually enclosed nature of the Site due to surrounding vegetation, with some occasional distant views towards the Dublin Mountains; and
  - Tranquil / still nature of the southern part of the Site boundary diminishing along western and northern boundary;
- the overall character receptors, i.e.
  - the Agricultural Lowland Character of the Site and the land to the immediate west (similar to County Meath LCA11 – South East Lowlands);
  - the Highly Sensitive Landscape area, to the south and east of the Development Site, including the Royal Canal Corridor (part of the Fingal River Valleys and Canal Character Type); and
  - the Hansfield SDZ.

The landscape receptors which have been scoped out are:

- the stream within the Development Site (landscape element), as this would be largely unaffected by the Proposed Development, due to its location within the proposed open space areas and associated ecological enhancements;
- the flat landform of the Site, as this would be largely retained as part of the Proposed Development (i.e. cut and fill requirements would be kept to a minimum); and
- the Co. Meath LCA11 – South East Lowlands and Co. Kildare Northern Lowlands LCA, due to lack of inter visibility as a consequence of intervening vegetation.

#### 4.3.3.2 Visual Receptors

The visual receptors potentially affected by the Proposed Development and therefore considered as part of the assessment of visual effects, are:

- Residents
  - along Barberstown Lane North (7 properties);
  - along Barberstown Lane South (2 properties);
  - along the R149 along the western boundary of the Development Site (7 properties);
  - along the R149 within 1.3km to the south-west of the Development Site (ca. 10 properties); and
  - along the southern boundary of the Hansfield SDZ (multiple residential units).
- Road users
  - along Barberstown Lane North and including Pakenham Bridge (ca. 900m section of road);
  - along Barberstown Lane South (ca. 1,000m section of road);
  - along the R149 along the western boundary of the Development Site (ca. 800m section of road); and
  - along the R149 within 1.3km to the south-west of the Development Site (ca. 1,500m section of road).
- Recreational users (walkers, cyclists, boaters and anglers) along the Royal Canal;
- Rail users of the Dunboyne-Clonsilla rail line.

The visual receptors which have been scoped out are:

- The Westmanstown Golf Club, the Golf Course at Luttrellstown Castle, the Luttrellstown Castle Resort and the Beechpark public park, due to lack of inter visibility, as a consequence of intervening vegetation; and
- Liffey Valley pNHA, due to lack of inter visibility as a consequence of intervening topography and vegetation.

## 4.4 Impact assessment

This Section sets out the effects that the Proposed Development would have on both landscape and visual receptors (as identified in section 4.3.3 above), during the construction and operational phase. It is based on the detailed development description and layout drawings contained in Chapter 2 of this EIAR.

### 4.4.1 Aspects of the Development Which Have the Potential to Cause Landscape and Visual Effects

#### 4.4.1.1 Location

The Development Site occupies approximately 29.6 ha of mostly agricultural land, comprising parts or all of nine fields under pasture and associated hedgerows. A small section of the Site is occupied by an industrially used property, including agricultural type buildings and hard standing areas, all of which would be removed to facilitate the Proposed Development. The permitted Ongar to Barnhill Distributor Road will be located within the western section of the Development Site. The area of agricultural land affected by the road works is not included in the abovementioned 29.6 ha.

There are eight existing detached and semi-detached residential properties surrounded by the Development Site (but not forming part of the planning application site), which would be retained. Eight further residential properties adjoin the Site, along roads adjacent to the western and southern boundaries. A high density urban residential development, the Hansfield SDZ, is under construction along the northern boundary. The completed sections of this development comprise terraced 2-storey houses and up to 8-storey apartment buildings. The construction of further apartment buildings immediately north of the railway line are yet to commence.

The Site is thus located on the settlement edge, and at the interface with rural agricultural land to the west, south and east. It follows that the design should acknowledge the transitional character of the Site, respecting the agricultural landscape on three sides, whilst also taking account of the strong urban influence of the settlement edge to the north.

#### 4.4.1.2 Scale, Height and Density

The Proposed Development would accommodate 1,243 residential units, comprising apartments, duplex units and a mix of detached/semi-detached/terraced houses. The western half of the Site, to the east and west of the distributor road, would be mainly occupied by 2-storey houses and 3-storey duplex units, with some 4-storey gateway apartment buildings, close to the entrance points into the Site.

The north-eastern corner (towards the Hansfield railway station), the central area (south of the existing residential properties within the Site) and the eastern corner of the Site (facing Pakenham Bridge over the Royal Canal), would be mainly occupied by apartment buildings. The height of these buildings would range from 2-storeys up to 12-storeys for one building to the east of the proposed Market Square at the centre of the Site. The majority of the apartment blocks would be 6-9-storeys in height. There would also be some 3-storey duplex units and 2-storey terraced houses within this generally higher density area.

The southern central area is reserved for a 5.6 ha neighbourhood park and would be developed as a multi-use area, including a playing pitch, walking/running/cycling tracks, play areas and nature areas.

In summary, as proposed in the Barnhill LAP, the highest density development and associated highest buildings are concentrated in the north-eastern section of the Site, towards the Hansfield rail station, with the density / height of buildings reducing towards the southern and western boundary.

The Proposed Development has been designed in ten distinct character areas 10, as described below (refer to Plate 4.5 for an illustration of the location of the different character areas). Please refer to the Planning and Design Statement, which accompanies the application, for a more detailed description of each character area.

- **1. Link Road West** – Situated in north-west corner of the Site, comprising mostly 2-storey houses one short terrace of 3-storey duplex units in the northern corner and one pocket park.
- **2. Link Road East** – Situated along northern boundary to the east of the distributor road, comprising mostly 2-storey houses, two short terraces of 3-storey duplex units in the south-western and south-eastern corner, a pocket park and separate play area, as well as direct access to the proposed enhanced pedestrian / cycle facilities along Barnhill Lane North.
- **3. Railway Quarter** – Situated along northern boundary to the west of Hansfield station, comprising apartment buildings ranging from 2-8 storeys, with landscaped courtyards amongst the buildings.



- **4. Station Plaza** – Situated south of Hansfield station, comprising apartment buildings ranging from 2-11 storeys, with landscaped courtyards amongst the buildings and including a landscaped public open spaces along the Station Plaza Avenue and along the enhanced pedestrian / cycle facilities along Barberstown Lane North.
- **5. Station Quarter South** – Situated in the eastern corner of the Site, comprising apartment buildings ranging from 3-9 storeys at the eastern end, with landscaped courtyards amongst the buildings. Also comprising a small estate of 2-storey houses at the western end, adjoining the neighborhood park, and a terrace of 3-storey duplex units along the northern boundary of the area, with direct access to the enhanced pedestrian / cycle facilities along Barberstown Lane North.
- **6. Village Centre** – Situated to the south of the existing residential properties within the Site, comprising apartment buildings ranging from 3-12 storeys in the northern half and the proposed school site in the southern half. A large landscaped Market Plaza and separate Village Square are located amongst the apartment buildings, with the Market Plaza providing access to the Station Plaza Avenue.
- **7. The Cross** – Situated to the west of the Village Centre and east of the distributor road, comprising mostly 2-storey houses and some 3-storey duplex terraces, as well as an apartment building ranging from 2-9 storeys in the south-eastern corner of the area, containing a landscaped courtyard. The area also contains two pocket parks and direct access to the enhanced pedestrian / cycle facilities along Barberstown Lane North, a linear open space with ecological features to the west and the neighbourhood park to the south-east.
- **8. The Crescent** – Situated south of the Barnhill Cross Character Area, comprising a mix of 2-storey houses and 3-storey duplex units. Two pocket parks are located within the area, which also has direct access to the neighbourhood park to the east.
- **9. The Stream** – Situated in the south-western corner of the Site to the east of the Distributor Road, comprising some 2-storey houses at the centre, terraces of 3-storey duplex units along the adjoining access roads and 4-storey gateway apartment blocks in the three corners of the area. A linear public open space, along Barnhill Stream runs in an east-west direction across this character area.
- **10. Parkside** – Situated in the south-western corner of the Site to the west of the Distributor Road, comprising 2-storey houses and two pocket parks.

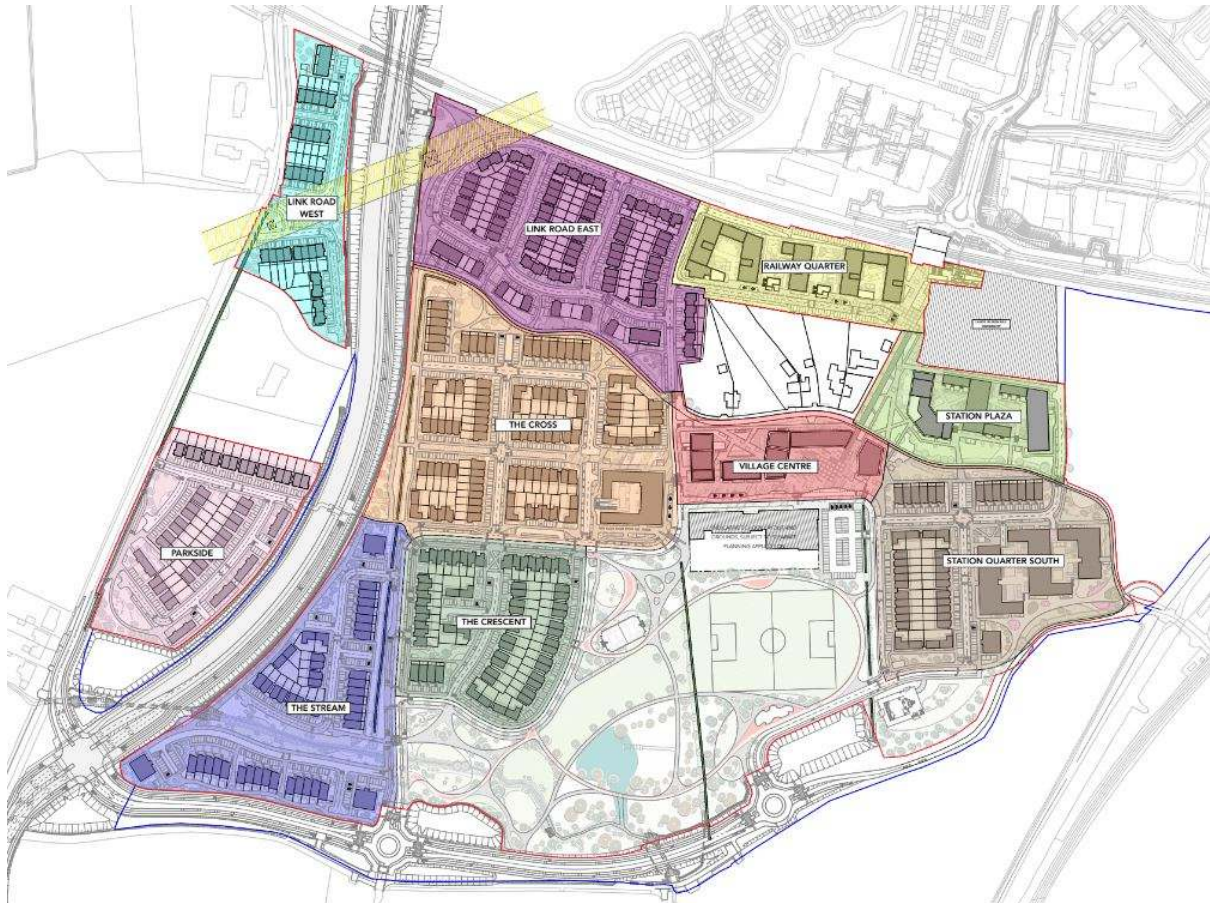


Plate 4.5 Map showing the location of the different character areas within the Site

#### 4.4.1.3 Loss of Landscape Elements

The Proposed Development (and associated permitted link road) would result in the loss of nine agricultural fields, which would be replaced by the new residential units and associated gardens, areas of open space and infrastructure.

The layout of the Proposed Development was designed, so that large sections of the existing hedgerows and associated trees would be retained within green corridors and public open spaces. The loss of hedgerows and trees would be compensated by extensive tree planting along residential streets, along the boundaries of the Site and within the proposed public open spaces.

#### 4.4.1.4 Design of the Development

It is assumed for the purpose of this assessment, that all landscape proposals, including hard and soft landscape elements would be implemented, as per the Landscape Design Report, accompanying the planning application.

The Barnhill LAP, set out a vision *“to create a place to live that is appealing, distinctive and sustainable, maximising the opportunities provided by the surrounding natural environment for improved amenities and the enhancement of biodiversity.”*

The proposed landscape design is based around this vision, by including distinctive placemaking tools, such as the red path and moon gates, by retaining sections of and enhancing the existing natural environment (e.g. the existing stream), by providing easy access pocket parks and play areas, as well as ample native and ornamental planting along the proposed streets and public plazas and within the proposed neighbourhood park.

At the same time the Proposed Development provides for a large number of residential units, both in the form of multi-storey apartment buildings and 2-3-storey housing and duplex units. All houses are provided with private outdoor spaces, while the duplex units and apartments have access to small private yard areas and/or balconies, as well as communal open spaces.

The design further provides for facilities, such as a creche, medical centre, retail units and office hub, all of which would be easily accessible via the numerous pedestrian and cycle links throughout the Site. There would also be easy access to Hansfield rail station and the residential development beyond.

The proposed buildings would be finished in muted tones of red, yellow, grey and beige, including clay brickwork details. A similar palette is present within the Hansfield SDZ, and this is also suitable to the location of the Site at the interface with rural agricultural land, where bright/striking colours would be out of place.

It is proposed to develop the Site in five phases plus enabling works, within an 8-year period, starting with the area to the north of Barberstown Lane North and east of the Ongar to Barnhill Distributor Road, moving south from there, with the westernmost residential areas being developed last.

Existing residential properties at the centre of the Development Site would be integrated into the design. Overshadowing caused by the tall apartment buildings at the village centre, and located to the immediate south of the existing properties would be minimized by limiting the height of such buildings to 3-storeys. This also retains the illusion of potential longer distance views in a southern direction. Further to that, the retention of part of the existing hedgerow along Barberstown Lane North, as well as ample new planting along the property boundaries, will provide some level of screening.

#### 4.4.1.5 Elements of the Proposed Development Likely to Cause Effects during Construction Phase

The following element are likely to cause landscape and visual effects during the Construction Phase:

- Setting up of the site compound, including fencing/hoarding surrounding the Development site;
- Site clearance, including hedgerow/tree removal and stripping of soil;
- Presence of construction machinery, including tower cranes and associated noise and movement;
- Presence of proposed buildings at several stages of completion; and
- Landscaping works, including tree planting and other ecological enhancement works, as well as construction of hard landscape areas.

#### 4.4.1.6 Elements of the Proposed Development Likely to Cause Effects during Operational Phase

The following element are likely to cause landscape and visual effects during the Operational Phase:

- Presence of the proposed buildings, ranging in height from 2-12 storeys;
- Presence of people and cars and associated noise and movement; and
- Presence of the landscaped areas, including trees, which will mature over time.

#### 4.4.2 Do-Nothing Scenario

Should the currently Proposed Development not be implemented, it is highly likely that, given the zoning of the land for residential purposes, as well as the details set out in the Barnhill LAP, the Site would be developed in a similar fashion to what is currently proposed in the not too distant future.

#### 4.4.3 Landscape Effects

##### 4.4.3.1 Landscape Receptor Sensitivity

In accordance with GLVIA3, sensitivity of landscape receptors is determined by combining their value with their susceptibility to the type of development proposed.

##### **Value of the Landscape**

In determining the value of landscapes, GLVIA3 recommends that the starting point should be to consider landscape-related designations. In this context it is important to note that no part of the Development Site is included within a statutory landscape designation, but rather that the Site is zoned for residential development and is subject to a local area plan. It should further be noted that the southern boundary of the Site is adjacent to an area designated as a 'Highly Sensitive Landscape' in the current FDP.

GLVIA3 states that the value of undesignated sites should also be considered. Table 1 of Landscape Institute Technical Guidance Note 2/21 supersedes Box 5.1 of GLVIA3 and provides a helpful guide for assessing these sites. A full assessment against these criteria is included in **Table A4.3.1 of Appendix 4.3**.

Using these criteria, it has been concluded that the value of the Development Site and its immediate context, and therefore most of the landscape receptors, is generally of community value. None of the factors assessed, such natural or cultural heritage, associations, perceptual or functional, were found to merit elevation above community value.

The area to the south of the Site, which is covered by a Highly Sensitive Landscape designation within the current FDP, was however assessed as having local authority value, due to its designation.

##### **Susceptibility of Landscape Receptors to the Development**

The susceptibility of the landscape receptors is assessed within **Table A4.3.2 of Appendix 4.3**.

Susceptibility was assessed as medium for the mature hedgerows, visually enclosed and agricultural lowland character landscape receptors, i.e. they are considered to have some ability to accommodate the Proposed Development. The agricultural fields and still / tranquil perceptual aspect along the southern boundary were found to have high susceptibility, the highly sensitive landscape to the south high/medium susceptibility and the Hansfield SDZ was found to have low susceptibility.

##### **Overall Sensitivity of Landscape Receptors**

The overall sensitivity of landscape receptors is assessed within **Table A4.3.2 of Appendix 4.3**.

The majority of the landscape receptors were assessed as having medium or medium/low sensitivity. The Hansfield SDZ was found to have low sensitivity. Please note that, taking the local context into account, the designated 'highly sensitive landscape' to the south was found to be of medium sensitivity to the Proposed Development, despite the designation title.

##### 4.4.3.2 Construction Phase

##### **Magnitude of Landscape Change**

In accordance with GLVIA3, potential changes to the individual landscape receptors have been assessed in relation to (see also **Table A4.3.3 of Appendix 4.3**):

- the Size and Scale of Change;
- the Geographical Extent of Change; and
- the Duration and Reversibility of Change.

##### Size and Scale of Change for Landscape Receptors

The size and scale of change range from small for the Hansfield SDZ receptor, as this is of a similar character to what is proposed to large for the agricultural fields landscape receptor and the tranquil / still perceptual aspect along the southern boundary, as these would be largely altered. The change to all other receptors was assessed as medium, as the overall balance/composition of these landscape elements/aspects/character areas would not be changed.

#### Geographical Extent of Change for Landscape Receptors

The geographical extent of landscape change to landscape receptors would be small, since the changes would be largely limited to the Site due to the level of enclosure provided by existing vegetation.

#### Duration/Reversibility of Change for Landscape Receptors

The planning application is sought for a duration of 10 years, although it is anticipated that the development would be completed within an 8-year period, spread over several development phases, plus enabling works. This would result in a medium-term duration, which is theoretically reversible.

#### Overall Magnitude of Change for Landscape Receptors

The agricultural fields and the tranquil / still perceptual landscape receptors along the southern boundary would experience a medium landscape change, the Hansfield SDZ a slight change and all other landscape receptors a medium/slight change.

### **Summary of Potential Landscape Effects and Significance (Construction Phase)**

**Table A4.3.4 of Appendix 4.3** draws together the sensitivity of landscape receptors and the magnitude of effects to determine the level of potential landscape effect, during the construction phase.

The agricultural fields, the tranquil / still perceptual aspect along the southern boundary and the highly sensitive landscape character area to the south will experience **moderate negative, but not significant, landscape effects**.

The mature hedgerows / trees, the visually enclosed aesthetic aspect and the Agricultural Lowlands Landscape Type will experience **moderate/minor negative, but not significant, landscape effects**.

The Hansfield SDZ and the still perceptual aspect along the western and northern site boundary will experience **minor neutral, not significant, landscape effects**.

#### 4.4.3.3 Operational Phase

### **Magnitude of Landscape Change**

Refer to **Table A4.3.5 of Appendix 4.3**.

#### Size and Scale of Change for Landscape Receptors

The size and scale of change will reduce for some of the landscape receptors, as there would be no further changes and/or due to the maturing vegetation. For the tranquil / still perceptual aspect along the southern boundary. The scale reduces to medium, as the noise from construction works is removed and as there would be a slight buffer from the large open space, with substantial tree planting, along the southern boundary.

The scale of change for the character receptors remains the same.

#### Geographical Extent of Change for Landscape Receptors

The geographical extent of landscape change to landscape receptors would remain small, since the changes would be largely limited to the Site due to the level of enclosure provided by existing vegetation.

#### Duration/Reversibility of Change for Landscape Receptors

The operational development would be permanent.

#### Overall Magnitude of Change for Landscape Receptors

As there would be no further change to the agricultural fields landscape receptor (the fields will remain removed), there would be no magnitude of change. Due to the permanent duration, the landscape change associated with the character landscape receptors increases slightly to medium and medium/slight. The remaining landscape receptors will remain at the same levels of magnitude of change, as during the construction stage.

## Summary of Potential Landscape Effects and Significance (Operational Phase)

**Table A4.3.6 of Appendix 4.3** draws together the sensitivity of landscape receptors and the magnitude of effects to determine the level of potential landscape effect, during the operational phase.

The agricultural fields will experience a negligible negative, not significant landscape effect.

The tranquil / still perceptual aspect along the southern boundary, the Agricultural Lowlands Character and the highly sensitive landscape character area to the south will all experience **moderate negative, but not significant, landscape effects**.

The mature hedgerows / trees and the visually enclosed aesthetic aspect will experience **moderate / minor, but not significant, landscape effects**. The nature of effects would be positive for the hedgerows / trees over time, as the new planting matures, that of the visually enclosed aspect would be negative.

The Hansfield SDZ and the still perceptual aspect along the western and northern site boundary will experience **minor neutral, not significant, landscape effects**.

### 4.4.4 Visual Effects

#### 4.4.4.1 Assessment of Visual Receptor Sensitivity

**Table A4.4.1 of Appendix 4.4** summarises the sensitivity of each of the visual receptors identified earlier, with reference to the relevant viewpoints (refer to **Appendix 4.1**).

The value of most visual receptors was assessed as low, as there are no designated or locally promoted view associated with them. Those visual receptors with views from or over the area designated as Highly Sensitive Landscape were assessed as having moderate value

Susceptibility of road and rail users is assessed as low, as they do not typically focus their attention on the landscape. In contrast the susceptibility of residents and recreational users is assessed as high, as their attention is likely to be focused on views into the landscape.

When combining value and susceptibility, most road and rail users are assessed as having low sensitivity, while most residential and recreational users are assessed as having medium sensitivity.

The residents within 1.3km to the south-west of the Site and the recreational users along the Royal Canal are assessed as having high/medium sensitivity, while the road users crossing Pakenham Bridge and those within 1.3km to the south-west of the Site are assessed as having medium/low sensitivity.

#### 4.4.4.2 Construction Phase

##### Magnitude of Visual Change

Potential changes to the individual visual receptors have been assessed in **Table A4.4.2 of Appendix 4.4** in relation to size and scale, geographical extent and duration, during the construction phase.

##### Size and Scale of Change for Visual Receptors

Most visual receptors would experience a large, large/medium or medium scale of change, depending on their location in relation to the different character areas and whether they would experience changes during some or all of the construction phase.

Recreational Users along the Royal Canal Way would experience a small scale of change, as views are limited by intervening topography and vegetation.

##### Geographical Extent of Change for Visual Receptors

The geographical extent of change for most visual receptors would be small, as the number of receptors affected is limited. There would be a higher number of receptors within the Hansfield SDZ, along sections of the R149 and along the railway line, increasing the geographical extent to medium.

##### Duration/Reversibility of Change for Visual Receptors

The planning application is sought for a duration of 10 years, although it is anticipated that the development would be completed within an 8-year period, spread over several development phases. This would result in a medium-term duration, which is theoretically reversible.

##### Overall Magnitude of Change for Visual Receptors

Most visual receptors would experience a medium or medium/slight magnitude of change to their views. Residents along Barberstown Lane North would experience a substantial / medium magnitude of



change, while the residents along Barberstown Lane South and Recreational Users along the Royal Canal Way would experience a slight magnitude of change.

#### **Assessment of Visual Effects and Significance (Construction Phase)**

**Table A4.4.3 of Appendix 4.4** summarises the assessment of visual effects for each visual receptor, with reference to the relevant viewpoints (refer to **Appendix 4.1**) and their significance, during the construction phase.

The residents along Barberstown Lane North would experience **major/moderate negative and locally significant effects**.

The residents within 1.3 km to the south-west of the Site and those within the Hansfield SDZ would experience **moderate negative, but not significant, visual effects**.

The residents along the western boundary, road users within 1.3 km to the south-west and recreational users along the canal would experience **moderate/minor negative, but not significant, visual effects**.

The residents along Barberstown Lane South, the remaining road users and the rail users would experience **minor negative, not significant, visual effects**.

#### 4.4.4.3 Operational Phase

##### **Magnitude of Visual Change**

Potential changes to the individual visual receptors have been assessed in **Table A4.4.4 of Appendix 4.4** in relation to size and scale, geographical extent and duration, during the operational phase.

##### Size and Scale of Change for Visual Receptors

Most visual receptors located would continue to experience a large, large/medium or medium scale of change, depending on their location in relation to the different character areas and associated height of buildings visible in views, as well as level of screening from existing and proposed vegetation.

Recreational Users along the Royal Canal Way would continue to experience a small scale of change, as views are limited by intervening topography and vegetation.

##### Geographical Extent of Change for Visual Receptors

The geographical extent of change would remain small to most visual receptors, as the number of receptors affected remains limited. There would continue to be a higher number of receptors within the Hansfield SDZ, along sections of the R149 and along the railway line, increasing the geographical extent to medium.

##### Duration/Reversibility of Change for Visual Receptors

The operational development would be permanent.

##### Overall Magnitude of Change for Visual Receptors

The magnitude of change would increase slightly for all visual receptors, due to the permanent duration of the operational stage. Most visual receptors would experience a substantial/medium or medium magnitude of change to their views. Recreational Users along the Royal Canal Way would experience a medium/slight magnitude of change.

#### **Assessment of Visual Effects and Significance (Operational Phase)**

**Table A4.4.5 of Appendix 4.4** summarises the assessment of visual effects for each visual receptor, with reference to the relevant viewpoints and associated Verified View Montages (VVM, refer to **Appendix 4.1**) and their significance, during the operational phase.

The residents along Barberstown Lane North and within the Hansfield SDZ would experience **major/moderate negative and locally significant effects**.

The remaining residential receptors and recreational users along the canal, as well as road users crossing Pakenham Bridge would experience **moderate negative, but not significant, visual effects**.

The road users along Barberstown Lane South and along the R149 within 1.3km to the south-west, as well as the rail users would experience **moderate/minor negative, but not significant, visual effects**.

The road users along most of Barberstown Lane North and along the western boundary of the Site would experience **minor negative, not significant, visual effects**.

#### 4.4.5 Direct/Indirect Effects

All landscape and visual effects described above are direct effects. The Proposed Development is not assessed as likely to have indirect effects in landscape and visual terms, i.e. the Proposed Development is unlikely to cause consequential changes to the surrounding landscape character or to existing views of the landscape surrounding the Site.

#### 4.4.6 Cumulative Impacts

##### 4.4.6.1 Third-Party Developments for consideration

It is considered appropriate to include major schemes within the local area to the Site that either have planning permission or are in the process of being implemented.

The major schemes considered as part of this assessment of cumulative landscape and visual effects are all located within the Hansfield SDZ to the north of the Site. Those of particular interest are located along the boundary with the railway line immediately north of the Site, as these would have intervisibility with the Proposed Development and are therefore most likely to result in cumulative effects. The third-party schemes considered are:

- **Fingal P.Ref. FW 15A/0032** – 128 units in zone 4 of the Hansfield SDZ: This site is located between the existing R149 and the proposed Ongar-Barnhill Distributor Road and consists of 128 2-storey houses. A cluster of five such houses will be located directly north of the railway line but are yet to be constructed.
- **Fingal P.Ref. FW 18A/0197** – 200 units in zone 7 of the Hansfield SDZ: This site is located to the east of the Ongar-Barnhill Distributor Road and the existing Hansfield Educate Together School and consists of mostly 2-storey houses, as well as some 4-storey apartment buildings. Most of the 2-storey houses have recently been completed, including a cluster of 26 houses and a creche directly adjoining the railway. The apartment building, which will be set-back from the railway and ultimately screened by another apartment building (see below) are yet to be constructed.
- **Fingal P.Ref FW 18A/0161** – 247 units in zone 7 of the Hansfield SDZ: This site is located along the railway line to the north-west of Hansfield railway station and consists of one apartment building made up from several cores, up to 7 storeys in height. This is yet to be constructed.
- **Fingal P.Ref. FW 18A/0110** – 618 units in zone 7 of the Hansfield SDZ: This site is located along the railway line to the north-east of Hansfield railway station and consists of 10 apartment buildings consisting of several cores each, up to 8 storeys in height. The westernmost building associated with this development, with one 8-storey core, has recently been completed, while most of the remainder of the development is yet to be constructed.

There are no major schemes that either have planning permission or are in the process of being implemented with intervisibility to the west, south and east of the Site.

##### 4.4.6.2 Potential Cumulative Landscape Effects and Significance

The third-party developments, once completed, will improve the currently slightly degraded appearance of the area to the north of the Site and will strengthen the urban character of the Hansfield SDZ, tying in with the urban centres of Ongar to the north and Clonsilla and Blanchardstown to the east.

The third-party developments consist of high density / tall apartment buildings in the vicinity of Hansfield train station, with lower density / lower height housing to the west towards the existing R149. There will be a number of landscaped public open spaces / plazas in between and within the individual schemes, as well as some tree planting along the railway line. The settlement edge will however be quite abrupt along the railway line with tall buildings facing the adjoining agricultural land and with little space for tree planting in some locations.

The Proposed Development would result in a southward extension of the existing urban area, containing similar elements of similar design and mimicking the development densities to the north, with the tallest/ high density units concentrated towards Hansfield train station and decreasing density and lower building heights to the west and south. Further to that, the decrease of housing densities to the south and west, as well as the large neighbourhood park along some of the southern boundary would result in a softening of the settlement edge towards the adjoining agricultural landscape. This will improve the transition between the urban character area to the north and the agricultural character of the landscape to the south.

There will therefore be no significant cumulative landscape effects.

#### 4.4.6.3 Potential Cumulative Visual Effects and Significance

In views from locations within the Site and along its western and southern boundaries (refer to Viewpoints 1, 2, 4, 5 and 6 in **Appendix 4.1**) there will be little intervisibility between the third-party developments and the Proposed Development, resulting in limited and not significant cumulative visual effects.

In views from locations in the vicinity of the eastern boundary of the Site, including the Royal Canal (refer to **Plate 4.3** above and Viewpoint 3), the sections of the third-party developments not yet constructed will increase the height of the already visible buildings within the Hansfield SDZ slightly. However, this will result in little change to the composition of the existing views. The visual effects, once the Proposed Development is added, will therefore be very similar to what was assessed, as part of the visual assessment above, which concluded that there will be no significant visual effects in views from this area. There will therefore be no significant cumulative visual effects in views from this area.

In views from locations within 1.3 km to the south-west of the Site (refer to Viewpoint 8), the proposed development will become visible in front of the Hansfield SDZ, effectively blocking views of the third-party developments. There will therefore be no significant cumulative visual effects in views from this area.

In views from locations within the Hansfield SDZ, there will be little intervisibility with the Proposed Development, once all third-party developments are completed, as these will effectively block views towards the Site. Also considering the existing urban environment of this area there will be limited and not significant cumulative effects. The visual effects on views from the apartments and houses and public open spaces along the southern boundary of the Hansfield SDZ were assessed, as part of the visual assessment above.

#### 4.4.7 Unplanned Events (i.e. Accidents)

It is assessed as highly unlikely that any unplanned events within the Proposed Development site would result in a significant landscape or visual effects.

#### 4.4.8 Transboundary Impacts

The Proposed Development is not located in the vicinity of an international boundary. Therefore, transboundary landscape or visual effects would not arise.

#### 4.4.9 Interaction with Other Impacts

There are no known interactions with effects identified in other topic areas.

### 4.5 Mitigation Measures; and Residual Impacts

#### 4.5.1 Mitigation Measures

The above assessment has identified localised significant visual effects, on views experienced by the residential receptors located along Barberstown Lane North and along the southern boundary of the Hansfield SDZ, both during the construction and the operational phase. These should be the focus of any mitigation measures proposed as part of this Chapter. However, the type of development proposed includes tall apartment buildings in high density area and where these are visible at close distance or by a large amount of visual receptors it is not always feasible to mitigate the visual effects to levels not considered significant (e.g. through additional planting).

Instead, it is important to ensure that effects on visual amenity are minimised during the construction and operational phases, as far as is feasible. This is achieved through good site management, best practice construction methods and a high-quality design, creating an aesthetically pleasing environment, which respects the character of the local area.

##### 4.5.1.1 Construction Phase

During the construction stage the effects on visual amenity would be minimised, by the full implementation of the proposed outline Construction & Environmental Management Plan (CEMP), submitted with the planning application. The CEMP is based on mitigation measures contained in the chapters of the EIAR including measures resulting in reduction of landscape and visual effects, such as:

- the early establishment of tree/hedgerow protection zones, as part of each of the construction phases;
- keeping the number and height of stockpiles to a minimum;
- using perimeter hoarding, and
- minimizing the number of tower cranes present within the site.

#### 4.5.1.2 Operational Phase

During the operational phase the main mitigation measure would be the high-quality design of the Proposed Development. For that matter, the proposed architectural layout and associated landscape design strategy aim to create a sustainable community, balancing the needs of the people that would live in the area with a biodiversity centred landscape treatment.

The finishes of the proposed buildings would utilise high-quality materials, in a muted colour palette of red, yellow, grey and beige, including clay brickwork details which both tie in with the buildings in the Hansfield SDZ and respect the surrounding agricultural landscape, consisting of numerous shades of green but with few contrasting colour elements.

The proposed landscape design would create a connection between the different architectural character areas, bringing the whole development together as one neighbourhood, by proposing

- distinctive placemaking tools, such as the red path and moon gates throughout the Site;
- numerous walking/cycling paths for easy access between the different areas;
- similarly designed pocket parks and play areas throughout the Site;
- the retention of and ecological enhancement of some of the existing landscape elements, such as the hedgerows and associated mature trees and the Barnhill stream; and
- ample tree and shrub planting areas throughout the development, along streets, along the site boundaries and within all public open spaces and public plaza areas, based on a development wide planting palette, which includes many native and/or pollinator friendly species.

Assuming that all of the proposed architectural and landscape features would be implemented in full and to a high standard, it is not considered that additional landscape or visual mitigation measures are required.

#### 4.5.2 Residual Impacts

As no additional landscape or visual mitigation measures are proposed, the residual levels of landscape and visual effects would be the same as those assessed in **Sections 4.4.3 and 4.4.4** above, for both the Construction and the Operational Phase.

## 4.6 References

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The Landscape Institute (2021) Technical Guidance Note 02/21: Assessing landscape value outside national designations, Landscape Institute





00138.00187.002.Figure 4.1\_Landscape Baseline.dwg



**NOTES**

1. EXTRACT FROM 1:50,000 O.S DISCOVERY MAP NO. 50
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50248253  
(C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

- BARNHILL STRATEGIC HOUSING DEVELOPMENT (SDH) EIA STUDY AREA
- VIEWPOINT / CGI LOCATIONS
- APPROXIMATE DISTANCE FROM SDH BOUNDARY

**LANDSCAPE DESIGNATIONS:**

- PRESERVE VIEWS (FINGAL DEVELOPMENT PLAN 2017-2023)
- SCENIC VIEWPOINTS (KILDARE COUNTY DEVELOPMENT PLAN 2017-2023)
- HIGHLY SENSITIVE LANDSCAPE (FINGAL DEVELOPMENT PLAN 2017-2023)
- PROPOSED NATURAL HERITAGE AREAS (pNHAs)
- SPECIAL AREAS OF CONSERVATION (SACs)

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**ALANNA HOMES**  
 ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
**BARNHILL STRATEGIC HOUSING DEVELOPMENT**  
 CLONSILLA, CO. DUBLIN  
**LANDSCAPE BASELINE & VIEWPOINT LOCATIONS**

**FIGURE 4.1**  
 Scale: 1:20,000 @ A3  
 Date: JULY 2022







# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

---

## CHAPTER 5

### Material Assets: Traffic and Transportation

# Volume II

Environmental Impact Assessment Report



**AECOM**

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July 2022

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# Chapter 5 Material Assets: Traffic and Transportation

## Contents

5	Material Assets: Traffic and Transportation .....	5-6
5.1	Overview.....	5-6
5.2	Site Location and Study Area.....	5-6
5.3	Overview of Proposed development .....	5-7
5.4	Scoping.....	5-8
5.5	Assessment Methodology .....	5-11
5.5.1	Local Area Model (LAM).....	5-11
5.5.2	Baseline Traffic Counts .....	5-12
5.5.3	Assessment Years and Scenarios .....	5-13
5.5.4	Future Road Network Assumptions .....	5-14
5.5.5	Proposed Ongar-Barnhill Road .....	5-15
5.5.6	Proposed Development Occupancy Data Assumptions and Trip Generation .....	5-15
5.5.7	Development Mode Share and Traffic Distribution Assumptions.....	5-16
5.5.8	Hansfield SDZ Development and Kellystown LAP Lands Population Assumptions .....	5-17
5.5.9	Assessment Junctions.....	5-18
5.5.10	Traffic Modelling Software.....	5-19
5.6	Relevant National and Local Policy.....	5-19
5.6.1	National Policy.....	5-19
5.6.2	Local Policy .....	5-22
5.7	Existing Conditions .....	5-30
5.7.1	Local Road Network.....	5-30
5.7.2	Existing Public Transport Services.....	5-31
5.7.3	Existing Traffic Volumes.....	5-32
5.7.4	Existing pedestrian and cyclist facilities .....	5-33
5.8	Future Receiving Environment.....	5-33
5.8.1	Road Network.....	5-33
5.8.2	Public Transport .....	5-35
5.8.3	Cycle Network- Greater Dublin Area Cycle Network Plan (2013).....	5-37
5.8.4	Walking Network .....	5-38
5.9	Proposed Character Areas.....	5-38
5.10	Proposed Development Movement Strategy .....	5-38
5.10.1	Internal Pedestrian/Cyclist Network and Circulation .....	5-38
5.10.2	Pedestrian/Cyclists Connection to Hansfield and Royal Canal Greenway .....	5-39
5.10.3	Proposed Pedestrian Crossings and Traffic Calming .....	5-41

5.10.4	Internal Vehicular Circulation .....	5-42
5.11	Proposed Barberstown Lane North Layout .....	5-43
5.11.1	Access to Existing Houses Within the Site.....	5-43
5.12	School/Creche Access .....	5-44
5.13	Proposed Car Parking and Cycle Parking Strategy .....	5-45
5.13.1	Car Parking.....	5-45
5.13.2	Cycle Parking .....	5-46
5.13.3	Hansfield Station Commuter Cycle Parking .....	5-47
5.14	Shared Driving Scheme (Go-Car) .....	5-48
5.15	Proposed Development Construction Phasing .....	5-48
5.16	Amenities in Local Area.....	5-49
5.17	Fire Access and Servicing.....	5-50
5.18	Proposed Development Traffic Generation.....	5-50
5.19	Estimated Traffic Flows.....	5-51
5.19.1	2025 Traffic Flows .....	5-51
5.19.2	2030 Traffic Flows .....	5-52
5.19.3	2040 Traffic Flows .....	5-53
5.20	Barberstown Lane South Upgrades .....	5-54
5.21	Traffic Modelling Software and Outputs .....	5-54
5.21.1	Traffic Modelling Software.....	5-54
5.21.2	Traffic Modelling Outputs .....	5-54
5.21.3	Assessment Junctions Turning Movements.....	5-55
5.22	Junction 1 Assessment .....	5-55
5.22.1	Assessment Layout .....	5-55
5.22.2	Do- Minimum Traffic Modelling Results .....	5-57
5.22.3	Do- Something Traffic Modelling Results.....	5-59
5.23	Junction 2 Assessment .....	5-60
5.23.1	Assessment Layouts .....	5-60
5.23.2	Do- Minimum Traffic Modelling Results .....	5-62
5.23.3	Do- Something Traffic Modelling Results.....	5-66
5.24	Junction 3 Assessment .....	5-70
5.24.1	Assessment Layout .....	5-70
5.24.2	Do- Minimum Traffic Modelling Results .....	5-71
5.24.3	Do- Something Traffic Modelling Results.....	5-73
5.25	Junction 4 Assessment .....	5-75
5.25.1	Assessment Layout .....	5-75
5.25.2	Do- Minimum Traffic Modelling Results .....	5-76
5.25.3	Do- Something Traffic Modelling Results.....	5-78



5.26	Junction 5 Assessment .....	5-79
5.26.1	Assessment Layout .....	5-79
5.26.2	Do- Minimum Traffic Modelling Results .....	5-81
5.26.3	Do- Something Traffic Modelling Results .....	5-83
5.27	Pakenham Bridge and Barberstown Level Crossing Traffic .....	5-84
5.28	Predicted Impacts of The Development .....	5-85
5.28.1	Construction Stage Impact .....	5-85
5.28.2	Operational Impacts .....	5-86
5.28.3	Cumulative Impacts .....	5-86
5.29	Mitigation Measures .....	5-86
5.30	Conclusion .....	5-86

## Tables

TABLE 5.1	PROPOSED RESIDENTIAL UNITS MIX .....	5-8
TABLE 5.2	FCC AND ABP PRE-PLANNING COMMENTS .....	5-8
TABLE 5.3	ESTIMATED POPULATION FOR THE BARNHILL, HANSFIELD, AND KELLYSTOWN LANDS ON EACH ASSESSMENT YEAR .....	5-18
TABLE 5.4	CYCLE PARKING REQUIREMENT DESIGN STANDARDS FOR NEW APARTMENTS .....	5-21
TABLE 5.5	FCC CAR PARKING STANDARDS (SOURCE: TABLE 12.8 FCC DEVELOPMENT PLAN 2017-2023) .....	5-25
TABLE 5.6	FCC CYCLE PARKING STANDARDS (SOURCE: TABLE 12.9 FCC DEVELOPMENT PLAN 2017-2023) .....	5-26
TABLE 5.7	EXISTING PUBLIC TRANSPORT SERVICES .....	5-32
TABLE 5.8	<i>SUMMARY PROPOSED CAR PARKING PROVISION</i> .....	5-46
TABLE 5.9	SUMMARY PROPOSED EV, DISABLE, AND VISITORS CAR PARKING PROVISION .....	5-46
TABLE 5.10	SUMMARY PROPOSED CYCLE PARKING PROVISION .....	5-47
TABLE 5.11	<i>SUMMARY PROPOSED CARGO AND EV CYCLE PARKING PROVISION</i> .....	5-47
TABLE 5.12	PROPOSED DEVELOPMENT CONSTRUCTION PHASING .....	5-49
TABLE 5.13	PROPOSED DEVELOPMENT PEAK HOUR TRIPS GENERATION .....	5-50
TABLE 5.14	JUNCTION 1 DO-MINIMUM AM PEAK TRAFFIC MODELLING RESULTS .....	5-57
TABLE 5.15	JUNCTION 1 DO-MINIMUM PM PEAK TRAFFIC MODELLING RESULTS .....	5-58
TABLE 5.16	JUNCTION 1 DO-SOMETHING AM PEAK TRAFFIC MODELLING RESULTS .....	5-59
TABLE 5.17	JUNCTION 1 DO-SOMETHING PM PEAK TRAFFIC MODELLING RESULTS .....	5-60
TABLE 5.18	JUNCTION 2 LAYOUT 1 DO-MINIMUM AM PEAK TRAFFIC MODELLING RESULTS .....	5-62
TABLE 5.19	JUNCTION 2 LAYOUT 2 DO-MINIMUM AM PEAK TRAFFIC MODELLING RESULTS .....	5-63
TABLE 5.20	JUNCTION 2 LAYOUT 1 DO-MINIMUM PM PEAK TRAFFIC MODELLING RESULTS .....	5-64
TABLE 5.21	JUNCTION 2 LAYOUT 2 DO-MINIMUM PM PEAK TRAFFIC MODELLING RESULTS .....	5-65

TABLE 5.22 JUNCTION 2 LAYOUT 1 DO-SOMETHING AM PEAK TRAFFIC MODELLING RESULTS .....	5-66
TABLE 5.23 JUNCTION 2 LAYOUT 1 DO-SOMETHING AM PEAK TRAFFIC MODELLING RESULTS .....	5-67
TABLE 5.24 JUNCTION 2 LAYOUT 1 DO-SOMETHING PM PEAK TRAFFIC MODELLING RESULTS .....	5-68
TABLE 5.25 JUNCTION 2 LAYOUT 2 DO-SOMETHING PM PEAK TRAFFIC MODELLING RESULTS .....	5-69
TABLE 5.26 JUNCTION 3 DO MINIMUM AM PEAK TRAFFIC MODELLING RESULTS.....	5-71
TABLE 5.27 JUNCTION 3 DO MINIMUM PM PEAK TRAFFIC MODELLING RESULTS .....	5-72
TABLE 5.28 JUNCTION 3 DO SOMETHING AM PEAK TRAFFIC MODELLING RESULTS.....	5-73
TABLE 5.29 JUNCTION 3 DO SOMETHING PM PEAK TRAFFIC MODELLING RESULTS .....	5-74
TABLE 5.30 JUNCTION 4 DO MINIMUM AM PEAK TRAFFIC MODELLING RESULTS.....	5-76
TABLE 5.31 JUNCTION 4 DO MINIMUM PM PEAK TRAFFIC MODELLING RESULTS .....	5-77
TABLE 5.32 JUNCTION 4 DO SOMETHING AM PEAK TRAFFIC MODELLING RESULTS.....	5-78
TABLE 5.33 JUNCTION 4 DO SOMETHING PM PEAK TRAFFIC MODELLING RESULTS .....	5-79
TABLE 5.34 JUNCTION 5 DO MINIMUM AM PEAK TRAFFIC MODELLING RESULTS.....	5-81
TABLE 5.35 JUNCTION 5 DO MINIMUM PM PEAK TRAFFIC MODELLING RESULTS .....	5-82
TABLE 5.36 JUNCTION 5 DO SOMETHING AM PEAK TRAFFIC MODELLING RESULTS.....	5-83
TABLE 5.37 JUNCTION 5 DO SOMETHING PM PEAK TRAFFIC MODELLING RESULTS .....	5-84
TABLE 5.38 ESTIMATED TRAFFIC LEVELS AT PAKENHAM BRIDGE AND BARBERSTOWN LEVEL CROSSING .....	5-85
TABLE 5.39 POTENTIAL IMPACTS DURING CONSTRUCTION STAGE.....	5-85

## Figures

FIGURE 5.1 STRATEGIC SITE LOCATION (INDICATIVE RED LINE BOUNDARY) .....	5-6
FIGURE 5.2 SITE LOCATION IN RELATION TO LOCAL ROAD NETWORK (INDICATIVE RED LINE BOUNDARY) .....	5-7
FIGURE 5.3 LOCAL AREA MODEL BOUNDARY.....	5-12
FIGURE 5.4 SURVEY LOCATIONS .....	5-13
FIGURE 5.5 FUTURE ROAD NETWORK. (INDICATIVE RED LINE BOUNDARY).....	5-14
FIGURE 5.6 OVERVIEW OF TRANSPORT MODELLING ASSESSMENT METHODOLOGY .....	5-17
FIGURE 5.7 ASSESSMENT JUNCTIONS .....	5-19
FIGURE 5.8 BLANCHARDSTOWN SOUTH DEVELOPMENT MAP (SOURCE: EXTRACT FROM SHEET 13, BLANCHARDSTOWN SOUTH FINGAL DEVELOPMENT PLAN 2017-2023) .....	5-23
FIGURE 5.9 BARNHILL DEVELOPMENT VISION AS PER LAP 2019 .....	5-28
FIGURE 5.10 BARNHILL LAP DEVELOPMENT PHASING .....	5-28
FIGURE 5.11 KELLYSTOWN LAP.....	5-29
FIGURE 5.12 PUBLIC TRANSPORT STOPS IN THE VICINITY OF THE SITE (INDICATIVE RED LINE BOUNDARY).....	5-31

FIGURE 5.13 TRAFFIC FLOW FOR THE YEAR 2019 .....	5-33
FIGURE 5.14 FUTURE ROAD NETWORK (INDICATIVE RED LINE BOUNDARY) .....	5-34
FIGURE 5.15 DART+ WEST ROUTE MAP .....	5-35
FIGURE 5.16 PROPOSED BUSCONNECTS NETWORK IN VICINITY TO THE SITE (SOURCE: BLANCHARDSTOWN AREA NETWORK MAP) ...	5-36
FIGURE 5.17 CYCLE NETWORK PLAN IN THE VICINITY OF THE SITE (SOURCE: GREATER DUBLIN AREA CYCLE NETWORK PLAN, 2013)	5-37
FIGURE 5.18 PROPOSED CHARACTER AREAS .....	5-38
FIGURE 5.19 PROPOSED PEDESTRIAN/CYCLIST NETWORK .....	5-39
FIGURE 5.20 PROPOSED PEDESTRIAN/CYCLIST CONNECTION TO HANSFIELD AREA.....	5-40
FIGURE 5.21 PROPOSED PEDESTRIAN/CYCLIST CONNECTION TO ROYAL CANAL.....	5-41
FIGURE 5.22 PROPOSED TRAFFIC CALMING AND ZEBRA CROSSINGS .....	5-42
FIGURE 5.23 PROPOSED ROAD NETWORK .....	5-42
FIGURE 5.24 PROPOSED ACCESS ARRANGEMENTS TO EXISTING PROPERTIES IN THE SITE.....	5-43
FIGURE 5.25 EXISTING AND PROPOSED CROSS SECTION BARBERSTOWN LANE NORTH ACCESS ROAD .....	5-44
FIGURE 5.26 PROPOSED SCHOOL/CRECHE ACCESS ARRANGEMENTS .....	5-45
FIGURE 5.27 PROPOSED DEVELOPMENT CAR PARKING LOCATIONS .....	5-45
FIGURE 5.28 PROPOSED DEVELOPMENT CONSTRUCTION PHASES (INDICATIVE RED LINE BOUNDARY).....	5-48
FIGURE 5.29 AMENITIES WITHIN HANSFIELD/ONGAR AREA (INDICATIVE RED LINE BOUNDARY).....	5-50
FIGURE 5.30 TRAFFIC FLOW, YEAR 2025, DO MINIMUM SCENARIO (INDICATIVE RED LINE BOUNDARY) .....	5-51
FIGURE 5.31 TRAFFIC FLOW, YEAR 2025, DO SOMETHING SCENARIO (INDICATIVE RED LINE BOUNDARY) .....	5-52
FIGURE 5.32 TRAFFIC FLOW, YEAR 2030, DO MINIMUM SCENARIO (INDICATIVE RED LINE BOUNDARY) .....	5-52
FIGURE 5.33 TRAFFIC FLOW, YEAR 2030, DO SOMETHING SCENARIO (INDICATIVE RED LINE BOUNDARY) .....	5-53
FIGURE 5.34 TRAFFIC FLOW, YEAR 2040, DO MINIMUM SCENARIO (INDICATIVE RED LINE BOUNDARY) .....	5-53
FIGURE 5.35 TRAFFIC FLOW, YEAR 2040, DO SOMETHING SCENARIO (INDICATIVE RED LINE BOUNDARY) .....	5-54
FIGURE 5.36 EXISTING BARNWELL ROUNDABOUT JUNCTION LAYOUT (JUNCTION 1).....	5-56
FIGURE 5.37 PROPOSED ONGAR BARNHILL NS LINK RD - R149 BARBERSTOWN LANE JUNCTION (LAYOUT 1) .....	5-61
FIGURE 5.38 PROPOSED ONGAR BARNHILL NS LINK RD - R149 BARBERSTOWN LANE JUNCTION (LAYOUT 2) .....	5-61
FIGURE 5.39 PROPOSED BARBERSTOWN LANE SOUTH/BARNHILL DEVELOPMENT ACCESS A JUNCTION LAYOUT.....	5-70
FIGURE 5.40 PROPOSED BARBERSTOWN LANE SOUTH/BARNHILL DEVELOPMENT ACCESS B JUNCTION LAYOUT .....	5-75
FIGURE 5.41 EXISTING MILESTOWN ROAD/ANNA LIFFEY MILLS ROAD/WOODWALL ROAD JUNCTION LAYOUT (JUNCTION 5) .....	5-80
FIGURE 5.42 PROPOSED MILESTOWN ROAD/ANNA LIFFEY MILLS ROAD/WOODWALL ROAD JUNCTION LAYOUT (JUNCTION 5).....	5-80



# 5 Material Assets: Traffic and Transportation

## 5.1 Overview

CSEA has been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed mixed-use development at site located in the Barnhill area South of Ongar Village, Clonsilla, Dublin 15.

The contents within this chapter are based on the full Traffic and Transport Assessment carried out in relation to the proposed development and submitted within the Planning Pack as a separate Report. The contents of such have been summarised for the purposed of this EIAR Report.

This assessment has been prepared by Carol Diaz-Rosario, MSc., B.Eng., Transportation Engineer with Clifton Scannell Emerson team, on behalf of the Client.

## 5.2 Site Location and Study Area

The proposed development site is located within the Barnhill Lands, approximately 4km west of Blanchardstown. Figure 5.1 and Figure 5.2, below, sets out the site's location in relation to the local road network. The subject site is currently, for the most part, in agricultural use.

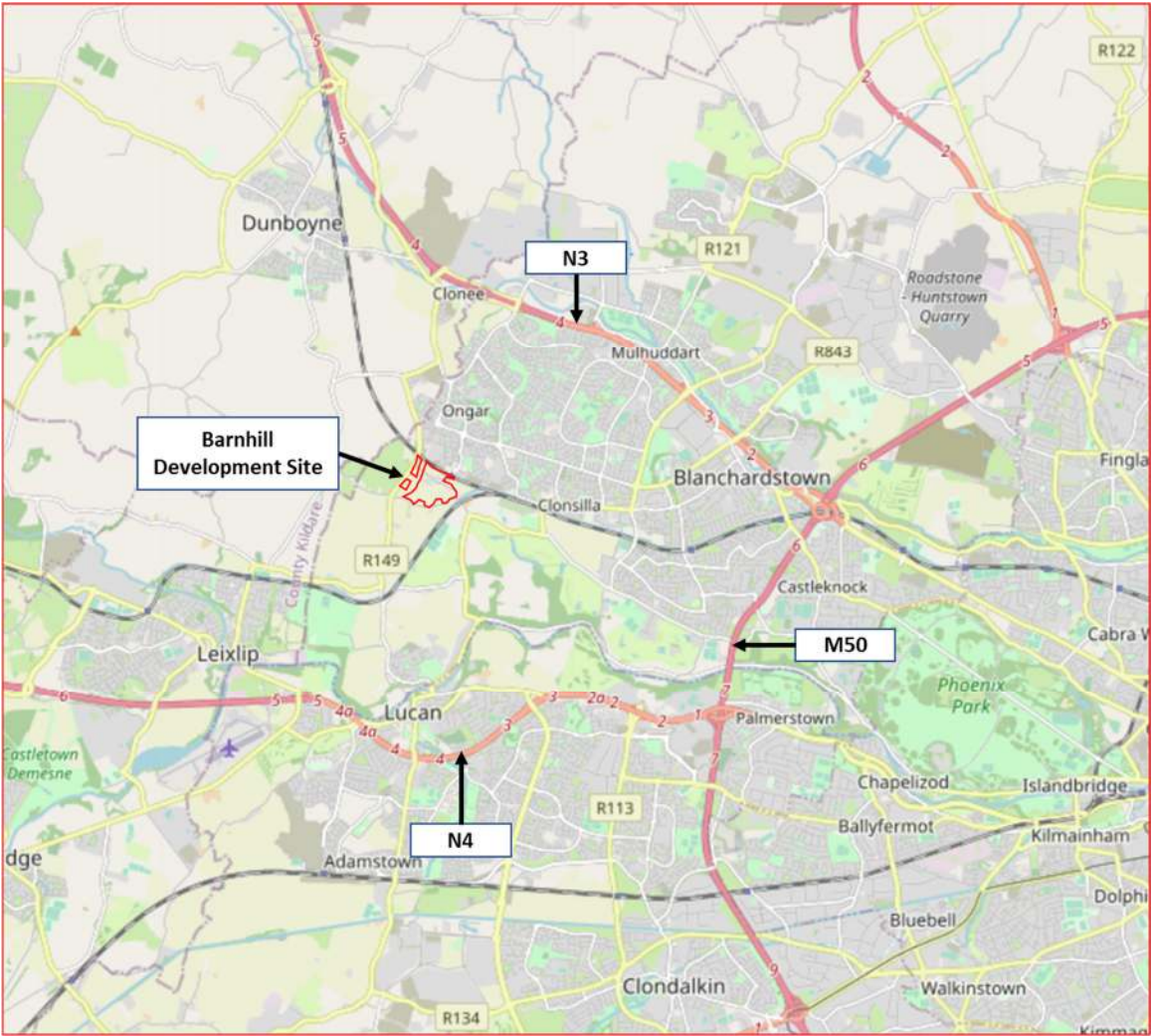


Figure 5.1 Strategic Site Location (Indicative Red Line Boundary)



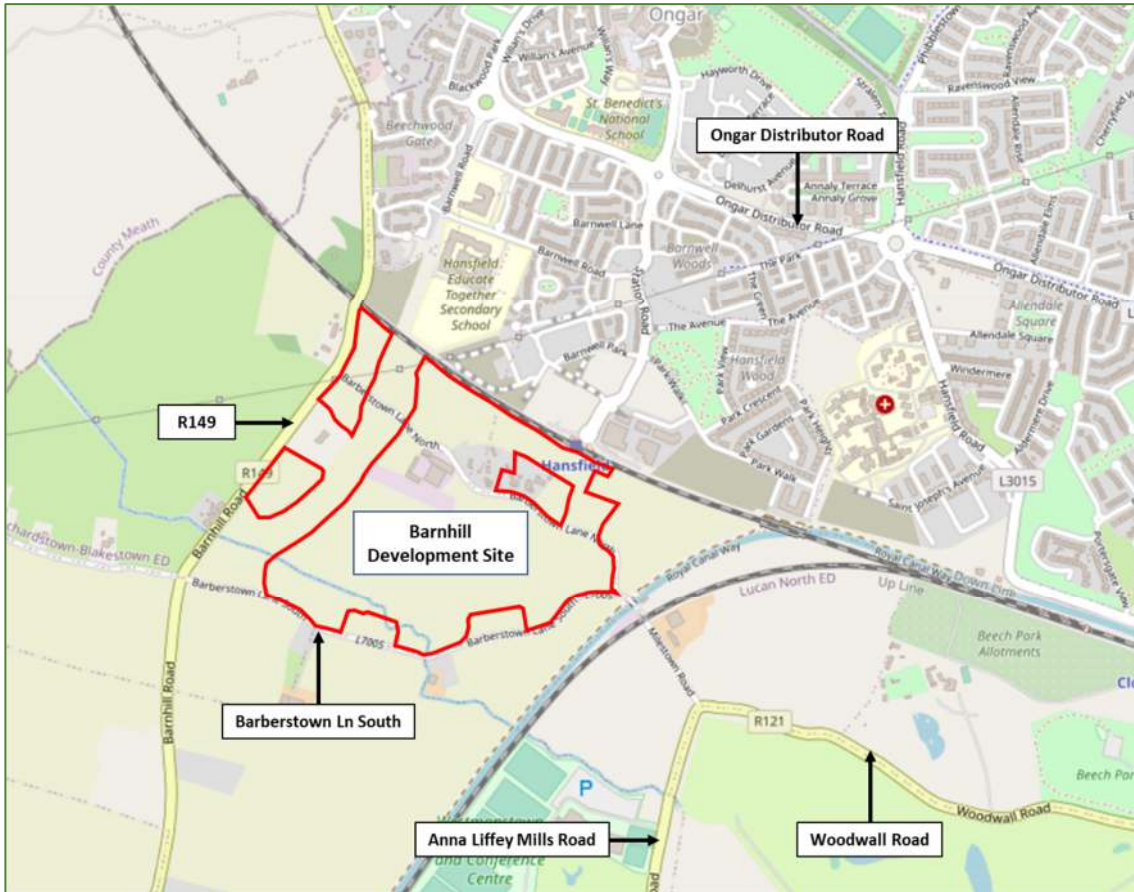


Figure 5.2 Site Location in Relation to Local Road Network (Indicative Red Line Boundary)

### 5.3 Overview of Proposed development

The proposed development will consist of the demolition of the existing vacant industrial buildings and the construction of 1,243 residential units, approximately 3,174 m<sup>2</sup> of commercial and community facilities, and ancillary development. The commercial and community development will include:

- Creche of 942 m<sup>2</sup> with capacity for approximately 210 children.
- Medical centre (GP / Dental practice) of approximately 344 m<sup>2</sup> with 8 no. consulting rooms.
- Convenience retail unit of 370 m<sup>2</sup>
- Five independent retail / retail service units ranging in size from 57 m<sup>2</sup> to 127 m<sup>2</sup> sqm, with capacity to amalgamate some of the units, if required.
- A Café of 158 m<sup>2</sup>
- A Community Space of 359 m<sup>2</sup>. This multi-use space will be able to accommodate a range of activities, including for example multi-denominational worship, fitness classes, community meetings etc.
- An Office Hub of 501 m<sup>2</sup>. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
- Provision of an access Plaza to Hansfield Train Station, including provision for a commuting bike storage area.
- Providing for pedestrianisation / cycle way along Barberstown Lane North (L-7010-0), with vehicle use restricted to local access only.
- Land set aside for a primary school to accommodate a minimum of 16 classrooms, to be delivered by the department of education.

The residential units consist of a mix of unit types as detailed in Table 5.1. Buildings range in height from 2-storeys to 12-storeys.

**Table 5.1 Proposed Residential Units Mix**

<b>Unit Type</b>	<b>No. of Units</b>
1-bed Apartment	148
2-bed Apartment	589
3-bed Apartment	63
4-bed Apartment	4
1-bed Duplex	5
2-bed Duplex	20
3-bed Duplex	92
3-bed House	286
4-bed House	36
<b>TOTAL:</b>	<b>1,243</b>

A detail description of the proposal, including units' breakdown, proposed road network, and parking provision is presented within section 6 of the full TTA Report submitted with the Planning Pack.

The proposed development has been designed in accordance with national best practice, namely the Design Manual for Urban Roads and Streets (DMURS) and the Design Standards for New Apartment, Guidelines for Planning Authorities, and the Climate Action Plan

## 5.4 Scoping

Several pre-planning meetings were conducted with Fingal County Council Transportation Department and An Bord Pleanála in relation to the scheme. The comments provided by the representatives in relation to the road design and transport assessment are presented below. The relevant sections addressing the comments are included in the following Table 5.2.

**Table 5.2 FCC and ABP Pre-Planning Comments**

<b>ABP/Council Comment</b>	<b>Report Section Addressing Comment</b>
The proposed Road Hierarchy in terms of road widths and function would be in accordance with the principals of the LAP and the Design Manual for Urban Roads and Streets.	Section 5.10.4 Drawings Included in CSEA Drawing Pack
Cul-de-sacs should not dominate residential layouts and networks should be based on layouts where all streets lead to other streets.	Section 5.10 Roads have been designed to always be connected for pedestrian and cyclists, but not always vehicles
Creating a new Cul-de-Sac on Barberstown Lane North is needed by the provision of the Ongar Barnhill Road. An extinguishment or Right of Way will be required as part of the provision of new road infrastructure.	An extinguishment of right of way is necessary for the Ongar Barnhill Road scheme which is being delivered by Fingal County Council. This will be undertaken by FCC as part of the road scheme prior to the commencement of the Barnhill development.  As part of this application, it is proposed to make the remaining section of Barberstown Lane North a pedestrian and cycle priority,

	with vehicle use restricted to local access only. See Section 5.11.
Further Discussion in relation to the details of pedestrian and cyclists' connectivity is required with respect to the R149 and access to the North-South Ongar Barnhill Road.	Section 5.10.1 Drawings Included in CSEA Drawing Pack
Additional Detail is required in relation to the design of the pedestrian and cyclists' connection in the scheme. Transition points between the shared pedestrian and cycle facilities and the proposed road network requires further consideration and detail. Similarly, the transition from the on-road cycle lanes to the off-road shared pedestrian and cycle require further analysis and details should be provided.	Section 5.10.1 Drawings Included in CSEA Drawing Pack
The shared pedestrian/cyclists' facilities would be 3.0 metres which is the minimum in order to provide high quality facilities, it is desirable to exceed the minimum.	Section 5.10.1 Drawings Included in CSEA Drawing Pack
Revision of cycle lane and footpath width.	Section 5.10.1 Drawings Included in CSEA Drawing Pack
Seating and cycle parking facilities shall be provided as an integral part of the design, particularly in the vicinity of the train station plaza.	Cycle parking facilities are addressed in Section 5.13.2. For Details on Seating areas please refer to Landscape Drawings submitted within the Planning Pack.
Further Detail is required in to maintaining access to the existing houses and providing for cyclists and pedestrian while maintaining the rural nature of the road.	Section 5.11.1
The Podium and basement parking areas should be designed in accordance with the requirements of the latest edition of the "Design Recommendations for Multi-storey and underground Car Parks."	Please refer to basement layouts drawings submitted within the planning pack
A Swept Path analysis of the most onerous parking Spaces should be provided.	Drawings Included in CSEA Drawing Pack
Justification for reduced car parking should be supported by a detail assessment of modal split and car ownership trends. Commercial parking quantum should be identified.	Details have been provided within the Mobility Strategy submitted with the Planning Pack.
Greater clarity on the parking breakdown to serve the commercial units, future school, and childcare facilities should be provided in order to assess the proposed parking provision. The provision of commercial parking also requires further consideration in respect of the dominance of surface parking.	A breakdown of the car parking allocation is provided for each character area in section 6 of the full TTA Report submitted with the Planning Pack
In relation duplexes, and apartments, parking layouts should include a drawing/schedule indicating the residential parking spaces and visitor parking spaces that are to be associated with each block of apartments/duplexes relating to the number and type of apartments/ retail and creche to be provided.	A breakdown of the car parking allocation is provided for each character area in section 6 of the full TTA Report submitted with the Planning Pack  Please refer to layouts' drawings submitted within the planning pack for further info.
The provision of EV and E-bike parking should be addressed in detail.	Section 5.13.2
Details of the set-down arrangements for the childcare facilities and primary school must be provided. The design of the set-down should avoid the need for reverse manoeuvres in the immediate vicinity of the childcare facilities; ensure that turning manoeuvres are eliminated and set down could be self-regulating.	Sections 5.12
Clarification on Staff parking provision for childcare is needed.	Sections 5.12

The application should provide further detail to ensure that the proposed layout around the school complies with the design fundamental for front of school environments and that 'school streets' can be accommodated.	Sections 5.12 Pedestrian, Cycle and Bus only Street in Village centre at school access. Carpark for Public Park also to allow for Park and stride to school
Bicycle parking should be of high standard with parking for each unit provided in a secure compartment. Stacking of bicycles can be provided if it is practicable accessible. Individual lockers for each unit would be required.	Please refer to drawings submitted with planning pack specifying the cycle parking locations
A dimensioned layout showing the particular house unit, car parking, cycle parking, and bin storage units should be provided to ensure that there is circulation room for pedestrians.	Please refer to drawings submitted with planning pack
Clarification on Car parking Calculation is needed.	Section 5.13.1
Clarification in relation to individual lockable cycle storage for apartments should be detailed and the provision of space for cargo bikes.	Sections 5.13.2
Clarification on the access to cycle storage facilities should be provided and the most direct accessible from the public road or from a shared area that gives direct access to the public road avoiding unnecessary long access route with poor passive security or slopes that can become hazardous in winter weather.	Please refer to drawings submitted with planning pack specifying the cycle parking locations and basement layouts
A detail TTA would require as part of the EIAR. Further discussion is required in relation to the modelling process and the additional modelling scenarios which would be required to be assessed.	Section 5.20
The developer will be required and facilitated by the councils to work together with the bus transport providers and the NTA to improve bus services to the area.	Details to be clarify after obtaining planning permission
Swept path analysis of traffic movements within the proposed development particularly the cul-de-sac areas that account for service vehicles and emergency vehicles should be provided. Car should be taken to ensure that the turning paths do not overrun parking areas, footpaths, or areas of public space.	Drawings Included in CSEA Drawing Pack
Further consideration of the documents and justification for the proposed development having regard to the dependency of the development on the delivery of the proposed Ongar-Barnhill Road. The application should identify the timetable for completion of such infrastructure and responsibility for the funding and completion of works in this regard. The provision of such infrastructure should be clearly identified as part of the phasing strategy for the development of these lands.	Ongar Barnhill Road to be completed by FCC Timeframe: Tender Q3/4 2022 Completion Q2/3 2024 Funded By FCC as part of their roads programme. Section 5.5.5
Further clarification and elaboration of the documents as they relate to the proposed pedestrian connection to Hansfield train station. In this regard, specific and detailed design proposals should clearly demonstrate how the development will deliver a high-quality public realm and accessibility for the public both to the station and across the railway to lands in Hansfield to the north. Evidence of the consent of the railway authorities to proposals in this regard should accompany the application5.15	Section 5.10.2
Detailed proposals for the phased development of these lands. Such phasing proposals should clearly identify the road and public transport to be delivered with each phase of residential development.	Section 5.15
Consideration should be given to a more direct connection from the western end of the proposed greenway (Barberstown Lane North) to the pedestrian and cycle infrastructure to be provided on the new Ongar-Barnhill Road	Section 5.10.1 Connection to be provided to Ongar Barnhill Road facilities via stairs provided under FCC scheme including cycle ramp to walk bikes up. The Ongar

	Barnhill Road is on a high embankment at this point to facilitate the Rail crossing. Drawings Included in CSEA Drawing Pack
A detailed Traffic and Transportation Impact assessment. The assessment should clearly describe the scenarios assessed and the traffic distribution considered therein. All assumptions should be clearly stated. The assessment should have regard to existing constraints on the road network to the east of the site, including the capacity of Pakenham Bridge and Barberstown level crossing, and any phased improvements to the road network in the area.	A description of the methodology is presented within Section 5.5 The Traffic Modelling Results are discussed within section 5.20 The traffic levels at the Level crossing are shown for each scenario with and without development
A Quality Audit in accordance with Advice Note 4 of DMURS, including a road safety audit.	Section 7 of the full TTA Report submitted with the Planning Pack
A Travel Plan / Mobility Management Plan, which should clearly identify targets for modal split and consider the availability of bus and rail services, and any required improvements to such services, to achieve these targets. The application should describe any engagement which has taken place with the NTA / bus providers in relation to this development.	A Mobility Strategy has been submitted with the Planning Pack.
A detailed description of car and cycle parking provision across the development, including the allocation of spaces. The quantum and design of cycle parking should accord with the provisions of the Apartment Design Guidelines and with the provisions of the National Cycle Manual and DMURS. This should include a level of commuter cycle parking adjoining Hansfield train station.	Section 5.13.2 for cycle parking provision across the development and Section 5.13.3 for details on Commuter Cycle Parking at Hansfield Station.
Clarification with regard to proposed pedestrian and cycle routes on the western side of the proposed Barnhill-Ongar Road at Parkside, as indicated in the submitted Design Statement.	Section 5.10.1 and Drawings Included in CSEA Drawing Pack
An existing cross section proposed, and future proposed cross section should be provided for Barberstown Lane North.	Section 5.11

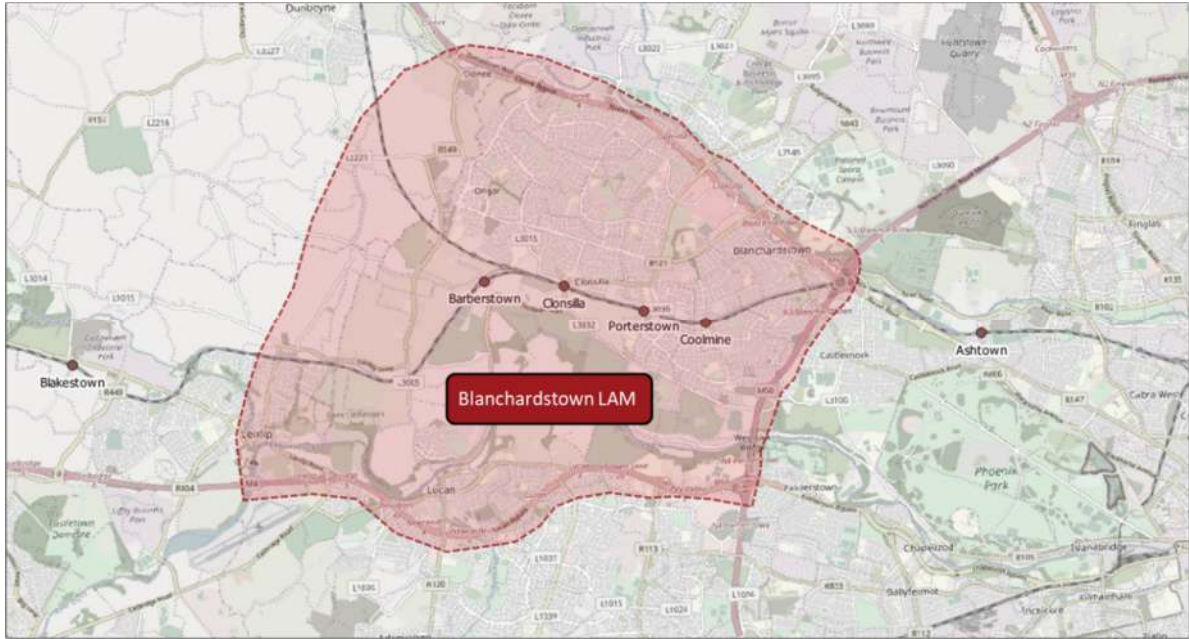
The transport elements of the proposal have been designed in accordance the comments mentioned in the above table. The methodology utilised for the assessment presented within this Report have been based on the comments from FCC transport pre-planning comments.

## 5.5 Assessment Methodology

### 5.5.1 Local Area Model (LAM)

As part of the Maynooth Line Transport Study commissioned by the NTA, a Local Area Model (LAM) was developed covering the area bounded by the N3, N4 and M50 as illustrated in Figure 5.3





**Figure 5.3 Local Area Model Boundary**

Due to the COVID-19 pandemic and related restrictions implemented by the Irish Government in December 2020, traffic volumes in the road network surrounding the site have significantly decreased. As a result, the existing flows in the road network do not represent a worst case scenario for traffic conditions in the local area. In light of this, and in order to determine baseline traffic conditions and provide a basis from which the future development’s traffic impact can be analysed, 2019 data has been used for the assessment.

Traffic survey data, collected in February 2019 (see section 5.5.2 for details), was used to calibrate and validate the 2019 base LAM to ensure that they provide an accurate representation of worst case scenario traffic flow within the study area.

The East Regional Model (Further discussed in section 5.5.7 of this Report) was utilised as a base for developing the LAM, with additional network and zonal detail included to provide an enhanced representation of the road network, and route choice, in the study area. The road network was reviewed to ensure that it provides a robust and accurate representation of existing conditions.

The Blanchardstown LAM was calibrated and validated in accordance with Transport Infrastructure Ireland’s (TII) Project Appraisal Guidelines (PAG) for National Roads Unit 5.1 – Construction of Transport Models (October 2016) and has been shown to meet all specified criteria for both the AM (08:00-09:00) and PM (17:00-18:00) peak hours

**LAM Road Assignment**

The road assignment within the Blanchardstown LAM is undertaken using the SATURN suite of modelling software. It allocates road users to routes between their desired origin and destination taking cognisance of aspects such as capacity constraints and traffic congestion.

**5.5.2 Baseline Traffic Counts**

The Blanchardstown Local Area Model has been used as a baseline to assess the development traffic impacts. This model utilised traffic survey data collected in February 2019 to gain an understanding of existing traffic conditions within the study area, and to assist in calibration and validation of the base year local area models. TRACSIS were commissioned to undertake the following surveys:

- Automatic Traffic Counts (ATC) at 35 location;
- Origin-Destination Surveys by automatic number plate recognition (ANPR) at 12 locations on 5th February 2019;
- Pedestrian and Cyclist counts at 2 locations; and
- Junction Turning Counts (JTC) at 48 locations;

This data was supplemented with counts undertaken in the study area in May 2018 by Fingal County Council (FCC), and journey time information on key routes extracted from a database of Satellite Navigation data housed within the NTA. The following sections of this chapter provide information on each of the surveys outlined above including site locations and observed results.

### Automatic Traffic Counts (ATC)

Automatic Traffic Counts (ATC's) were undertaken at 35 locations across the network, as illustrated in Figure 5.4, over a 3-week period from Monday 28th January to Sunday 14th February 2019. The ATC data provides information on:

- The daily and weekly profile of traffic within the study area;
- Busiest time periods and locations of highest traffic demand on the network;
- Any issues on the network during the survey period i.e., accidents, road closures etc.; and
- Typical speed of traffic on the network.

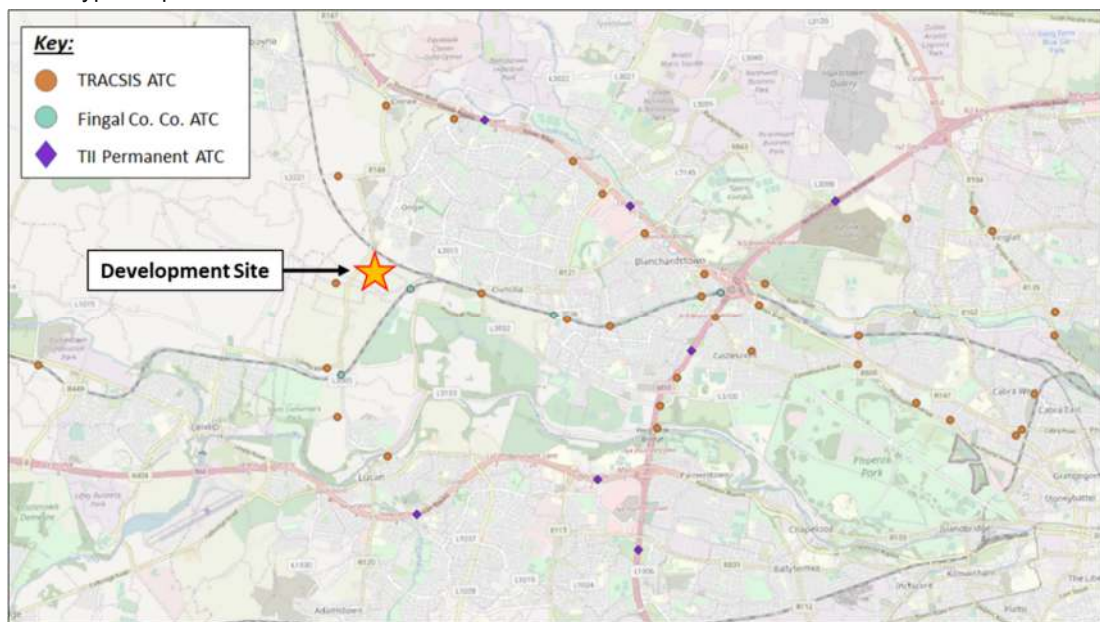


Figure 5.4 Survey Locations

## 5.5.3 Assessment Years and Scenarios

### Assessment Years

The following assessment year has been taken into consideration in the analysis:

- 2019: Baseline Year
- 2025: Development's Year of Opening (YoO)
- 2030: Future Year, YoO+5
- 2040: Horizon Year YoO+15, in line with the National Transport Authority 2040 planning sheet and East Regional Model.

### Assessment Scenarios

A 'Do-Minimum' scenario and a 'Do-Something' scenario have been assessed to understand the proposed development's impact to the local road network. These scenarios can be described as follow:

- **Do-Minimum:** This scenario will establish the performance of the road network with background traffic conditions and without the proposed development. The Blanchardstown Local Area Model have served as basis for this scenario. This scenario takes into consideration include all future planned road network discussed in section 5.5.4, all improvements to the public transport infrastructure proposed as part of BusConnect, Dart + West, and the Cycle Network Plan (see section 5.8), and the traffic associated with the Hansfield SDZ, and Kellystown LAP lands.
- **Post Development/Do-Something Scenario:** The with-development or 'do-something' scenario represents traffic conditions following completion of the proposed development, i.e., do-minimum plus additional traffic generated by the proposed development.

The models assessed the AM peak and PM Peak, which have been determined to be 08:00-09:00hrs and 17:00-18hrs, respectively.

### 5.5.4 Future Road Network Assumptions

The assessment will take into consideration the road schemes planned in the vicinity of the development site. These are:

- **Ongar-Barnhill Road scheme**, which is included in the Barnhill LAP and is to be delivered by FCC as part of their Section 48 programme. This Road link is expected to be put out for tender in Q3/4 2022 and to be completed by Q2/3 2024. This road is required in order to provide for a coherent sustainable movement and transport strategy and to maximise development capacity within the Barnhill LAP lands.
- **Kellystown Link Road**, this road is not required for the delivery of the proposed development, however it has been included to be able to take into account the traffic generation associated with Kellystown LAP (to establish a worst case scenario for traffic flows in local network). Pre-draft phase was initiated by Fingal County Council in mid-2019, and this road scheme has been presented to elected councillors which is included in the draft Kellystown LAP.

Figure 5.5 (overleaf) sets out the location of these roads in relation to the proposed development site.

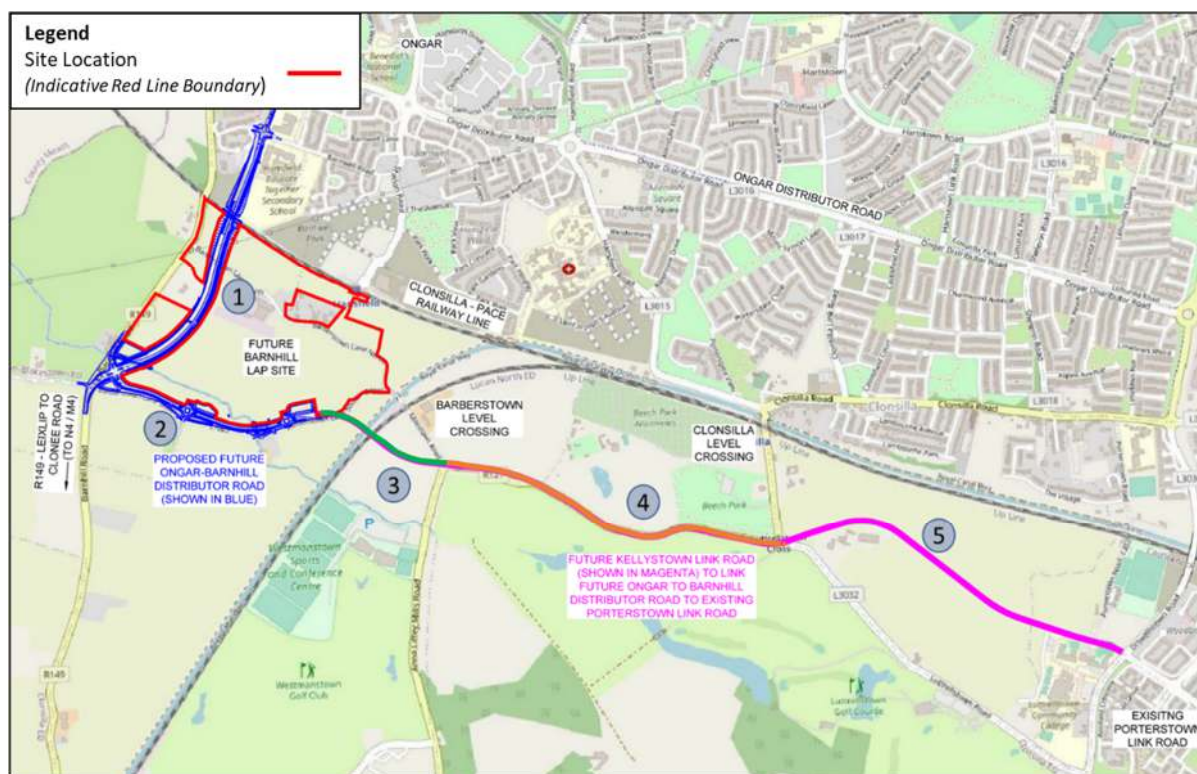


Figure 5.5 Future Road Network. (Indicative Red Line Boundary).

The main components of these two road schemes, as numbered in Figure 5.5, are outlined below:

1. **Ongar - Barnhill North-South Link Road** – a dual carriageway distributor road approximately 1.16km long extending from the Ongar Road roundabout in a south-westerly direction to tie into the existing R149 just south of Barberstown Lane South. This road will be delivered by Fingal County Council and is due to be tendered in Q3 2022 with view to start construction in Q1 2023, and finalise in Q2/Q3 2024. Fingal County Council will initially build this scheme as a single carriageway and Construct the rail bridge to facilitate Dual carriageway. The reservation for the second carriageway will be landscaped as agreed with FCC Parks Department.
2. **Upgrade of existing Barberstown Lane South** – Barberstown Lane South will connect to the proposed Ongar-Barnhill North-South Link Road via a proposed new signalised junction, to replace the existing crossroads at the R149/Barberstown Lane junction. Upgrade of 650 metres to a single carriageway is proposed in an easterly direction along the existing link between the R149 & the R121 towards Pakenham Bridge.
3. **Barberstown Bridge** - located adjacent to the existing Barberstown railway level crossing and provides a grade separated crossing over the Royal Canal and Railway line when the existing level crossing at Barberstown is closed as part of the DART Expansion Programme. The bridge connects to the Part 8 approved



'Barberstown Lane South Upgrade' on the west side and to the 'Kellystown Road proposal – West of Clonsilla Station' on its east side. This scheme is to be delivered by Irish Rail under Dart + west and is due to be lodged with An Bord Pleanála in the coming months and funded by NTA

4. **Kellystown Road – West of Clonsilla Station.** This road would connect to the road leading from the Barberstown level crossing/ the proposed new Barberstown Bridge at its west end at a point where the existing R121 turns through a 90 degree angle to change alignment from north-south to east-west. It would connect to the 'Kellystown Road- East of Clonsilla Station' at its east end. The proposed Kellystown Road – West of Clonsilla Station would run parallel to the existing R121. The R121 is not suitable for high volumes of traffic due to its winding alignment and the proposed new road would provide a safer alternative route including pedestrian and cyclist facilities.
5. **Kellystown Road – East of Clonsilla Station** –road proposal is shown on the FCC development plan and Kellystown LAP. It connects to the north-south section of the R121 (at a point approximately 100 south of the Clonsilla Level crossing)/ future proposed Kellystown Road –West of Clonsilla Station at its west end. From here it continues east and runs approximately parallel to the Porterstown Road and connects to the recently completed Porterstown Link Road at a point adjacent to and north of Scoil Choilm Community National School at its east end. This section of road is expected to accommodate the Kellystown LAP traffic. Figure 5.5 (overleaf) shows the location of these road proposal in relation to the proposed development site.

For the network traffic modelling and traffic assignment, the following assumptions are proposed in relation to the timeframe for the delivery of these roads.

- 2025 Year of Opening: Roads 1 and 2, as per Figure 5.5, will be in place.
- 2030 (YoO+5): Roads 1, 2, and 5 will be in place.
- 2040 (Horizon Year): Roads 1, 2, 3, 4, and 5 will be in place. Barberstown Level Crossing and Clonsilla Level Crossing will be closed.

### 5.5.5 Proposed Ongar-Barnhill Road

The future Ongar-Barnhill Distributor Road is to be constructed to provide access to the Barnhill LAP development and provide an additional road crossing of the Railway Line that will allow for other level crossings to be closed to facilitate Dart + west. The scheme is on the FCC Road Construction Programme and will be completed prior to the commencement of the proposed development.

The Ongar to Barnhill Distributor Road Scheme is expected to commence construction in early 2023 and be complete in mid-2024. Tenders are currently prepared and Tender issue is imminent. The bridge agreement between FCC and Irish Rail is signed off.

The main section of this future road shall connect to the existing Ongar Distributor Road roundabout located to the north of Hansfield and the Barnhill LAP development site. From here, the proposed road shall run in a southerly direction across the existing Clonsilla – M3 Parkway Railway Line by means of a new railway overbridge and connect to Barberstown Lane South and the existing R149 regional road by means of a new signalised junction. This scheme will also include the realigned upgrade of the Barberstown Lane South Road, complete with the 2 no. National Cycle Manual design roundabouts which will provide access to the Barnhill LAP development. The Barberstown Lane South Road will be upgraded to just after the 2nd roundabout access to the Barnhill LAP site where it shall tie back with the existing Barberstown Lane South Road. A booklet of drawings for the scheme are included in the planning pack.

The abovementioned scheme will also facilitate the Dart+ West Scheme which includes a new bridge from the end of the Barberstown Lane South realignment over the Dublin to Maynooth Railway Line and the Royal Canal which will allow for the future closure of the existing Barberstown Level Crossing.

The Ongar to Barnhill Distributor Road Scheme shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill LAP development for the purposes of the EIAR.

### 5.5.6 Proposed Development Occupancy Data Assumptions and Trip Generation

The total number of trips that will access/egress the development during the peak hours have been estimated using a combination of the NTA's National Demand Forecasting Model (NDFM) and the East Regional Model (ERM). The NDFM is a single national system that provides estimates of the total quantity of daily travel demand produced by, and attracted to, each of the Census Small Areas. Trip generations and attractions are related to zonal attributes such as population, number of employees and other land-use data. The NDFM provides input into the regional models and interacts with a number of key regional model components and utilises planning data to output levels of travel demand at the smallest available spatial aggregation (Census Small Area) for input into each of the Regional Models.

The following general assumptions have been used for estimating land use occupancy within the Barnhill LAP lands that were used as input in the model:

- Population:
- 2.0 persons per 2- bed apartments
- 2.4 persons per 3- beds apartments
- 2.8 persons for all non-apartment units
- Education: 28 pupils per primary school classroom
- 230 children per 900m2 creche
- Employment: 1 employee per 50m2 retail or commercial space

The assumptions on population, employment and education were fed into the NDFM which includes trip rates for various journey purposes and is used to generate overall 24-hour travel demand. This demand was then fed into the ERM which undertakes mode and destination choice and generates travel demand to/from every zone for the peak hours.

The assumptions presented above have been based on the demographic and land-use estimates, including population and levels of employment and education, contained in the NTA's 2040 planning sheet for testing the GDA Strategy, and the Census 2016 data.

### 5.5.7 Development Mode Share and Traffic Distribution Assumptions

#### East Regional Model and Greater Dublin Area Strategy (GDA)

##### 2025 and 2030 Assessment

The ERM is a strategic multi-modal transport model representing travel by all the primary surface modes – including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles.

It covers the area to the east of Ireland including the counties of Dublin, Wicklow, Kildare, Meath, Louth, Wexford, Carlow, Laois, Offaly, Westmeath, Longford, Cavan and Monaghan.

The ERM sits within the overall NTA Regional Modelling System which comprises of the following three main components, namely:

- The National Demand Forecasting Model (NDFM);
- 5 Regional Models (including the ERM); and
- A suite of Appraisal Modules.

It is comprised of the following key elements:

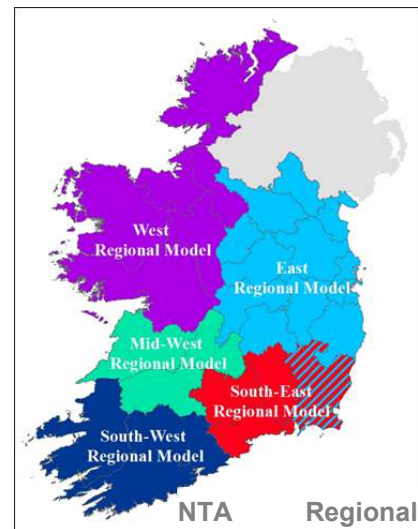
- **Trip End Integration:** The Trip End Integration module converts the 24-hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM);
- **The Full Demand Model (FDM):** The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved; and
- **Assignment Models:** The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.

Destination and mode choice within the East Regional Model (ERM) will be utilised for the 2025 and 2030 (YoO and YoO+5) assessment. Growth in vehicular traffic from the ERM has been used to generate forecast year matrices for testing on the road network.

The ERM has been calibrated using two main sources: Census 2016 Place of Work, School or College - Census of Anonymised Records (2016 POWSCAR), and the Irish National Household Travel Survey (2012 NHTS).

##### 2040 Assessment

The network assessment in the 2040 scenario has been done utilising the destination and mode choice data contained within the Greater Dublin Area (GDA) Strategy. This strategy takes in consideration the changes in mode share expected as a result of major public transport and infrastructure projects to be





delivered within the GDA area by 2040. Some of these projects are a BusConnects, DART Expansion Programme, and the Greater Dublin Area Cycle Network Plan.

Demographic and land-use estimates, including population and levels of employment and education, are contained in the NTA's 2040 planning sheet which is used for testing the GDA Strategy. Figure 5.6 (overleaf) summarises the Modelling Methodology utilised for the assessment.

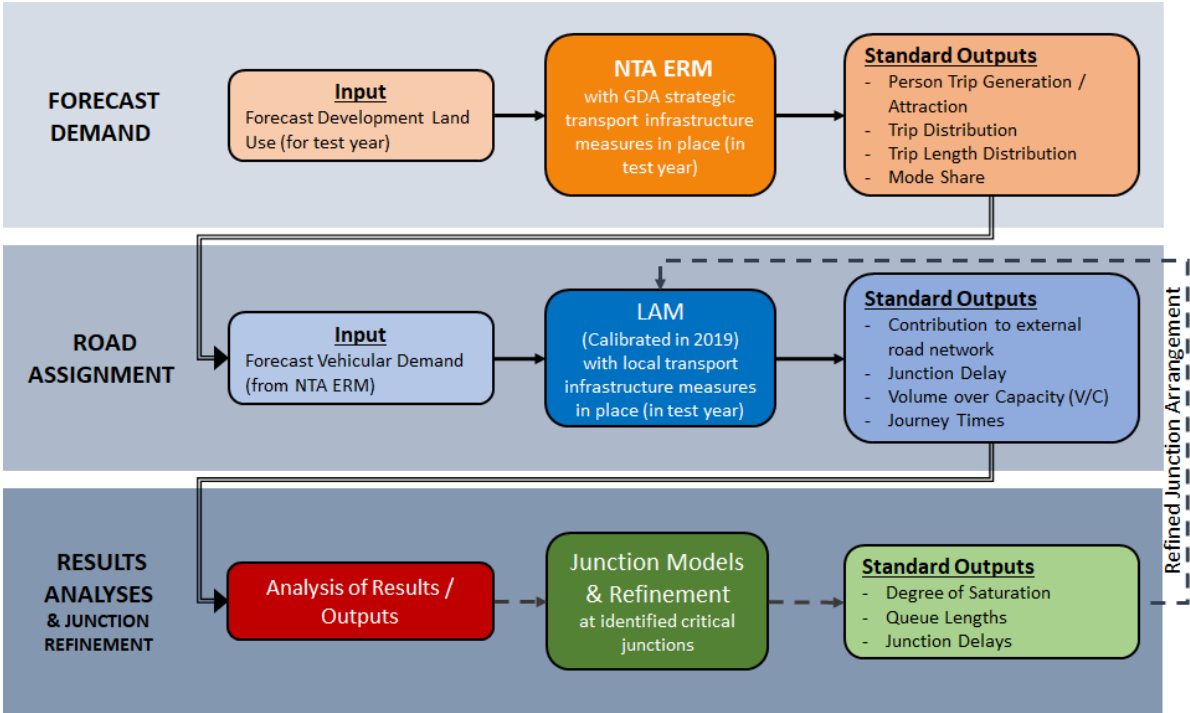


Figure 5.6 Overview of Transport Modelling Assessment Methodology

5.5.8 Hansfield SDZ Development and Kellystown LAP Lands Population Assumptions

The following assumption will be made in relation to the population and phasing for Hansfield and Kellystown:

**Hansfield SDZ Development**

- Assume full build out in 2040 = 3,000 Residential Units.
- Assume 60% SDZ development completed by 2025; and 100% completed by 2030.
- Population for 2025 is calculated as 2016 population + 60% of difference between 2030 and 2016 populations. Census 2016 population in Hansfield and Barnhill areas (SAPs 267028004/01, 02, 03) = 1,053.
- Assume 120 jobs in 2025 (60% development), increasing to 200 jobs by 2030.
- Assume increase of primary school pupils from 330 to 538 in 2025 (60% development) and up to 896 by 2030. Currently Educate Together school with pupil numbers = 330 from Census 2016.

**Kellystown LAP Lands**

- Assume full build out in 2040 = 1,000 Residential Units, i.e. 2,800 population.
- Assume 100 jobs and 448 primary school pupils in Kellystown LAP lands by 2040.
- Assume development will commence after 2025, i.e., population, jobs, and education between 2016 and 2026 will remain unchanged. Note: Census 2016 population in Kellystown area (SAP 267102001) = 356.
- Linear interpolation used (2025 to 2040) to get development values for interim test year 2030.

Table 5.3 presents the estimated population for the Barnhill, Hansfield, and Kellystown lands on each assessment year.

**Table 5.3 Estimated population for the Barnhill, Hansfield, and Kellystown lands on each assessment year**

LAND USE SCENARIO		ROAD NETWORK		BARNHILL LAP			HANSFIELD SDZ			KELLYSTOWN LAP		
		Ongar-Barnhill Road	Barnhill SHD access road	Population	Employment	Education	Population	Employment	Education	Population	Employment	Education
<b>Base Year (2019)</b>	Base	✓	✗	0	0	0	3,257	330	330	356	0	0
<b>Opening Year (2025)</b>	Do-Min	✓	✗	0	0	0	5,461	420	538	356	0	0
	Do-Development Phase 1	✓	✓	1,884	30	230	5,461	420	538	356	0	0
<b>Opening Year +5 (2030)</b>	Do-Min	✓	✗	0	0	0	8,400	500	896	1,296	38	172
	Do-Development 100%	✓	✓	3,259	45	568	8,400	500	896	1,296	38	172
<b>Future Year (2040)</b>	Do-Min	✓	✗	0	0	0	8,400	500	896	2,800	100	448
	Do-Development 100%	✓	✓	2,762	45	568	8,400	500	896	2,800	100	448

### 5.5.9 Assessment Junctions

In order to estimate the development's traffic impact in the local network, it has been deemed relevant to undertake detail traffic modelling of the following critical junctions:

- Junction 1 (J1): Barnwell Road/ Ongar Distributor Road/ Littlepace Distributor Road junction, known as the Barnwell roundabout.
- Junction 2 (J2): Ongar Barnhill NS Link Rd/ R149 Barberstown Lane South Junction.
- Junction 3 (J3): Baberstown Lane South/ Barnhill Development South Access A Junction.
- Junction 4 (J4): Baberstown Lane South/ Barnhill Development South Access B Junction.
- Junction 5 (J5): Milestown Road/ Anna Liffey Mills Road/ Woodwall Road Junction.

The location of these junctions in relation to the proposed development site is shown in Figure 5.7.



**Figure 5.7 Assessment Junctions**

### 5.5.10 Traffic Modelling Software

Detail Modelling of the junctions discussed in preceding section was undertaken utilising the following Modelling Packages:

- **ARCADY/PICADY:** ARCADY was utilised to assess junctions 1, 3, 4, and 5. ARCADY is a modelling software dedicated for analysing the capabilities of priority-controlled roundabout. Key functions of this software include capacity-based traffic assignment across the roads and lanes forecasting of performance parameters for the and entire network, individual junctions, and individual lanes. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Ration of Flow to Capacity (RFC).  
PICADY was utilised to assess the exiting layout of junction 5, which is currently a priority Y-junction, in the 2025 and 2030 scenario only. A roundabout is expected to be in place in junction 5 for the year 2040.
- **LINSIG:** This modelling software was utilised to assess the performance of Junction 2. LinSig is a modelling software dedicated for analysing isolated signal-controlled junctions and small junction networks. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Practical Reserve Capacity (PRC).

## 5.6 Relevant National and Local Policy

### 5.6.1 National Policy

#### Traffic and Transport Assessment Guidelines (2014)

Transport Infrastructure Ireland's (TII's) Traffic and Transport Assessment (TTA) Guidelines (May 2014) provides guidelines for best practice in relation to the preparation of a Traffic and Transport Assessment.

In relation to scoping, the guidance states:

*“The scoping study is a very important part of the TTA process. It is a precursor to the preparation of a TTA and should be undertaken at the earliest stages of planning for development. For a planning application, this phase may be the initial contact between the developer and the planning authority and, as such, the opportunity should be taken to emphasise the role of transport as both a possible asset and liability to the development. The planning authority should avail of such contact to address traffic and transport implications as an integral element of the development proposal.”*

In relation to the Assessment:

*“The Traffic and Transport Assessment should be written as an impartial assessment of the traffic impacts of a scheme, and it should not be seen to be a “best case” promotion of the development. All impacts, whether positive or negative, should be recorded. The level of detail to be included within the report should be sufficient to enable an experienced practitioner to be able to follow all stages of the assessment process and to reach a similar set of results and conclusions.”*

Within Table 2.2 of the TTA Guidelines, the following threshold is provided in relation to the requirement for a full TTA “where national roads are affected” i.e., the most onerous thresholds presented in the Guidelines:

*“Housing - 100 dwellings within urban areas with a population equal to or greater than 30,000.”*

The threshold of 100 no. residential units contained within the preceding Guidelines is exceeded by the proposed development, as such a TTA is required.

### **Design Manual for Urban Roads and Streets (DMURS)**

The Design Manual for Urban Roads and Streets (DMURS) was jointly published by the Department of Transport, Tourism and Sport and Department of Environment, Community and Local Government in 2013, and updated in 2019. The principles, approaches and standards set out in the Manual apply to the design of all urban roads and streets (streets and roads with a speed limit of 60 km/ h or less).

A detail description of the DMURS guidance applicable to the development is presented within section 7 of this Report of the full TTA Report submitted with the Planning Pack.

### **Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020**

Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities was published in December 2020 and provides guidance on different aspects of new residential developments, including cycle parking and car parking provision.

The design guidance included within this document is only relevant to the apartment units/duplex units proposed with the development.

In relation to cycle parking, Section 4.17 of the Design Standards state “the accessibility to, and secure storage of, bicycles is a key concern for apartment residents”, with specific guidance provided in relation to the location, quantity, design, and management of cycle parking facilities. In terms of cycle parking quantity, “a general minimum standard of 1 cycle storage space per bedroom shall be applied. For studio units, at least 1 cycle storage space shall be provided. Visitor cycle parking shall also be provided at a standard of 1 space per 2 residential units.”

Based on the abovementioned standards, the cycle parking requirements for the apartment units and duplex units is presented in Table 5.4 (overleaf).

**Table 5.4 Cycle Parking Requirement Design Standards for New Apartments**

Unit Type	Proposed Number of Units	Total no. Beds	Required Cycle Parking Residents	Required Cycle Parking Visitors
1 bed apartment	148	148	148	74
2 bed apartment	589	1,178	1,178	295
3 bed apartment	63	189	189	32
4 bed apartment	4	16	16	2
1 bed duplex	5	5	5	3
2 bed duplex	20	40	40	10
3 bed duplex	92	276	276	46
<b>Total</b>	<b>921</b>	<b>1,852</b>	<b>1,852</b>	<b>462</b>

As shown above, the Design Standards for New Apartments indicates the requirement of 2,314 no. cycle parking spaces to serve the apartment/duplex units in the development. Of these, 1,852 should accommodate residents and 462 should accommodate visitors.

The proposed cycle parking provision for the apartment/duplex units proposed with the development have been design in accordance with the standards presented above. A total of 3,337 no. cycle parking spaces will be provided to with the proposed development, in excess of the requirements presented above.

In terms of qualitative requirements, it is stressed that cycle storage/ parking facilities shall be sufficiently accessible, offer an adequate level of safety and security, be well-lit and properly maintained. It is further recommended that cycle parking is provided within “a dedicated facility of permanent construction.”

The proposed development cycle parking provision (both capacity and specification) is consistent with the Design Standards’ requirements presented above.

Section 4.18 of the Design Standards stipulates that car parking provision at apartment developments shall have regard to the type o location, based on “proximity and accessibility criteria”. As per Section 4.22, “as a benchmark guideline for apartments in relatively peripheral or less accessible urban locations, one car parking space per unit, together with an element of visitor parking, such as one space every 3-4 apartments, should generally be required.” However, as per Sections 4.19 and 4.20 “in larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances. (...) These locations are most likely to be in cities, especially in or adjacent to (i.e., within 15 minutes walking distance of) city centres or centrally located employment locations. This includes 10 minutes walking distance of DART, commuter rail or Luas stops or within 5 minutes walking distance of high frequency (min 10 minute peak hour frequency) bus services.”

As detailed above, the Design Standards recommend a reduced level of car parking provision for highly accessible sites which are well served by alternative transport modes. A total of 1593 no. car parking spaces are proposed with the development. This reduced level of on-site car parking provision is deemed appropriate due to the strategic location of the development site, located within a short walk (350 meters) from Hansfield Train station (see section 4.3), and short walk from the amenities and retail available within Hansfield area to the north of the site, and further amenities proposed with the development.

Furthermore, the site is also serviced by several bus stops, located to the north of the site which have high frequency service and are approximately 1 km away from the centre of the new development. These bus stops can be accessed easily via cycling and walking.

The public transport accessibility will further improve in the future with the implementation of BusConnects and Dart+ West.

### **Climate Action Plan**

The Climate Action Plan 2021 contains the Irish Government’s plan for tackling climate breakdown and reduce Ireland’s greenhouse gas emissions. It outlines the current state of play across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture, and charts a course of action towards ambitious decarbonisation targets.

Climate Action Plan aspirations are to achieve a net zero carbon energy system and create a resilient, vibrant, and sustainable country, with modal shift to public transport presented as one of the transport



related objectives. The Climate Action and Low Carbon Development (Amendment) Act 2021 commits Ireland to reach a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 (compared to 2018 levels). Under the 2021 Act, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity rich, environmentally sustainable and climate-neutral economy

Table 3.1 of the plan proposes a 42-50% reduction in transport emissions by 2030, in comparison to 2018. This cut in transport emissions by 2030 will be achieved through measures including:

- 500,000 extra walking, cycling and public transport journeys per day by 2030
- Increasing the proportion of kilometres driven by passenger electric cars to between 40 and 45% by 2030, in addition to a reduction of 10% in kilometres driven by the remaining internal combustion engine cars
- All replacements for bus and commuter rail vehicles and carriages to be low or zero carbon by 2030
- Increased rollout of rural public transport through Connecting Ireland. [42-50% reduction in emissions by 2030]

The proposed pathway of the Plan in relation to transport is focused on accelerating the electrification of road transport, the use of biofuels, and a modal shift to transport modes with lower energy consumption (e.g., public, and active transport).

Furthermore, the Plan commits to expanding sustainable mobility options to provide meaningful alternatives to everyday private car journeys is necessary to reduce transport emissions. It is the goal to provide continued and enhanced investment in our walking, cycling and public transport infrastructure and services across the country.

The Plan aims to achieve the delivering an additional 500,000 daily sustainable journeys by 2030 through the implementation of major transport projects such as:

- BusConnects
- Connecting Ireland
- Expanding rail services and infrastructure in, and around, major urban centres
- A significant increase in our walking and cycling investments

The proposed development has been designed as sustainable community in line with the visions of the Climate Action Plan. 10% of the proposed car parking has been designated for Electric Vehicles and space has been put aside to allow regular parking spots to be turned into EV in the future, as needed.

The development design aims to insensitive modal shift to sustainable transport options by the provision of high-quality cycle parking, in accordance with the standards presented within the Fingal Development Plan 2017-2023 and the Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities. High quality and segregated walking and cycling infrastructure will be provided across the development to facilitate more trips in a sustainable manner and reduced the need for cars.

Furthermore, the site location is ideal for the delivery of a sustainable community due to its proximity to the Hansfield station, whose service will be upgraded once DART + West is completed. The proposal includes space for amenities and services, such as retail, remote working space, creche, medical facility, and schools (to be provided by the department of Education), in order to limit the number of trips by car and allow more trips to be done by sustainable modes at the local level.

## 5.6.2 Local Policy

### **Fingal County Council Development Plan 2017-2023**

The Fingal County Council Development Plan 2017-2023 sets out the Council's policies and objectives for development in the County over the period from 2017 through 2023.

The Barnhill lands are zoned Objective 'RA', which seeks to 'Provide for new residential communities subject to the provision of the necessary social and physical infrastructure' in the Fingal Development Plan 2017-2023. Figure 5.8, below presents an extract of the Sheet 13 Blanchardstown South indicating the zoning objectives for the Barnhill development site and its surroundings.

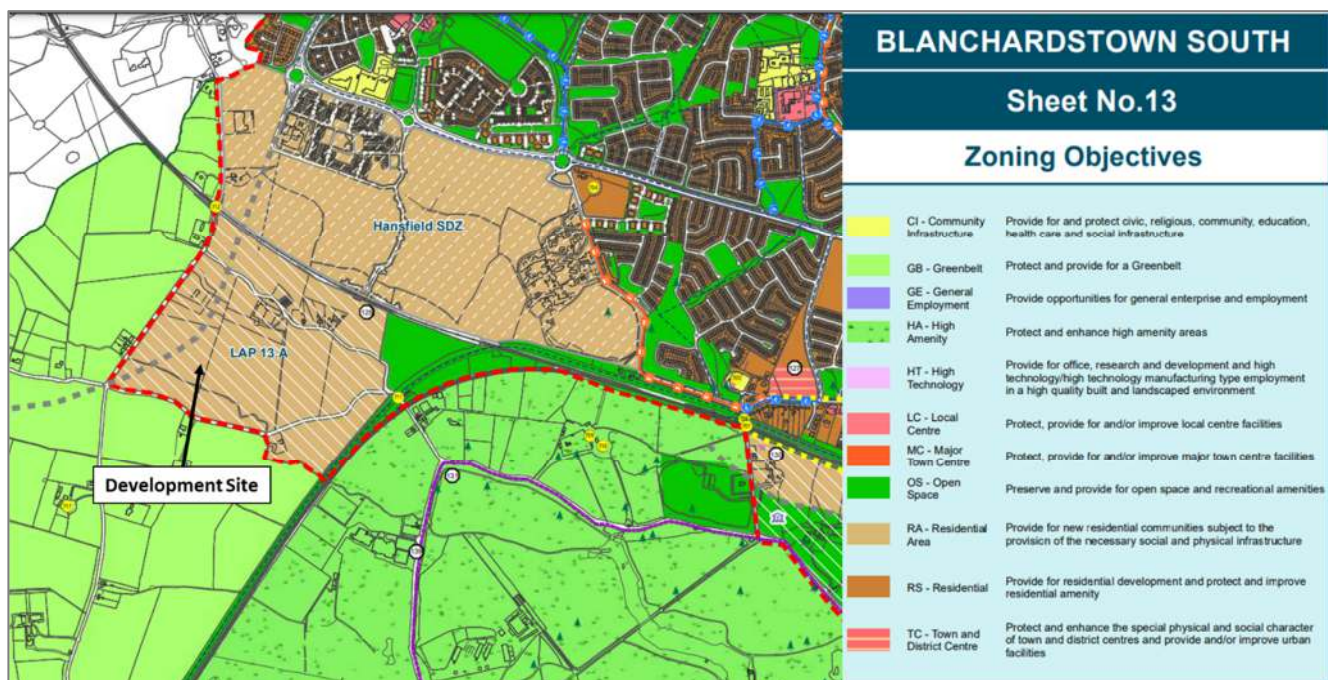


Figure 5.8 Blanchardstown South Development Map (Source: Extract from Sheet 13, Blanchardstown South Fingal Development Plan 2017-2023)

Chapter 4 of the Plan presents development strategy of Blanchardstown to include “the provision of civic, cultural, retail, commercial, residential and employment activity within Blanchardstown at a level appropriate for a Metropolitan Consolidation Town.”

In the Local Area Plans and Master Plans, the Objective 18 Blanchardstown Area includes the following elements for Local Area Plan of Barnhill- “Construction of houses on these lands will be dependent on the delivery of the proposed new road and bridge over the railway. Ensure the provision of pedestrian access between Barberstown/Barnhill and the Hansfield SDZ by means of a new pedestrian overbridge integrated with adjoining development including the proposed Hansfield rail station. Adoption of the Local Area Plan shall be dependent on the rail station at Hansfield being open, accessible and serviced by train.”

Chapter 7 of the Plan discussed the objectives relating to movement and infrastructure. The following transport related objectives are deemed relevant to the proposed development:

- Objective MT05: Integrate land use with transportation by allowing higher density development along higher capacity public transport corridors.
- Objective MT06: Integrate the County’s transport and tourism strategies to promote increasingly sustainable travel patterns and improved linkages between the City Centre, Villages and the Coast among visitors to the County.
- Objective MT08: Control on-street parking in the interests of the viability, vitality and amenity of commercial centres by maximising the supply of short stay parking for shoppers, while providing appropriate levels of long- term parking within a reasonable distance for employees.
- Objective MT09: Consider the implementation of Parking Demand Management Strategies in housing estates in close proximity to public transport facilities experiencing parking and congestion issues, where deemed appropriate and practicable.
- Objective MT10: Facilitate the provision of electricity charging infrastructure for electric vehicles both on street and in new developments in accordance with car parking standards.
- Objective MT11: Support the growth of Electric Vehicles and EBikes, with support facilities, through a roll-out of additional electric charging points in collaboration with relevant agencies at appropriate locations.
- Objective MT13: Promote walking and cycling as efficient, healthy, and environmentally-friendly modes of transport by securing the development of a network of direct, comfortable, convenient and safe cycle routes and footpaths, particularly in urban areas.
- Objective MT16: Promote the provision of adequate, secure and dry bicycle parking facilities and a bike rental scheme at appropriate locations, including stations and other public transport interchanges.
- Objective MT17: Improve pedestrian and cycle connectivity to schools and third level colleges and identify and minimise barriers to children walking and cycling to primary and secondary schools.

- Objective MT21: Ensure that as soon as possible, but by the end of the lifetime of the Development Plan the environment in the immediate vicinity of schools is a safe and attractive low speed (30kph) environment, and drop-off by car within a given distance restricted.
- Objective MT22: Improve pedestrian and cycle connectivity to stations and other public transport interchanges.
- Objective MT37: Implement traffic calming on particular roads and in appropriate areas of the County, especially residential areas, to reduce vehicle speeds in the interests of road safety and residential amenity. Ensure that where appropriate, traffic calming is included as a pre-condition as part of the development of all new estates or extensions to existing estates.
- Objective MT39: Review the results of the 30km/h Residential Speed Limit Pilot Study, with a view to rolling out a 30km/h speed limit in all residential estates.
- Objective MT42: Protect the strategic transport function of national roads, including motorways through the implementation of the DoECLG 'Spatial Planning and National Roads – Guidelines for Planning Authorities'. There is a provision in road schemes to link Barnhill area to Ongar and Leixlip Interchange via N3-N4 link.
- Objective EN04: Encourage development proposals that are low carbon, well adapted to the impacts of Climate change and which include energy saving measures and which maximise energy efficiency through siting, layout and design.
- Objective NP04: Ensure that future developments are designed and constructed to minimise noise disturbance and take into account the multi-functional uses of streets including movement and recreation as detailed in the Urban Design Manual (2009) and the Design Manual for Urban Roads and Streets (2013).
- Objective DMS117: Require new developments to be designed in accordance with DMURS. In particular they shall have layouts and designs which reflect the primacy of walking and cycling by providing safe, convenient and direct access to local services, employment and public transport. The promotion of cycling as a sustainable mode of transport depends on providing sufficient parking at places of employment and education
- Objective DMS119: Support public transport improvements by reserving the corridors of planned routes free from development. Provide setbacks along public transport corridors to allow for future improvement to enable the provision of a safe and efficient network of public transport infrastructure.
- Objective DMS126: Ensure that necessary new entrances are designed in accordance with DMRB or DMURS as appropriate, thereby avoiding the creation of traffic hazards.
- Objective DMS128: Require developers to provide a Traffic Impact Assessment where new development will have a significant effect on travel demand and the capacity of the surrounding transport network.
- Objective DMS129: Promote road safety measures in conjunction with the relevant stakeholders and avoid the creation of traffic hazards.
- Objective DMS130: Ensure that new residential developments are designed in accordance with DMURS to create low-speed environments.

In relation to Car parking, Chapter 7 states the following “ No-one will travel by car if they know that there are no car parking spaces available at their destination. In particular, commuters will use more sustainable modes of transport if they do not have car parking at their place of work or education, and this is the most effective and most widely used form of demand management. The Development Plans for each of the four Dublin Local Authorities currently include standards which limit the amount of car parking at new developments, especially places of work and education. Employment-based developments that are close to public transport need fewer car parking spaces.

In line with the above, the development plan splits the car parking standards for places of work and education into 2 zones, which are described below:

- Zone 1: areas which are within 1600m of DART, Metro, Luas or BRT, (existing or proposed), within 800m of a Quality Bus Corridor, zoned MC Major Town Centre, or subject to a Section 49 Scheme.
- Zone 2: all other areas.

The development Plan states that car parking standards for places of work within Zone 1 should be reduced by 50%.

The location of the proposed development site falls within the description of Zone 1, as it is located in close proximity to the Hansfield Train Station. In light of this, all car parking calculations for commercial/educational units within the proposed development will be reduced by 50%.

Table 12.8, within Chapter 12 of the Plan, provides guidance in relation to the car parking provision for new developments. Table 5.5, below, provides an overview of the car parking standards and the corresponding car parking required for each land use type.

**Table 5.5 FCC Car Parking Standards (Source: Table 12.8 FCC Development Plan 2017-2023)**

Land Use	Proposed no. units/ Sqm	FCC Standard	Standard for Visitors	Car Parking Spaces
1-bed Apartment/ 1-Bed Duplex	153	1 per apartment	Plus 1 visitor space per 5 units	184
2-beds Apartments/ Duplex	609	1.5 per apartment	Plus 1 visitor space per 5 units	1,036
3-beds Apartments/ Duplex	155	2 per apartment	Plus 1 visitor space per 5 units	341
4-beds Apartments/ Duplex	4	2 per apartment	Plus 1 visitor space per 5 units	9
3 bed house	286	2 within Curtilage	-	572
4 bed house	36	2 within Curtilage	-	72
Retail/Commercial units*	871	1 per 30 sqm (reduced by 50%)	-	15
Café	158	1 per 15 (Reduced by 50%)	-	5
Community Space	359.2	1 per 50	-	7
Creche	941.6 (8 classrooms)	0.5 Per Classroom	-	4
Medical Centre (GP / Dental practice)	8 Consulting Rooms	2 per consulting Room	-	16
<b>Total</b>				<b>2,261</b>

\* Land Use Retail – Convenience Stores assumed for commercial units to simplify analysis

As shown above, the maximum or ‘norm’ car parking requirement would be 2,261 spaces. Due to the strategic location and good public transport available in the vicinity of the site, a reduced provision of 1,593 no. car parking spaces is proposed for development, of which 641 will be located within the curtilage of the houses.

Such reduced provision is in line with the recommendations of the Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020, which states “in larger scale and higher density developments, comprising wholly of apartments in more central locations that are well served by public transport, the default policy is for car parking provision to be minimised, substantially reduced or wholly eliminated in certain circumstances (see section 5.6.1 for details)

Furthermore, objective DM113 within the Development Plan aims to “limit the number of car parking spaces at places of work and education so as to minimise car-borne commuting”.

The Plan provides guidelines in relation to car parking for electric vehicles and disable users. It is stated that “One space or more per 100 spaces should be reserved for disabled parking bays and one space or more per 100 spaces should be reserved for electric vehicles with charging facilities.”

14% of the total off-curtilage car parking spaces provided with the development will be equipped as an EV parking Spot and 5% of the total off-curtilage parking will be designated for disabled users. This represents the provision of 154 no. electric vehicle parking and 55 no. disable parking. Ducting has been provided for all car parking spaces inside the development to allow them to be turn into EV spots in the future. Appropriate ducting will be provided at all houses to facilitate EV charging. all Houses will have ducting for EV Charging. 10% will be provided with charging points.

A detail description of the car parking strategy for the development is provided within section 5.13 of this report.

In relation to cycle parking provision, Table 12.9 of the Plan sets out the Bicycle Parking Rates for all new developments in the County. Table 5.6 (overleaf), provides an overview of the cycle parking standards and the corresponding cycle parking required for the development.

**Table 5.6 FCC Cycle Parking Standards (Source: Table 12.9 FCC Development Plan 2017-2023)**

Land Use	Standard	Visitors	No. Proposed	Cycle Parking Spaces Required
Apartment, townhouse 1 bedroom	1 per unit	Plus 1 visitor space per 5 units	921 Apartments/ Duplex	1,105
Retail/Commercial units*	1 per 100 sqm	-	870.5	9
Cafe	1 per 150 sqm	-	158 sqm	1
Creche	0.5 Per Classroom	-	942 sqm (8 Classrooms assumed)	4
Community Space	1 per 100 sqm	-	359.2	4
Medical Centre	1 per 4 consulting Rooms	-	8 consulting Rooms	2
<b>Total</b>				<b>1,124</b>

\* Land Use Retail - Convenience assumed for commercial units to simplify analysis

As shown on above, a total of 1,124 no. cycle parking spaces must be provided with the proposed development. A total of 3,337 no cycle parking spaces are proposed in excess of the Development Plan Standards.

Cycle parking provision for the apartments/duplex element of the proposed development has been designed in accordance with the standards presented within the Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities, December 2020, discussed in Section 5.6.1 of this Report.

A detail description of the car parking strategy for the development is provided within section 5.13 of this report.

### **Barnhill Local Area Plan 2019**

The Barnhill Local Area Plan 2019 sets out the Council’s vision, development themes, and opportunities for the Barnhill Area.

The Barnhill lands are zoned Objective ‘RA’, which seeks to ‘Provide for new residential communities subject to the provision of the necessary social and physical infrastructure’ in the Fingal Development Plan 2017-2023. The number of residential units supported on the LAP lands has been intended to be in the range of approximately 900 to 1,150 units.

The vision of the council for the Barnhill area is the following:

“To create a place to live that is appealing, distinctive and sustainable, maximising the opportunities provided by the surrounding natural environment for improved amenities and the enhancement of biodiversity. It is envisaged that Barnhill will develop as a sustainable community comprised of new homes, community, leisure and educational facilities based around an identifiable and accessible new local centre which will form the heart of the area.”

The LAP incorporates the following sustainable Principles:

- Optimal use of land through the development at an appropriate density, in particular having regard to proximity of the lands to Hansfield train station.
- Maximising opportunities for open space, green connected networks and protection of the natural environment as defining characteristics of the developing area.
- Development of a movement and transport strategy which minimises trip generation and promotes cycling, walking, public transport, and sustainable modes of transport through the area.
- Creation of sustainable communities through integration of the new community with the established community in Hansfield to provide people with the services/facilities they need close to their homes to encourage lifetime residency and vibrant communities and places.



Section 6 of the LAP presents the Movement and Transport Strategy for Barnhill. The LAP seeks to achieve a significant proportion of journeys on foot, by cycle and by public transport. To support this, it requires a well-designed pedestrian and cycle networks to ensure ease of access to the high-quality network of public transport which serves the site. A network of attractive and safe footpaths and cycleways, coupled with the provision of frequent and reliable public transport services, will connect major destinations within the area and beyond.

The LAP also requires that the design and layout of new developments provide permeability, linkages, and connectivity to their surrounding areas, thereby minimising local trips by private car.

The key transport objectives of the LAP are the following:

- Improve accessibility and maximise public transport use, taking account of the land's location adjoining Hansfield train station.
- Encourage use of sustainable transport options. Walking and cycling shall be encouraged, particularly for shorter trips.
- Prioritise planned infrastructure that supports public transport, and ensures the land use strategy is informed by, and integrated with transportation objectives.
- Seek the interconnection of walking and cycling routes with key public transport and amenity destinations (both existing and planned).
- Encourage sustainable densities of population, such that public transport is supported and sustained, and walking and cycle routes are kept active.
- Facilitate the provision of electricity charging infrastructure for electric vehicles both on street and in new developments in accordance with car parking standards.

The Plan seeks a high level of connectivity, with a network that encourages low traffic speeds by integrating traffic calming measures into road design by providing:

- Frequent crossing points and junctions
- Raised crossing points as required
- Horizontal and vertical deflections
- Minimising formal signage and road markings
- Narrower carriageways
- On-Street parking
- Reduced visibility splays
- Shared street surfaces
- Tighter corner radii
- Appropriate landscaping and urban design to minimise through visibility for drivers

The LAP also presents as a key piece of infrastructure for Barnhill the delivery of the necessary extension of the Ongar-Barnhill Road with provision of a new bridge over the Dunboyne (Pace) – Clonsilla rail line and provision of a new junction with the existing road network. This will connect the Ongar Road to the existing Clonee-Lucan Road (R149). Furthermore, it is also required the Creation a new cul-de-sac on Barberstown Lane North.

The following is required for the LAP:

- The village centre and area to the front of the train station shall incorporate civic spaces. Seating and cycle parking facilities shall be provided as an integral part of the design.
- The Local Area Plan incorporates a network of pedestrian and cycle routes connecting to the local centre, school, community services and public open space. The pedestrian/cycle routes will connect with existing links in adjoining areas and to the pedestrian/cycle network in the Greater Blanchardstown Area.

Figure 5.9 below, presents the vision of the Council for the Barnhill area, including the movement network, as presented in the LAP.



Figure 5.9 Barnhill Development Vision as per LAP 2019

The LAP envisions the development of Barnhill in the Phasing illustrated in Figure 5.10 (overleaf).

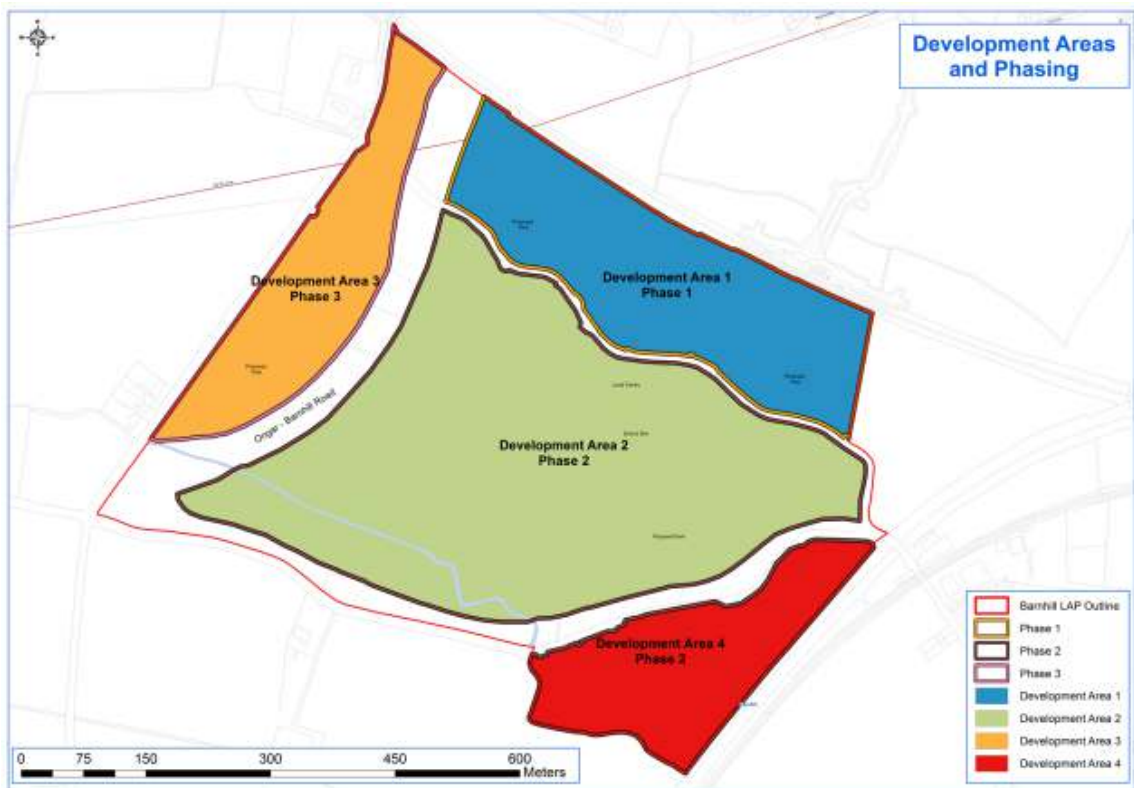


Figure 5.10 Barnhill LAP development Phasing

## Kellystown Local Area Plan 2021.

The Kellystown Local Area Plan 2019 sets out the Council's vision, development themes, and opportunities for the Kellystown Area.

Kellystown is located directly to the east of the proposed development site. The LAP proposes the development of ca. a 1,055 - 1,583 residential properties

The Barnhill lands are zoned Objective 'RA', which seeks to 'Provide for new residential communities subject to the provision of the necessary social and physical infrastructure' in the Fingal Development Plan 2017-2023.

The vision for Kellystown is to promote the development of a distinctive, sustainable, high quality new residential quarter, connected to the neighbouring suburbs of Clonsilla and Carpenterstown. Kellystown will provide a sustainable residential community, comprising a choice of high-quality new homes, with a mix of dwelling types, size and tenure based around a new civic square that incorporates local services with new schools, public open space and access to high-capacity public transport links.

The council's Vision for Kellystown is shown in Figure 5.11 (overleaf).

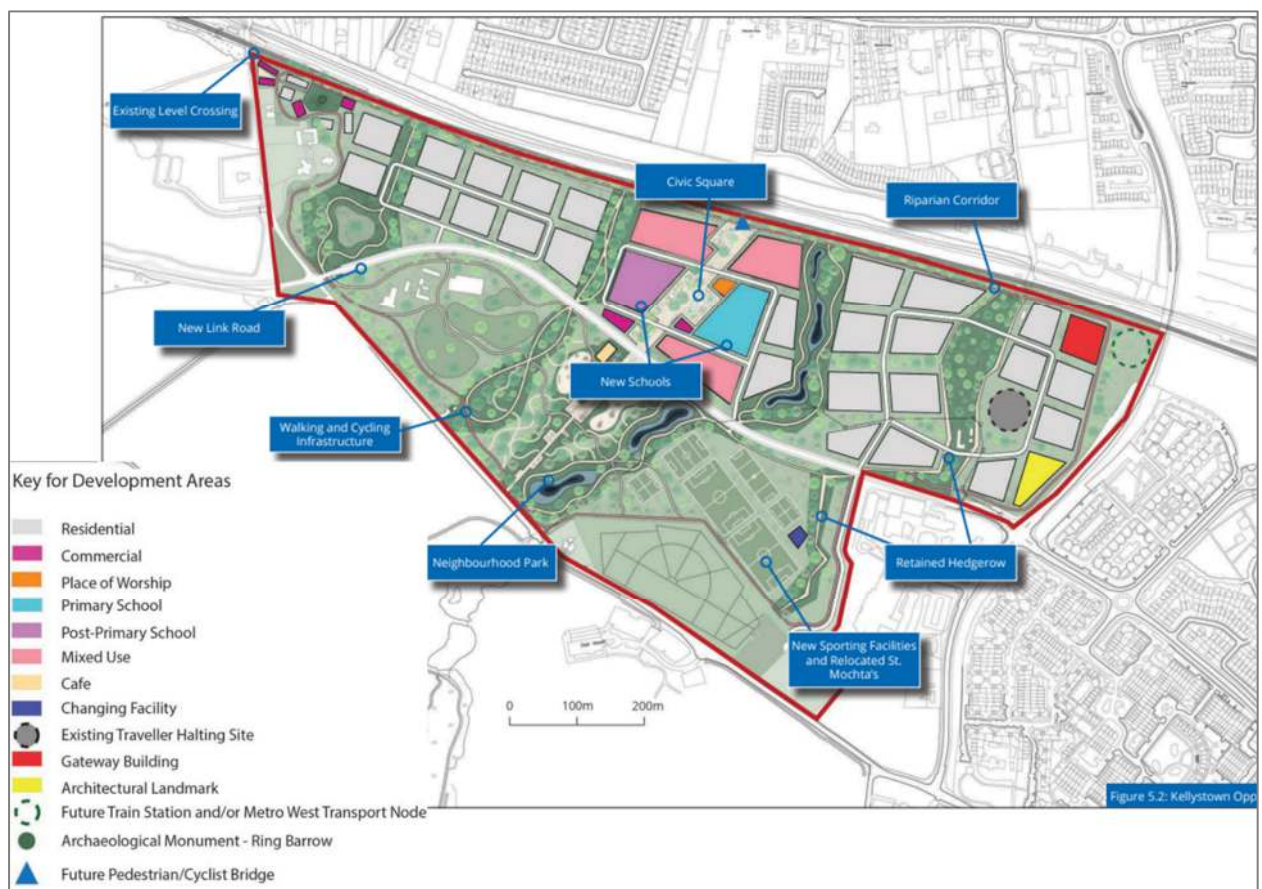


Figure 5.11 Kellystown LAP

As shown above, a Link Road is proposed to extend across the Kellystown LAP, which will connect from the R121 to the Diswellstown Road to the east. This road corresponds to road no. 5 in the Future Road network assumptions taken in consideration in the assessment of the Barnhill Development (see section 5.8.1 for details)



# 5.7 Existing Conditions

## 5.7.1 Local Road Network

### R149

R141 Barnhill Road is a two-carriageway regional road located to the west of the proposed development site. Near the site, this road accommodates one lane for general traffic in each direction. The road connects the development site to the northern developments and bus stops. No pedestrian or cycle facilities are available in this stretch of the road along the development side.



### R121

R121 is a regional road and is located to the east of the development site. The road is bifurcated into R121 Woodwall Road in the North and Anna Liffey Mills Road in the South. Both the roads can accommodate two-way traffic and have two lanes. No pedestrian or cyclists' facilities are present on the stretch of the road close to development site. Woodwall road connects the development site to the Clonsilla train station, which is the second closest train station to the development site after Hansfield.



### Barberstown Lane North

Barberstown Lane North is a local road which marks the north boundary of the development site. It branches from R149 towards East. The road is open to two-way traffic, and it does not have any road markings. There are some private properties and agricultural land on the roadsides



### Barberstown Lane South

Barberstown Lane South is a local road which marks the south boundary of the development site. It branches from R149 towards East. The road is open to two-way traffic, and it does not have any road markings. There are some private properties and agricultural land on the roadsides. The road meets Barberstown Lane North via a three-leg junction to the east. The third leg further diverges into R121 North and South.



## Ongar Distribution Road

Ongar Distribution Road is a local road located to the North of Hansfield train station. It passes through the residential development to the north of Barnhill Site. The stretch of the road has four roundabouts and a few junctions. The road has dual carriageways to accommodate for two-way traffic. It has bus lanes all along, and a few bus stops are located on the road. It has verge alongside both the carriageways followed by footpaths and cycle lanes.



### 5.7.2 Existing Public Transport Services

The Hansfield Train Station is roughly 350 m from the centre of the site. It connects Barnhill to Dublin City Centre and Longford via M3 Parkway. There are several bus stops towards the north of the site. The nearest bus stop is approximately 1.2 km from the centre of the development to the north of the site. Figure 5.12 illustrates the location of the train station and bus stops in the vicinity of the proposed development site.

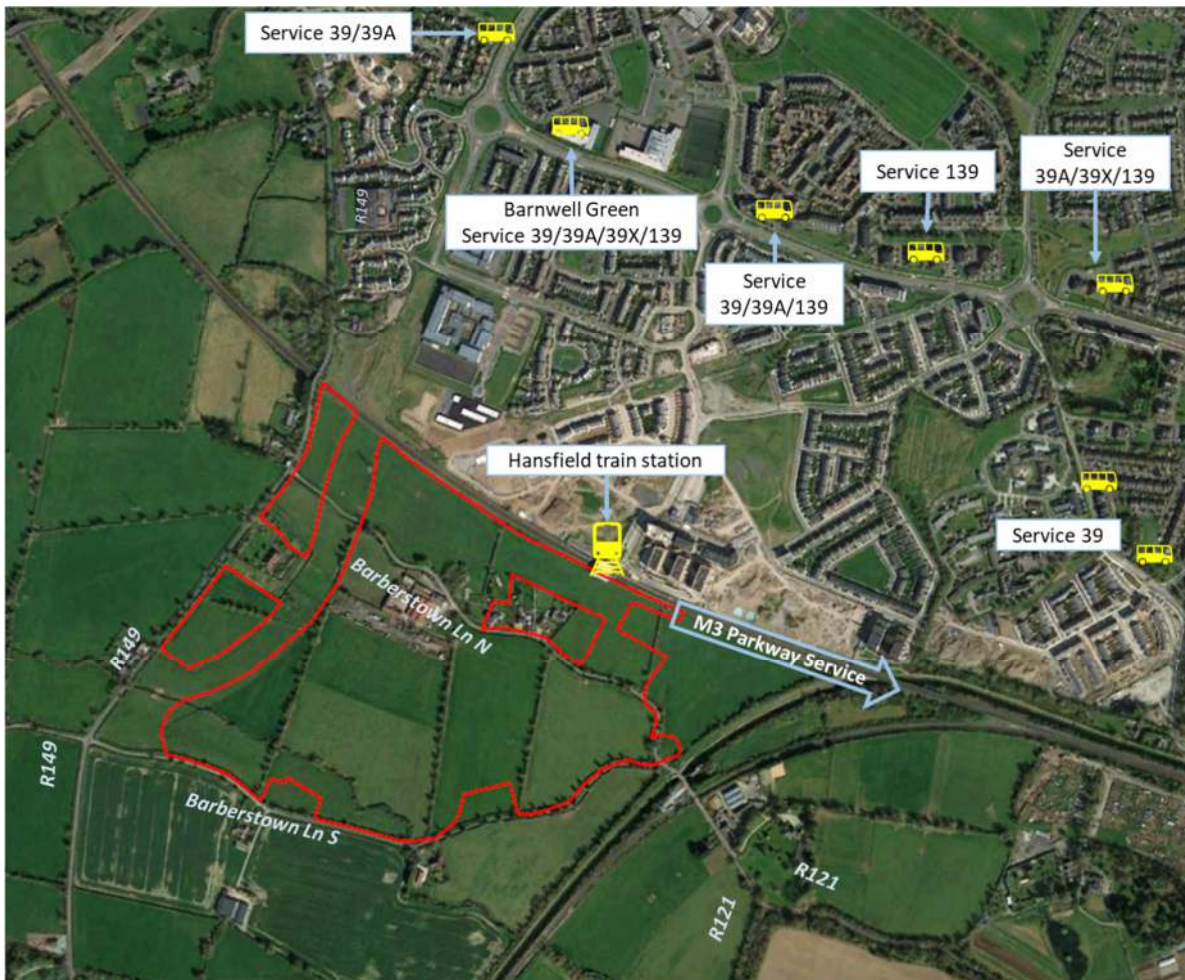


Figure 5.12 Public Transport stops in the Vicinity of the Site (Indicative Red Line Boundary)

Table 5.7, below, summarises the train routes and bus routes available and their frequency.



**Table 5.7 Existing Public Transport Services**

Stop Name	Route No.	Route	Peak Hour Frequency
Hansfield		Dublin – M3 Parkway – Longford	30 minutes
Barnwell Green	39	Burlington Road – Ongar Road	30 minutes
	39A	Delhurst Estate-UCD	10 minutes
	39X	Burlington Road-Ongar Road	Twice in 30 minutes (operates only in evenings on weekdays)
	139	Naas Hospital - Blanchardstown	2 hours

### 5.7.3 Existing Traffic Volumes

Due to the COVID-19 pandemic and related restrictions implemented by the Irish Government in December 2020, traffic volumes in the road network surrounding the site have significantly decreased. As a result, the existing flows in the road network do not represent a worst case scenario for traffic conditions in the local area. In light of this, and in order to determine baseline traffic conditions and provide a basis from which the future development’s traffic impact can be analysed, 2019 data has been used for the assessment.

Automatic Traffic Counts (ATC’s) were undertaken at 35 locations across the network over a 3-week period from Monday 28th January to Sunday 14th February 2019. The ATC data provides information on:

- The daily and weekly profile of traffic within the study area;
- Busiest time periods and locations of highest traffic demand on the network;
- Any issues on the network during the survey period i.e., accidents, road closures etc.; and
- Typical speed of traffic on the network.

Figure 5.13 shows the traffic flow in the surrounding areas of the Barnhill development site for the base year 2019 between AM (08:00-09:00hrs) and PM (17:00-18:00hrs) peaks.

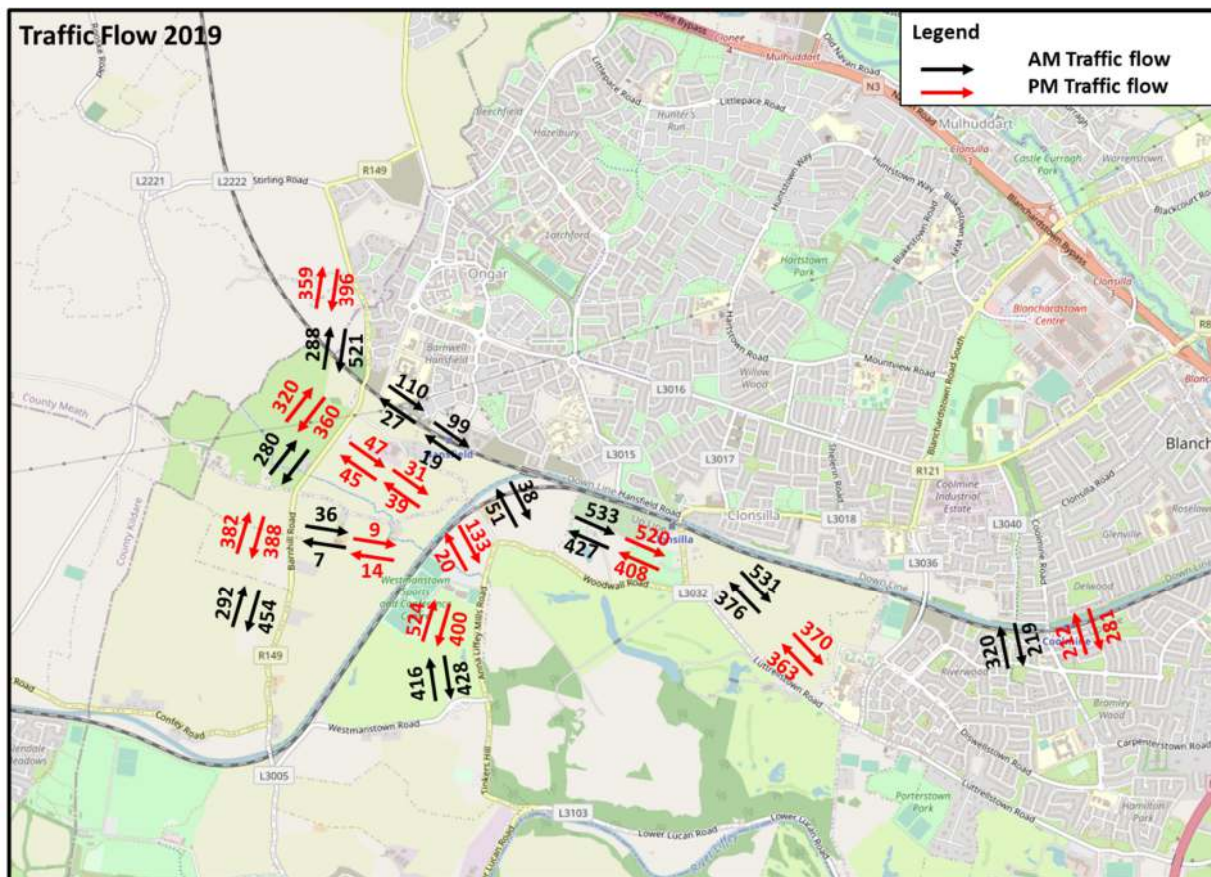


Figure 5.13 Traffic flow for the year 2019

#### 5.7.4 Existing pedestrian and cyclist facilities

There are presently no footpaths and cycle facilities along both sides of roads in the vicinity of the subject site. Ongar Distribution Road, which is located to the north of the development site, has designated bus lanes, cycle lanes and footpath facilities on both the sides of the road all along the stretch.

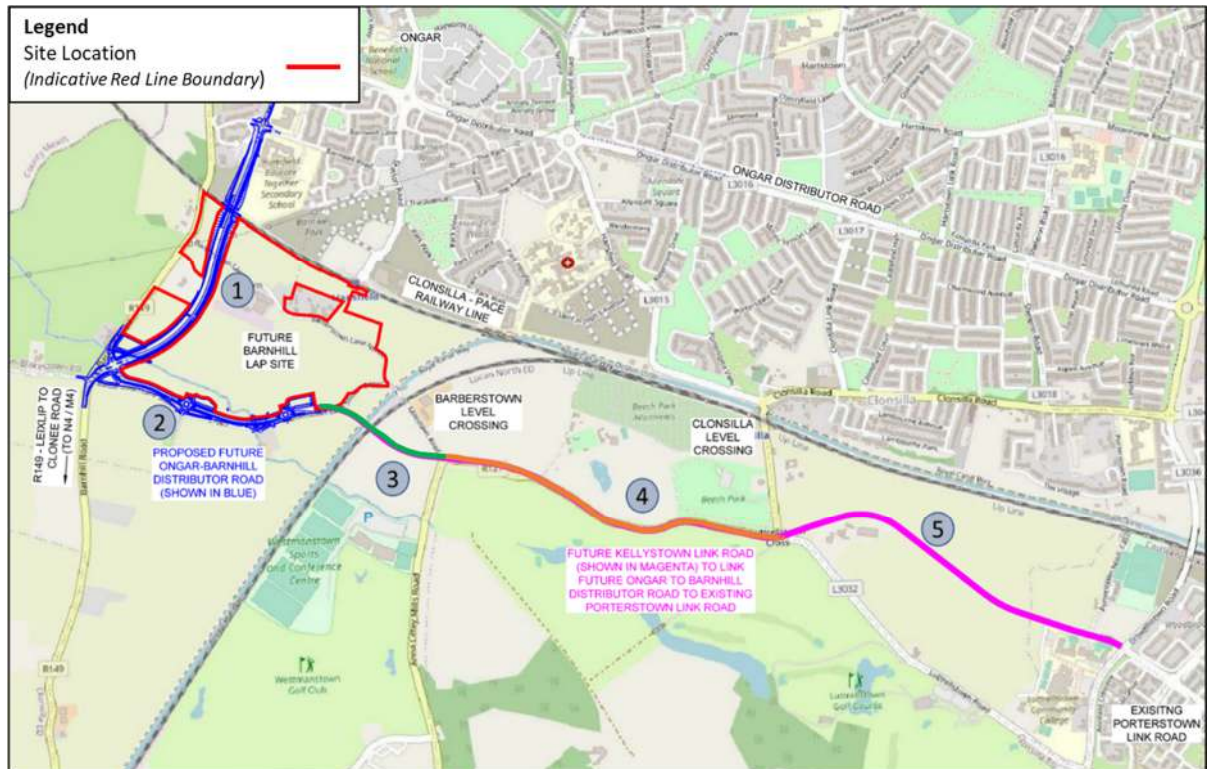
### 5.8 Future Receiving Environment

#### 5.8.1 Road Network

The following road schemes are planned in the vicinity of the development site:

- **Ongar-Barnhill Road scheme**, which is included in the Barnhill LAP and is to be delivered by FCC as part of their Section 48 programme. This Road link is expected to be Tender in Q3/4 2022 and to be completed by Q2/3 2024. This road is required in order to provide for a coherent sustainable movement and transport strategy and to maximise development capacity within the Barnhill LAP lands.
- **Kellystown Link Road**, this road is not required for the delivery of the proposed development, however it has been included to be able to take into account the traffic generation associated with Kellystown LAP (to establish a worst case scenario for traffic flows in local network). Pre-draft phase was initiated by Fingal County Council in mid-2019, and this road scheme has been presented to elected councillors which is included in the draft Kellystown LAP.

Figure 5.14 below, sets out the location of these roads in relation to the proposed development site.



**Figure 5.14 Future Road Network (Indicative Red Line Boundary)**

The main components of these two road schemes, as numbered in Figure 5.14, are outlined below.

1. **Ongar - Barnhill North-South Link Road** – a dual carriageway distributor road approximately 1.16km long extending from the Ongar Road roundabout in a south-westerly direction to tie into the existing R149 just south of Barberstown Lane South. This road will be delivered by Fingal County Council and is due to be tendered in Q3 2022 with view to start construction in Q1 2023, and finalise in Q2/Q3 2024. Fingal County Council will initially build this scheme as a single carriageway and Construct the rail bridge to facilitate Dual carriageway. The reservation for the second carriageway will be landscaped as agreed with FCC Parks Department.
2. **Upgrade of existing Barberstown Lane South** – Barberstown Lane South will connect to the proposed Ongar-Barnhill North-South Link Road via a proposed new signalised junction, to replace the existing crossroads at the R149/Barberstown Lane junction. Upgrade of 650 metres to a single carriageway is proposed in an easterly direction along the existing link between the R149 & the R121 towards Pakenham Bridge.
3. **Barberstown Bridge** - located adjacent to the existing Barberstown railway level crossing and provides a grade separated crossing over the Royal Canal and Railway line when the existing level crossing at Barberstown is closed as part of the DART Expansion Programme. The bridge connects to the Part 8 approved 'Barberstown Lane South Upgrade' on the west side and to the 'Kellystown Road proposal – West of Clonsilla Station' on its east side. This scheme is to be delivered by Irish Rail under Dart + west and is due to be lodged with An Bord Pleanála in the coming months and funded by NTA.
4. **Kellystown Road** – West of Clonsilla Station. This road would connect to the road leading from the Barberstown level crossing/ the proposed new Barberstown Bridge at its west end at a point where the existing R121 turns through a 90 degree angle to change alignment from north-south to east-west. It would connect to the 'Kellystown Road- East of Clonsilla Station' at its east end. The proposed Kellystown Road – West of Clonsilla Station would run parallel to the existing R121. The R121 is not suitable for high volumes of traffic due to its winding alignment and the proposed new road would provide a safer alternative route including pedestrian and cyclist facilities.
5. **Kellystown Road** – East of Clonsilla Station –road proposal is shown on the FCC development plan and Kellystown LAP. It connects to the north-south section of the R121 (at a point approximately 100 south of the Clonsilla Level crossing)/ future proposed Kellystown Road –West of Clonsilla Station at its west end. From here it continues east and runs approximately parallel to the Porterstown Road and connects to the recently completed Porterstown Link Road at a point adjacent to and north of Scoil Choilm Community National School at its east end. This section of road is expected to accommodate the Kellystown LAP traffic. Figure 5.14 (overleaf) shows the location of these road proposal in relation to the proposed development site. of these road proposal in relation to the proposed development site.



## 5.8.2 Public Transport

### Rail

The key piece of strategic transport infrastructure to be delivered in future adjacent to the development site is the DART + West Programme. This project aims “to deliver frequent, modern, electrified services within the Greater Dublin Area, helping to achieve government climate change targets by reducing greenhouse gas emissions and facilitating a societal shift away from private car use and on to public transport. It will facilitate sustainable mobility and development, promote multi-modal transit, active transport and boost regional connectivity, helping make public transport the preferred option for more and more people.”

The DART + West will be the first infrastructural projects of the DART+ Programme to be delivered, improving capacity on Maynooth and M3 Parkway to city centre rail corridors. The development site will benefit from the improvements of this programme as it is directly adjacent to the Hansfield Train station (on the M3 Parkway Line).

The project will bring the following improvements to the Line:

- Increase train capacity from the current 6 trains per hour per direction up to 12 trains per hour per direction subject to demand. Passenger capacity will increase from 5,000 in 2019 to 13,200 passengers in 2025.
- Electrification and re-signalling of the Maynooth and M3 Parkway lines (approximately 40km in length). Reduce carbon emissions through the deployment of new electric trains.
- Support growing communities, businesses, and future development by providing high-quality integrated public transport service in line with Government policy including the National Planning Framework and Climate Action Plan.
- Closure of level crossings and provision of replacement bridges where required, including the level crossings at Closnilla and Barberstown.

The 2nd round of Public Consultation on the preferred option for the DART+ West project has now concluded it is expected that an application to An Bord Pleanála will be lodged in 2022. Figure 5.15 below, illustrates the DART+ West Route Map.



Figure 5.15 DART+ West Route Map

Based on the above, it can be stated that the proposed development will continue to have a very frequent and high-quality public transport connectivity, improving the opportunities for sustainable travel. The changes to be delivered with Dart+ West will further improve the already frequent service available at Hansfield Station.

## Bus

### BusConnects: Bus Network Redesign and Core Bus Corridors Project

The 'BusConnects' programme was launched by the National Transport Authority (NTA) in May 2017 and is described as "a plan to fundamentally transform Dublin's bus system, so that journeys by bus will be fast, reliable, punctual, convenient and affordable. It will enable more people to travel by bus than ever before and allow bus commuting to become a viable and attractive choice for employees, students, shoppers and visitors."



The BusConnects programme contains three key elements:

- Dublin Area Bus Network Redesign Project;
- fare and ticketing enhancements; and
- better quality bus infrastructure, including the Core Bus Corridors Project.

The revised proposed bus network plan emerging from the Dublin Area Bus Network Redesign Project was published by the NTA in September 2020. Figure 5.16 presents the proposed bus network in the application site's surrounding.



Figure 5.16 Proposed BusConnects network in vicinity to the site (Source: Blanchardstown Area Network Map)

As shown in 5.16 the development site is located in close proximity to branches B1 and B2 of the proposed BusConnects B-Spine. These branches will be serviced every 8 minutes throughout the day, with a 15-minutes bus frequency. These services will connect the site with Blanchardstown Town Centre, Dublin City Centre and several areas within north and south-west Dublin.



In addition to the B-Spine branches discussed above, the proposed development will be service by Local Routes L52, connecting to Adamstown Station, and Peak Time routes X61/X62, connecting to the city centre.

The Blanchardstown CBC project is programmed to be lodged with An Bord Pleanála in Q3 2022. When implemented, this project will provide significantly enhanced bus priority on the B-Spine corridor, reducing journey times and further enhancing capacity. The bus network in the vicinity of the site will therefore be high frequency in nature following implementation of the proposals contained within the Dublin Area Bus Network Redesign Project.

### 5.8.3 Cycle Network- Greater Dublin Area Cycle Network Plan (2013)

The Greater Dublin Area Cycle Network Plan was published by the NTA in December 2013 and sets out proposals to develop a cycle network within the region to achieve the national 10% cycle mode share target. It proposes a comprehensive and integrated network of infrastructure comprising primary, secondary, greenway and inter-urban components. The network within the development site's vicinity is presented in Figure 5.17.

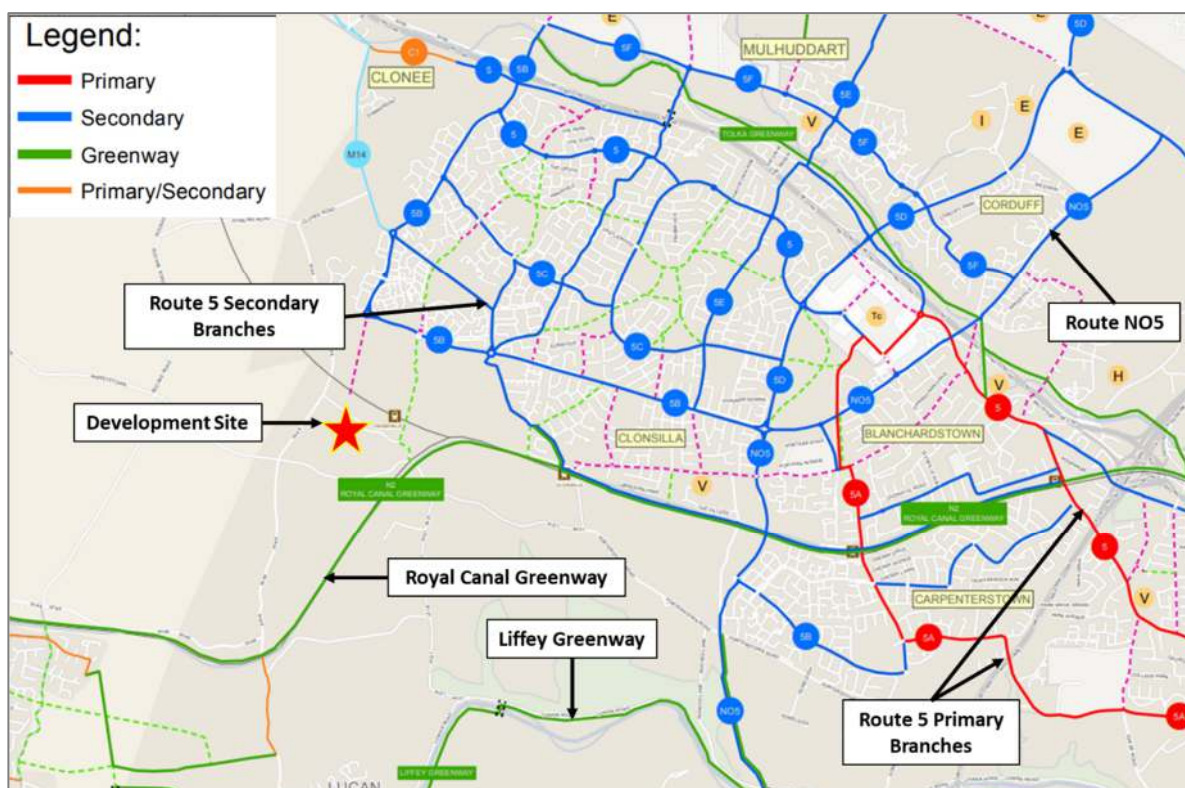


Figure 5.17 Cycle Network Plan in the Vicinity of the Site (Source: Greater Dublin Area Cycle Network Plan, 2013)

As shown in Figure 5.17 the development site is located in closed proximity to the the following Cycle Routes:

- Royal Cannal Greenway: from the city centre via Cabra, Ashtown, Castleknock, Coolmine and Clonsilla. Some or all of this greenway will form part of National Cycle Route 2 between Dublin and Galway
- Liffey Valley Greenway: along the southern edge of this sector between Chapelizod and Leixlip.
- Route 5 Primary and Secondary: Liffey Quays to Heuston Station, and then through the Phoenix Park to Castleknock and Blanchardstown.
- Route NO5: from the coast at Kilbarrack to Donaghmede, Coolock, Santry and Finglas

At present, there are existing cycleways within the Hansfield SDZ that link from Hansfield Train Station to secondary routes north and east of the SDZ.

## 5.8.4 Walking Network

The planned pedestrian network is similar to the planned cycle network, as discussed in preceding Section 5.8.3, including the Royal Canal Greenway and the Liffey Valley Greenway. The internal pedestrian routes within the development and how they tie into the existing and proposed pedestrian paths in the vicinity of the site are discussed in section 5.10.1 of this Report.

## 5.9 Proposed Character Areas

The proposed development will spread over 10 different character areas, namely:

- Link Road West
- Link Road East
- Railway Quarter
- Station Plaza
- Station Quarter South
- Village Centre Residential
- Barnhill Cross
- Barnhill Crescent
- Barnhill Stream
- Parkside

Figure 5.18, below, illustrates the location of each of these character areas within the site. A detail description of the proposal for each area is provided within the remainder of this chapter.

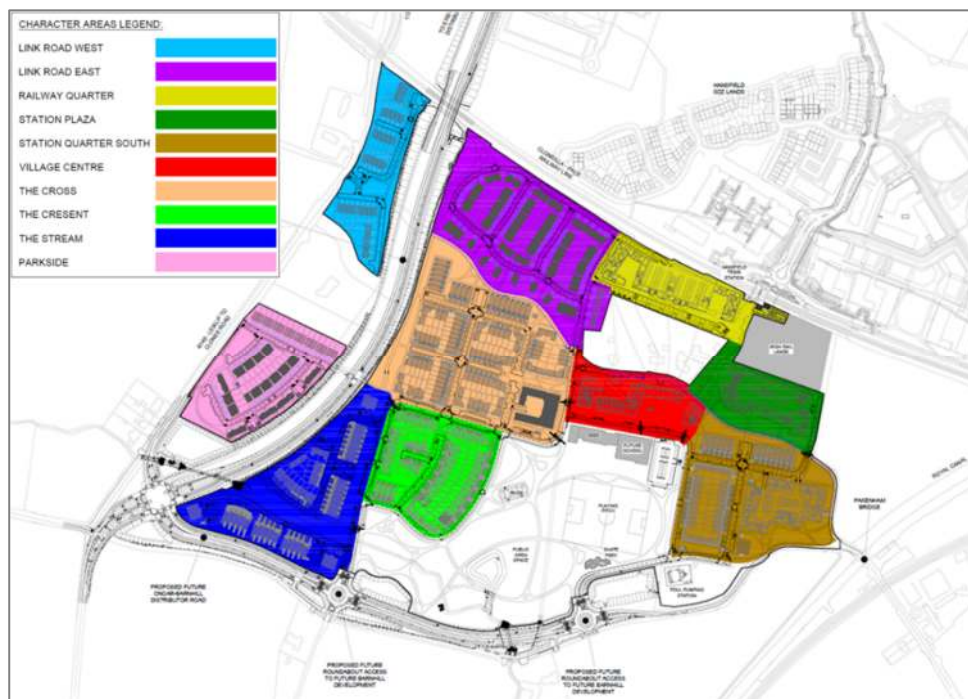


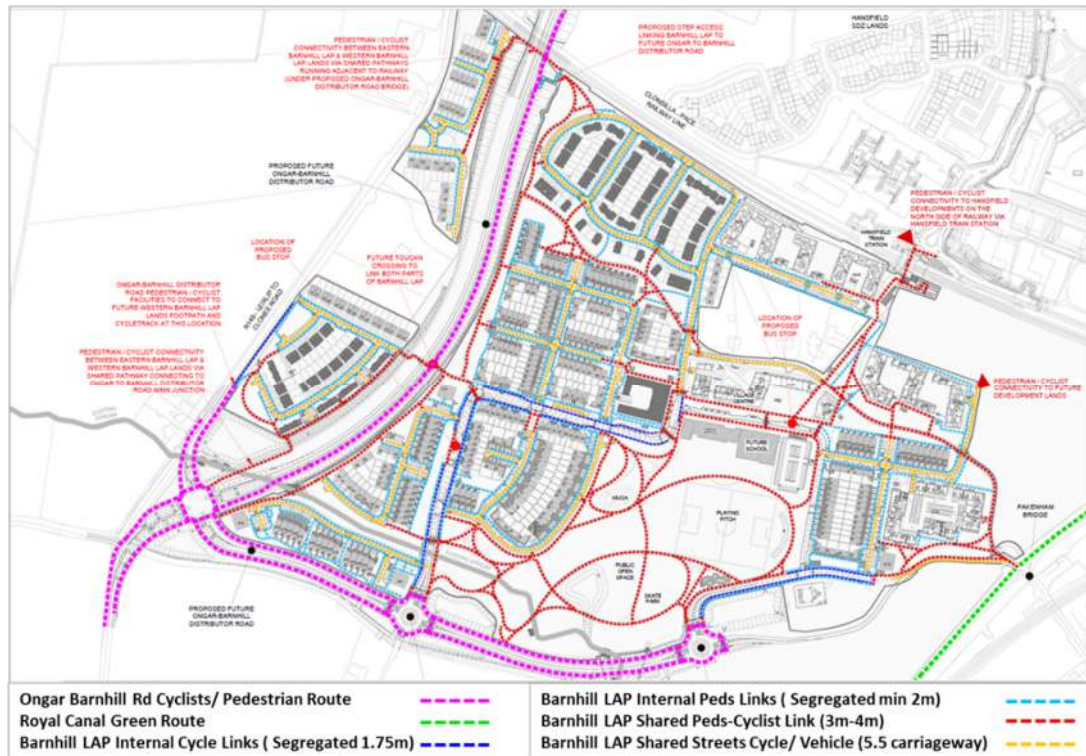
Figure 5.18 Proposed Character Areas

Detail layouts for each character areas, illustrating the provision for all users have been provided within the Chapter 2 of this EIAR.

## 5.10 Proposed Development Movement Strategy

### 5.10.1 Internal Pedestrian/Cyclist Network and Circulation

Figure 5.19 below, illustrates the proposed pedestrian/cyclist's network inside the Site.



**Figure 5.19 Proposed Pedestrian/Cyclist Network**

As shown above, the network accommodating pedestrians and cyclists extends through the entire development, along all road and parks. Footpaths have been designed to have a minimum width of 2.0 metres. The cycle tracks proposed will be 1.75 metres wide. The areas where pedestrians and cyclists will be accommodated within a shared spaces will measure 3-4 metres wide. Two pedestrian/cycle link will be provided across the Ongar-Barnhill Road, one connecting 'Parkside' Character Area to the 'Barnhill Stream' and the second connecting 'Link Road West' to 'Link Road East'.

Mid-block crossings have been provided where the distance between junctions is greater than 120m.

Drawings have been prepared illustrating the most convenient walking/cycling routes from each character areas to following key destinations inside the development:

- the railway station
- the village centre
- the school
- the main park

These drawings have been included in the CSEA Drawing Pack (no. 16\_053\_001 to no. 16\_053\_007).

### 5.10.2 Pedestrian/Cyclists Connection to Hansfield and Royal Canal Greenway

A Pedestrian/Cyclists link between the Barnhill Site and Hansfield area will be available via the proposed Ongar-Barnhill Link Road and through a link across the Hansfield Train Station. Figure 5.20 Illustrates the Layout of this connection.



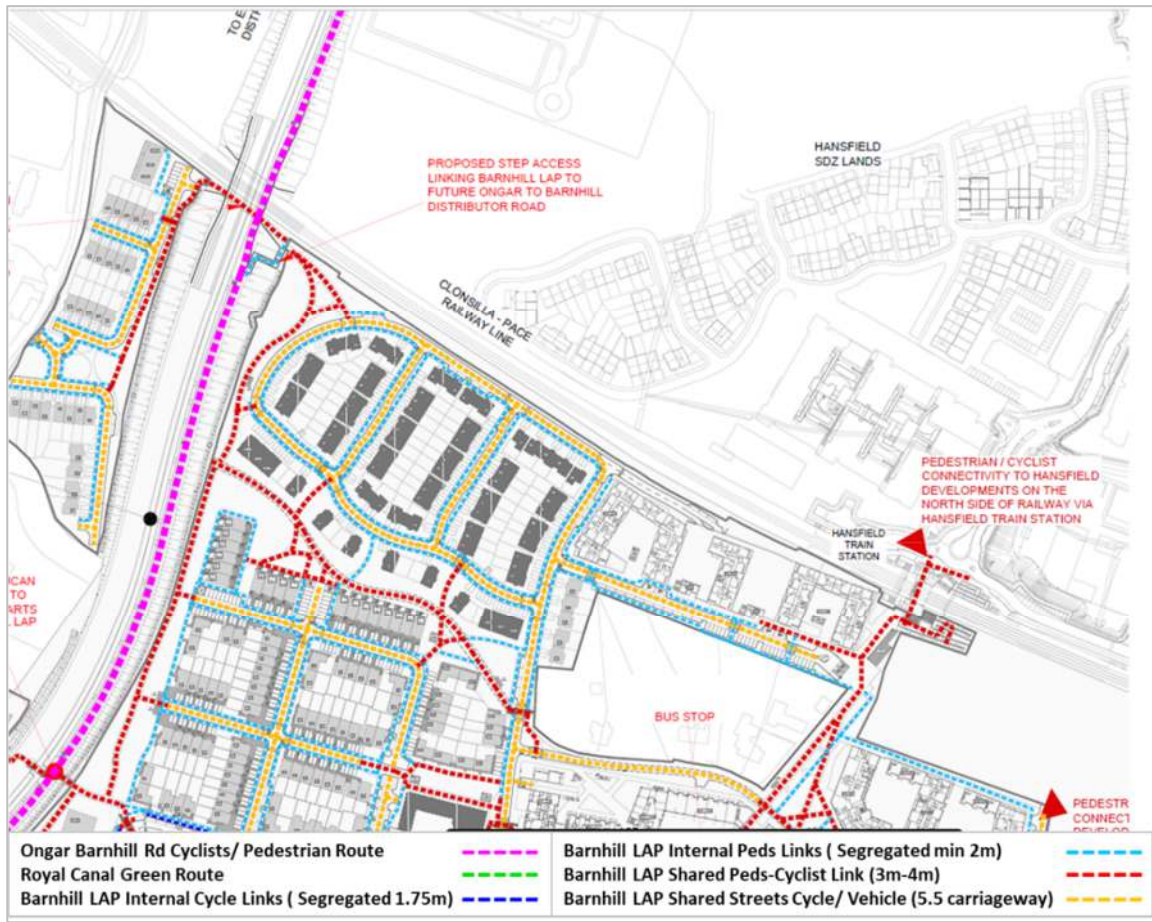


Figure 5.20 Proposed Pedestrian/Cyclist Connection to Hansfield Area

The proposal also includes a link to the Royal Canal Greenway at Pakenham Bridge. Figure 5.20 illustrates the layout of this connection.

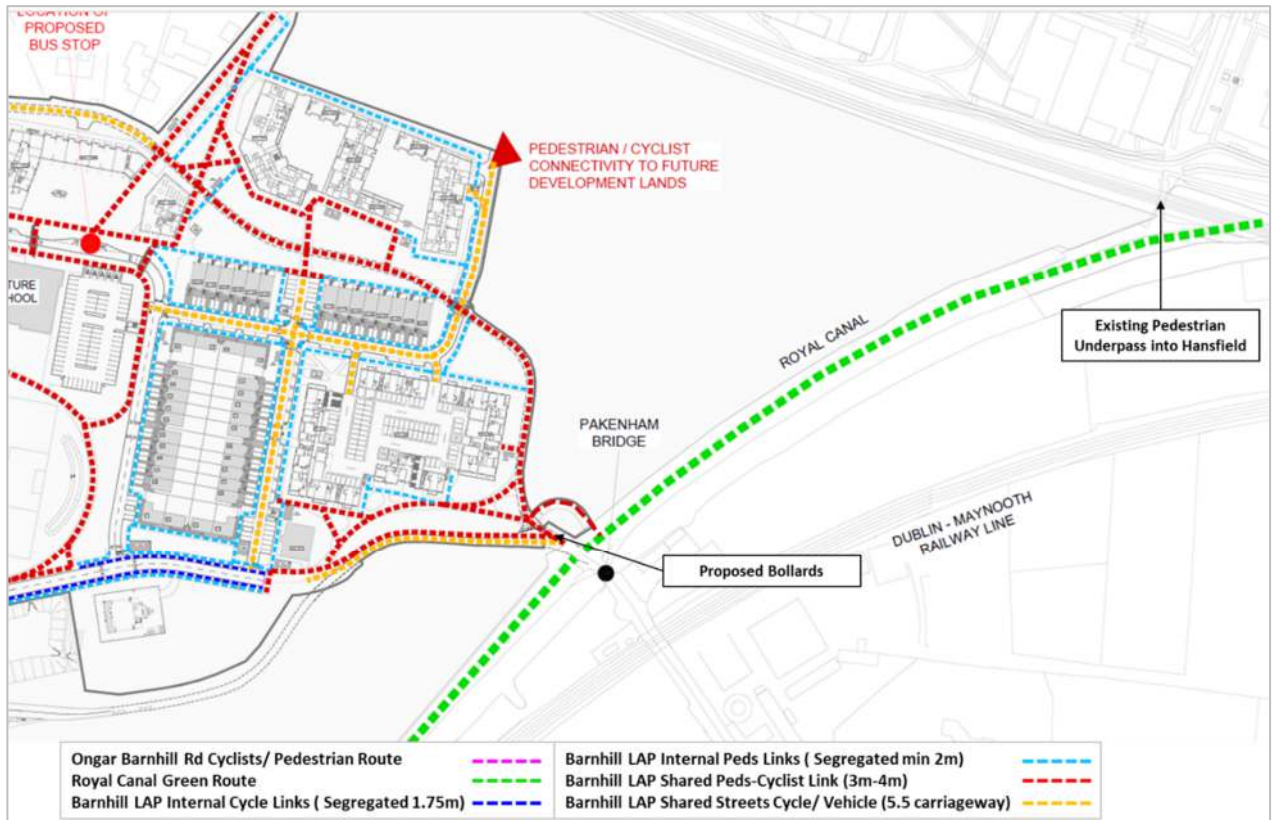


Figure 5.21 Proposed Pedestrian/Cyclist Connection to Royal Canal

As shown above, a pedestrian underpass connecting the Royal Canal to Hansfield is currently available. This will provide direct connectivity from the development to amenities available in Future Hansfield Village.

Vehicle movements along Barberstown Lane North will be limited as this will be predominately a pedestrian/cyclist's link, with the exception of the access to existing houses. Bollards will be put in place where this road meets Barberstown Lane South and Milestown Road to restrict vehicle movement.

### 5.10.3 Proposed Pedestrian Crossings and Traffic Calming

Following the guidelines recommended by DMURS in relation to traffic calming, series of horizontal and vertical deflections have been included in the development design. Raised tables, zebra crossings and curves are provided in the road network in order to ensure that a low-speed environment for pedestrians and cyclists.

Raised tables have been provided at the following locations:

- On longer straights where there is more than 70m between junctions.
- At all equal priority junctions
- At all pedestrian crossings

The provision of on-street car parking also promotes a low-speed environment

Figure 5.22 illustrates the location of the raised tables and zebra crossings throughout the development.



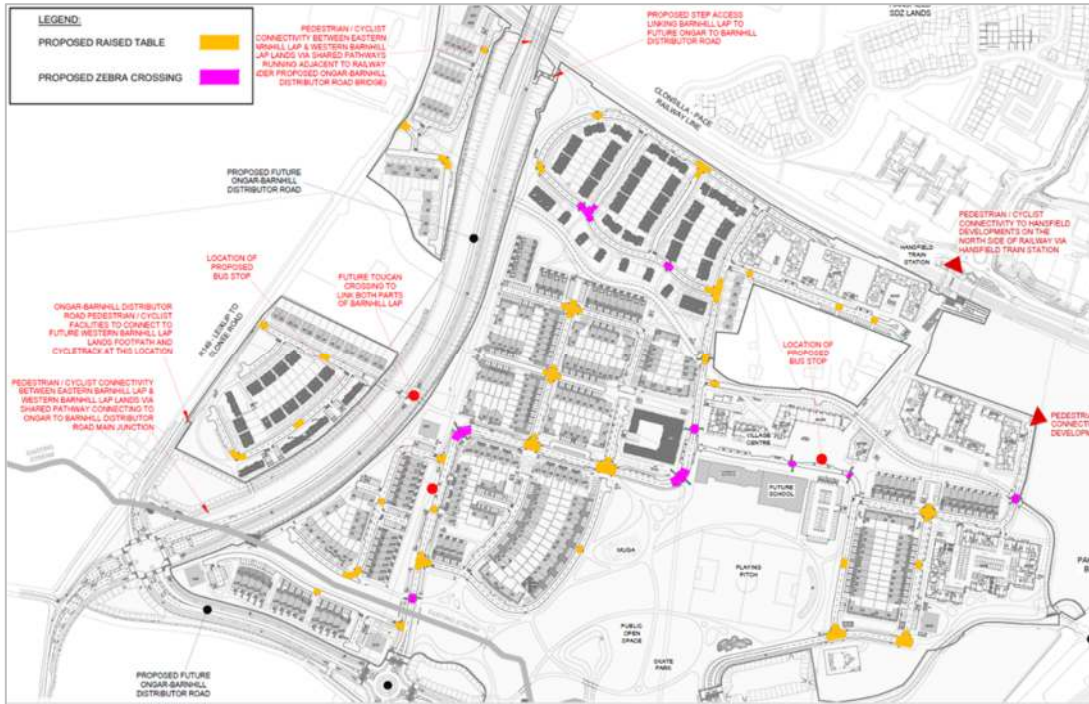


Figure 5.22 Proposed Traffic Calming and Zebra Crossings

### 5.10.4 Internal Vehicular Circulation

Vehicular access to the development site will be via 2 no. access points into Barberstown Lane South. Roundabouts will be available at this access points, which will be delivered by Fingal County Council with the upgrades proposed on this stretch of road.

The proposed Primary Link will have a carriageway of 6.0 metres wide and the proposed secondary roads will have a carriageway of 5.5 metres.

Figure 5.23, illustrate the development's proposed road network.

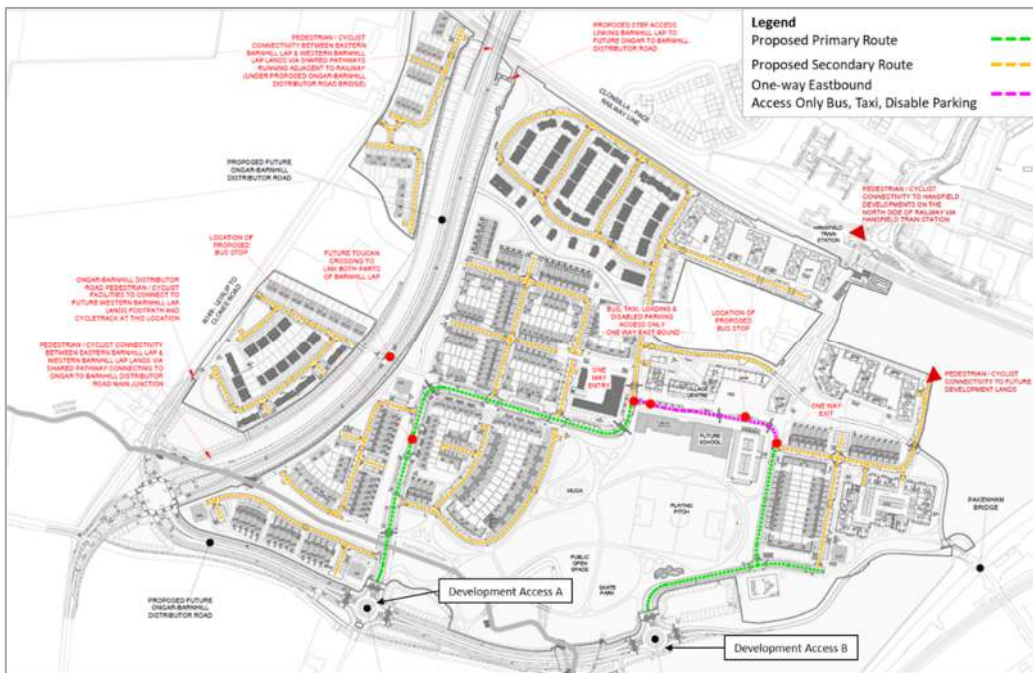


Figure 5.23 Proposed Road Network

### 5.11 Proposed Barberstown Lane North Layout

For most sections of Barberstown Lane North, it is proposed that vehicle movements will not be allowed as this will be turned into a pedestrian/cyclist's link. The only section of road that will retain vehicle movements will be the access to existing properties within the site.

The pedestrianisation of Barberstown Lane North (east of the existing properties) will be implemented at a later phase in the development, subject to agreement on implementation with Fingal County Council.

The creation of a cul-de-sac will be required on the western end of the road for the delivery of the Ongar-Barnhill Road by Fingal County Council; Bollards will be put in place where this road meets Barberstown Lane South and Milestown Road to restrict vehicle movement (eastern end)..

The drawings illustrating the existing and proposed cross-sections for this road have been included in the CSEA Drawing Pack.

#### 5.11.1 Access to Existing Houses Within the Site

The stretch of road currently providing access to the existing properties inside the site will remain as existing. 'Access Only' signage will be put in place in order to limit the number of vehicle movements in and out the retained section of road. Bollards will be put in place on the approach eastern side of this access road in order to ensure vehicular movements restrictions into the plaza leading to the train station.

Cyclists will be expected to share the road with the vehicles and a 2.8 metres wide footpath will be available accommodate pedestrians. Figure 5.24 illustrates the proposed layout of this stretch of road and its interaction with surrounding network. Figure 5.25 illustrates the existing and proposed cross section for this access road.

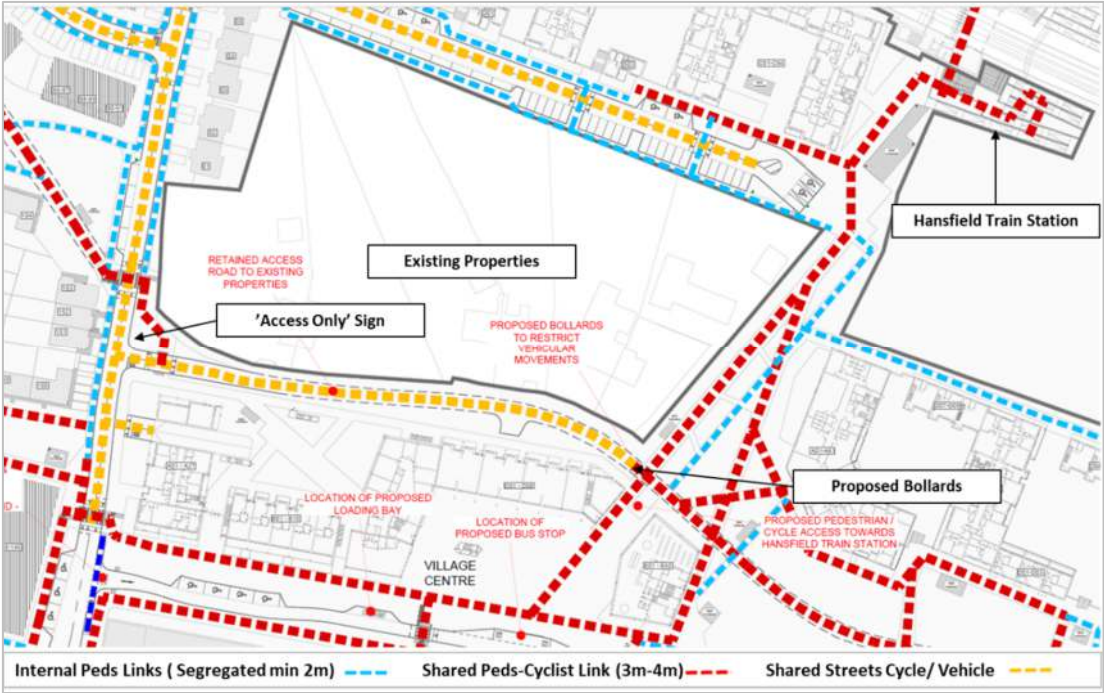


Figure 5.24 Proposed Access Arrangements to Existing Properties in the Site



Figure 5.25 Existing and Proposed Cross Section Barberstown Lane North Access Road

## 5.12 School/Creche Access

It is proposed that the road directly to the north of the school will be a One-Way(westbound). General vehicle movement will be restricted, allowing access only for disabled parking users attempting to reach the disabled parking spaces on this road, vehicles to use the loading bay, and buses. This will ensure a safe school street access environment free from traffic and will encourage active travel school access.

The car park to the east of the future school will provide park-and-stride for the school/creche. It is anticipated that this car park will accommodate the car parking demand for the school and the public park.

Designated creche car parking is provided within the basement car park of Station Plaza character area, where the creche is located.

The access arrangements provided for this area have been designed in accordance with NTA's Safe Routes to School guidance document, March 2022. The provision for pedestrian/cyclists in the local area is presented in Figure 5.26.



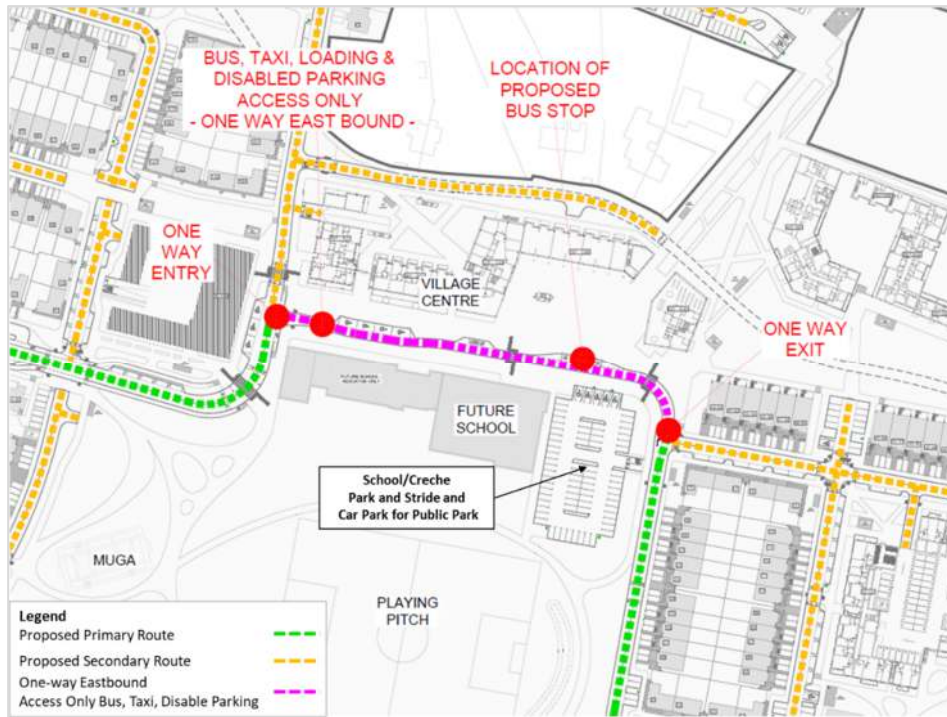


Figure 5.26 Proposed School/Creche Access Arrangements

## 5.13 Proposed Car Parking and Cycle Parking Strategy

### 5.13.1 Car Parking

Details for the car parking layout is provided individually for each character areas within section 6 of the full TTA Report submitted with the Planning Pack. Figure 5.27 illustrates the location of all car parking spaces proposed with the development. Detail layouts for each character areas and the basement car park have been submitted with the planning package.

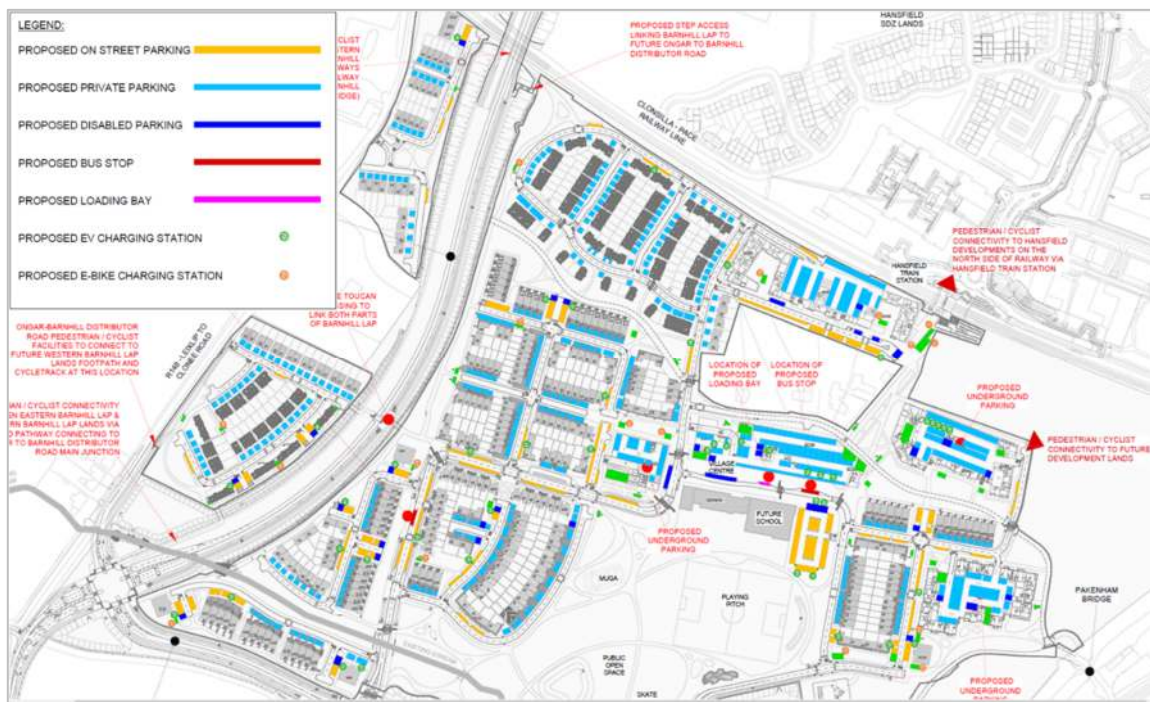


Figure 5.27 Proposed Development Car Parking Locations

Table 5.8 summarises the proposed car parking provision for each character area.

**Table 5.8 Summary Proposed Car Parking Provision**

Character Area	Curtilage	Podium Basement	or	Surface	Total Car Parking Provision
Link Road West	54	-		11	65
Link Road East	158			28	186
Railway Quarter	-	125		45	170
Station Plaza	-	100		4	104
Station Quarter South	68	79		51	198
Village Centre Residential	-	151		77	228
Barnhill Cross	146	43		84	273
Barnhill Crescent	76	-		54	130
Barnhill Stream	63	-		74	137
Parkside	76	-		26	102
<b>Total</b>	<b>641</b>	<b>498</b>		<b>454</b>	<b>1,593</b>

Table 5.9, below provides details about the proposed EV, disabled, and visitor's car parking provision for each character area.

**Table 5.9 Summary Proposed EV, Disable, and Visitors Car Parking Provision**

Character Area	Total Proposed EV	Total Proposed Disable	Total Designated for Visitors	Total Commercial/Creche/Medical Centres	School Parking
Link Road West	5	1	5		
Link Road East	20	2	4		
Railway Quarter	18	9			
Station Plaza	11	6	4	4	
Station Quarter South	13	6	31		
Village Centre Residential	23	13	10	42	48
Barnhill Cross	22	5	43		
Barnhill Crescent	13	4	19		
Barnhill Stream	16	7	23	-	-
Parkside	13	2	3		
<b>Total</b>	<b>153</b>	<b>55</b>	<b>142</b>	<b>46</b>	<b>48</b>

### 5.13.2 Cycle Parking

Details for the cycle parking layout is provided individually for each character areas within section 6 of the full TTA Report submitted with the Planning Pack. Detail layouts for each character areas, indicating the cycle parking locations, have been submitted within the planning package. Figure 5.27 (overleaf) illustrate the location of the proposed cycle parking for E-bikes. Table 5.10 summarises the proposed cycle parking provision for each character area.



**Table 5.10 Summary Proposed Cycle Parking Provision**

Character Area	Podium or Basement		Surface		Dedicated Space (e.g., front of terraced house or Assumed Capacity Rear Garden)		Total Proposed Cycle Parking
	Residential	Visitors	Residential	Visitors	Residential	Visitors	
Link Road West	-	-	123	10	-	-	133
Link Road East	-	-	279	24	-	-	303
Railway Quarter	-	-	-	39	366	-	405
Station Plaza	324	-	14	20	-	-	358
Station Quarter South	344	-	-	42	158	-	544
Village Centre Residential	245	-	112	25	-	-	382
Barnhill Cross	195	-	-	41	301	-	537
Barnhill Crescent	20	-	20	18	186	-	224
Barnhill Stream	56	-	-	21	195	-	272
Parkside	-	-	157	22	-	-	179
<b>Total</b>	<b>1,184</b>	<b>0</b>	<b>705</b>	<b>262</b>	<b>1,206</b>	<b>0</b>	<b>3,337</b>

Table 5.11 provides details about the proposed cycle parking for E-Bikes and cargo bikes on each character area.

**Table 5.11 Summary Proposed Cargo and EV Cycle Parking Provision**

Character Area	Total Proposed Cargo Bikes	Total Proposed EV Bikes
Link Road West	4	4
Link Road East	9	9
Railway Quarter	20	13
Station Plaza	18	
Station Quarter South	18	
Village Centre Residential	19	25
Barnhill Cross	9	-
Barnhill Crescent	3	
Barnhill Stream	5	-
Parkside	4	130
<b>Total</b>	<b>111</b>	<b>181</b>

### 5.13.3 Hansfield Station Commuter Cycle Parking

A total of 82 no. cycle parking spaces, of which 8 are for cargo bikes, are proposed directly adjacent to Hansfield Train Station. These spaces are anticipated to accommodate the cycle parking demand associated with commuter.

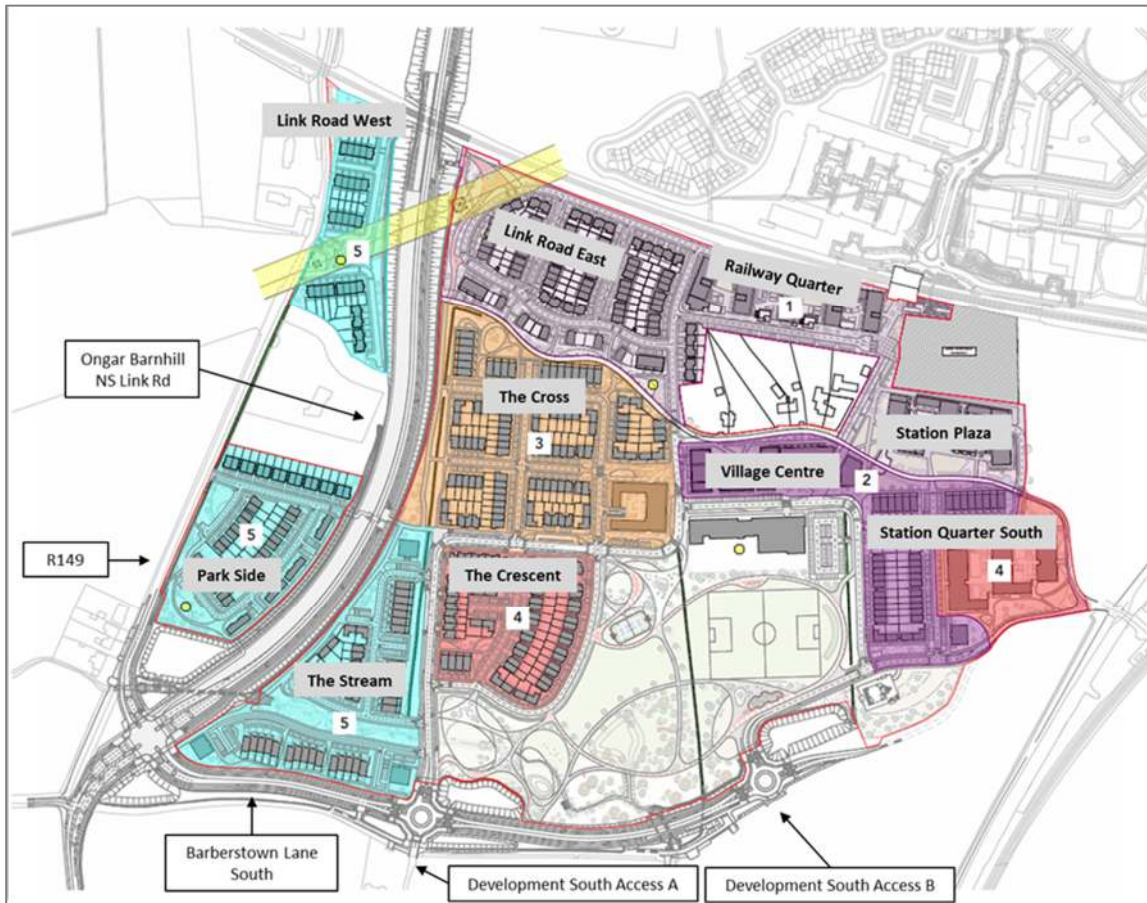
## 5.14 Shared Driving Scheme (Go-Car)

A total of 2 no. Go-Car Car Parking Spaces will be provided in the Village Centre. These spaces will be located in the car park adjacent to the school and will be dedicated for the use of this share driving scheme.

The provision for Go-Car can be increased in the future based on demand

## 5.15 Proposed Development Construction Phasing

The proposed development construction will divide into 5 no. phases, illustrated in Figure 5.28, which follows. The order in which the development is planned is from phase 1 to 5.



**Figure 5.28 Proposed Development Construction Phases (Indicative Red Line Boundary)**

As shown above, Railway Quarter and Link Road East are the character areas to be developed first. This is followed by Village Centre and partial Station Quarter in phase 2. The Barnhill Cross will be developed in phase 3; the remainder of station Quarter South and Barnhill Crescent will be developed in phase 4. All remaining Character areas, namely, Park Side, Link Road West, and The Stream, will be developed in Phase 5.

Table 5.12 below shows the timeline of each phase, the character area which each phase development includes, and a breakdown of the residential units.

**Table 5.12 Proposed Development Construction Phasing**

<b>Development Phases</b>	<b>Phase 1A</b>	<b>Phase 1B</b>	<b>Phase 2</b>	<b>Phase 3</b>	<b>Phase 4</b>	<b>Phase 5</b>
<b>Timeline</b>	Q1 2025 to Q4 2026	Q1 2025 to Q2 2029	Q1 2027 to Q2 2029	Q3 2028 to Q1 2030	Q1 2029 to Q3 2030	Q3 2030 to Q3 2032
	69		24	70	53	74
<b>4 bed houses</b>	10		4	10	2	8
	21	61	25	21	16	3
<b>2 bed apartments</b>	37	249	93	65	111	55
	15	7	36	29	28	45
<b>4 bed apartments</b>					4	
<b>Commercial</b>			2,034 sqm			
			344			
<b>School</b>						
	<b>152</b>	<b>317</b>	<b>182</b>	<b>195</b>	<b>214</b>	<b>185</b>

Before the phases are developed, basic infrastructure will be provided within the development site. The timeline for enabling works is 1st October 2024 to 27th August 2025. Phase 1A is the first phase to be developed, and all the phases share an overlapping in timeline. It is expected that almost 50% of the residential units will be in place by the end of Phase 2 development.

## **5.16 Amenities in Local Area**

The proposed development will include the space for the provision of Retail, Commercial, Creche, Medical, and education facilities. These facilities will be primarily located within the Village Centre Area, the creche is to be located in Station Plaza with direct pedestrian access to the Village Centre.

The proposed development site will also benefit from the amenities located within the Hansfield/ Ongar area and the partially developed/under construction Hansfield Village. Figure 5.29 shows the location of the different amenities, such as restaurants, supermarket, pharmacies, and medical facilities available within Hansfield/Ongar over a 1.5 km radius from the centre of the Barnhill Site.

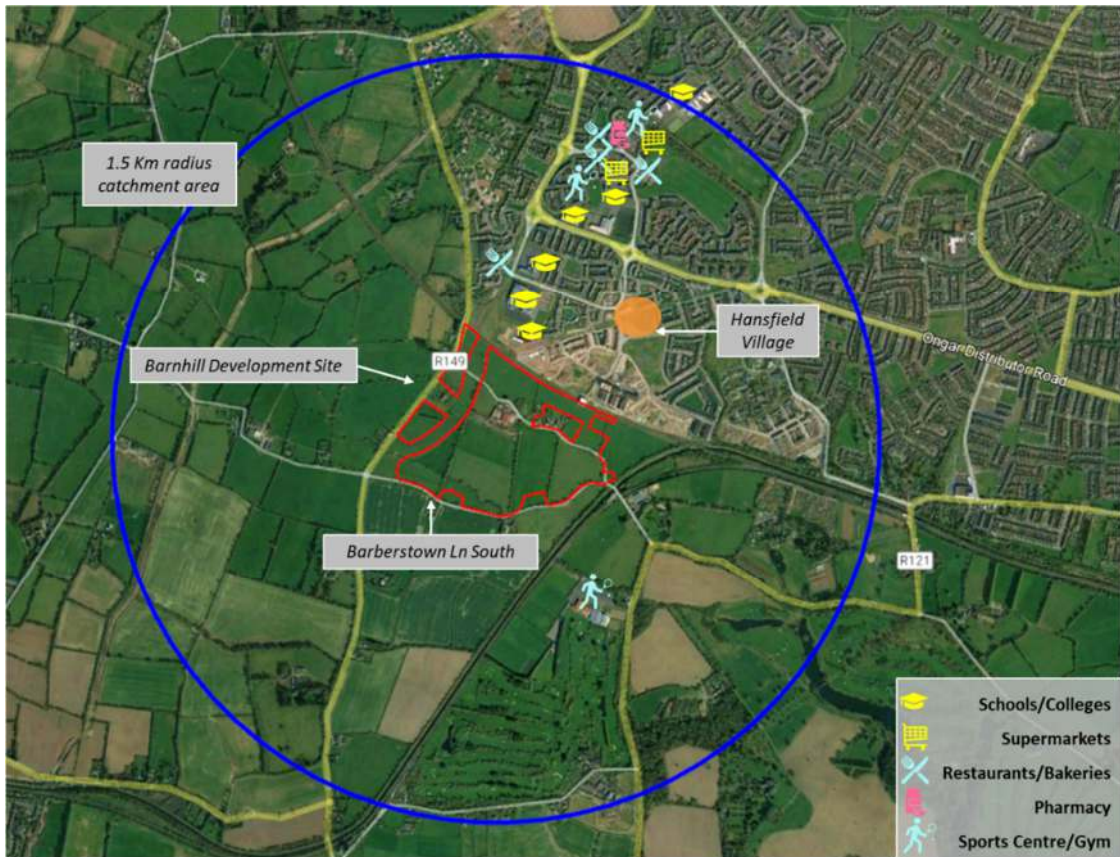


Figure 5.29 Amenities Within Hansfield/Ongar Area (Indicative Red Line Boundary)

### 5.17 Fire Access and Servicing

Auto track drawings each character area has been prepared to ensure the development road network is able to successfully accommodate emergency services vehicles. These drawings have been included in the CSEA Drawing Pack as no. 16\_053\_033.

### 5.18 Proposed Development Traffic Generation

The total number of trips that will access/egress the development during the peak hours have been estimated using a combination of the NTA’s National Demand Forecasting Model (NDFM) and the East Regional Model (ERM). Further details on the assumptions and methodology are provided in section 5.5.5 of this Report. The expected trip generation for the Proposed development is summarised in Table 5.13.

Table 5.13 Proposed Development Peak Hour Trips Generation

Assessment Year	AM Peak (08:00-09:00hrs)		PM Peak (17:00-18:00hrs)	
	IN	OUT	IN	OUT
Year of Opening 2025	262	471	351	266
Year of Opening +5 2030	260	449	335	262
Year of Opening + 15 2040	50	321	236	108

It can be observed that trip generation for the year 2040 is less than the preceding years. As discussed in section 5.5.6, the traffic modelling for the assessment years 2025 and 2030 have been performed using East Regional Model, whereas for the year 2040, the assessment has been done using the destination and



mode choice data contained within the Greater Dublin Area (GDA) Strategy. This strategy takes in consideration the changes in mode share expected as a result of major public transport and infrastructure projects to be delivered within the GDA area by 2040. Some of these projects are a BusConnects, DART Expansion Programme, and the Greater Dublin Area Cycle Network Plan. The inclusion of such projects has resulted in a modal shift towards more sustainable modes of transport, and hence, a reduction in traffic flow is captured in the assessment year 2040.

Further details about the methodology utilised to estimate the proposed development Trip generation can be found in section 5.5.6 of this Report.

The mode share obtained from the ERM and the GDA model have been included in Appendix A of the full TTA Report submitted with the Planning Pack.

## 5.19 Estimated Traffic Flows

Based in the road network assumptions discussed in preceding sections of this Chapter and the traffic generation estimated for the proposed development (see section 5.18), the traffic estimated in the network for both scenarios, do-minimum and do-something, has been estimated.

The remainder of this Chapter presents the periods traffic flows estimated for all major links road on the area in the vicinity of the development for all assessment years.

### 5.19.1 2025 Traffic Flows

#### Do Minimum

Figure 5.30, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2025 without the proposed development in place.

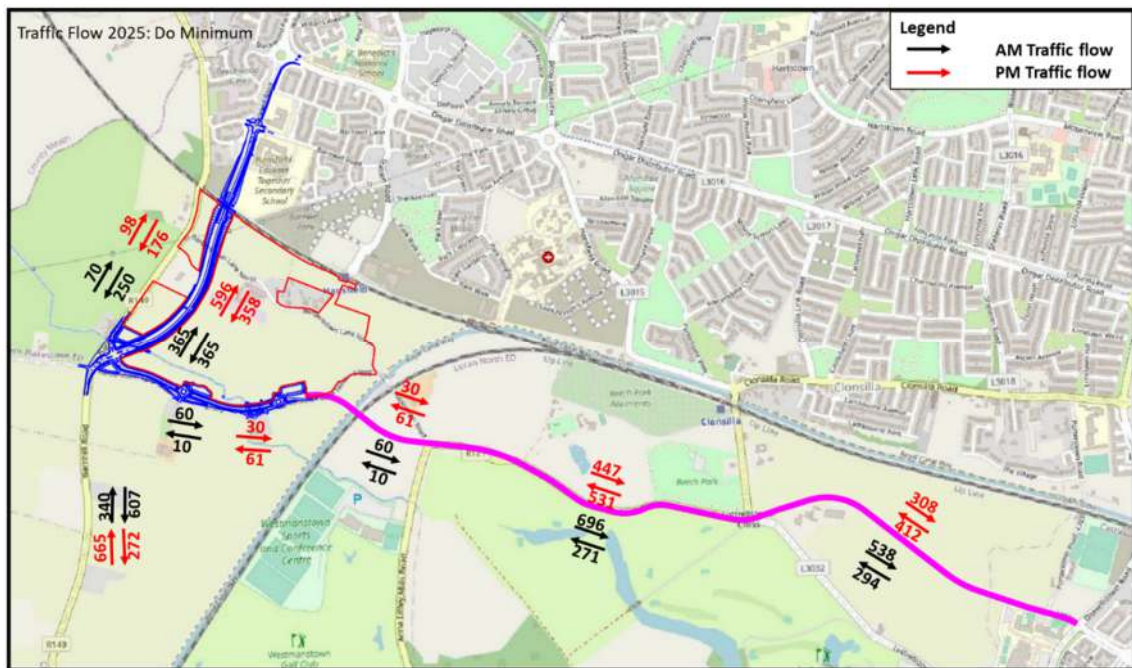


Figure 5.30 Traffic flow, year 2025, Do Minimum scenario (Indicative Red Line Boundary)  
Do Something

Figure 5.31, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2025 with the proposed development in place.

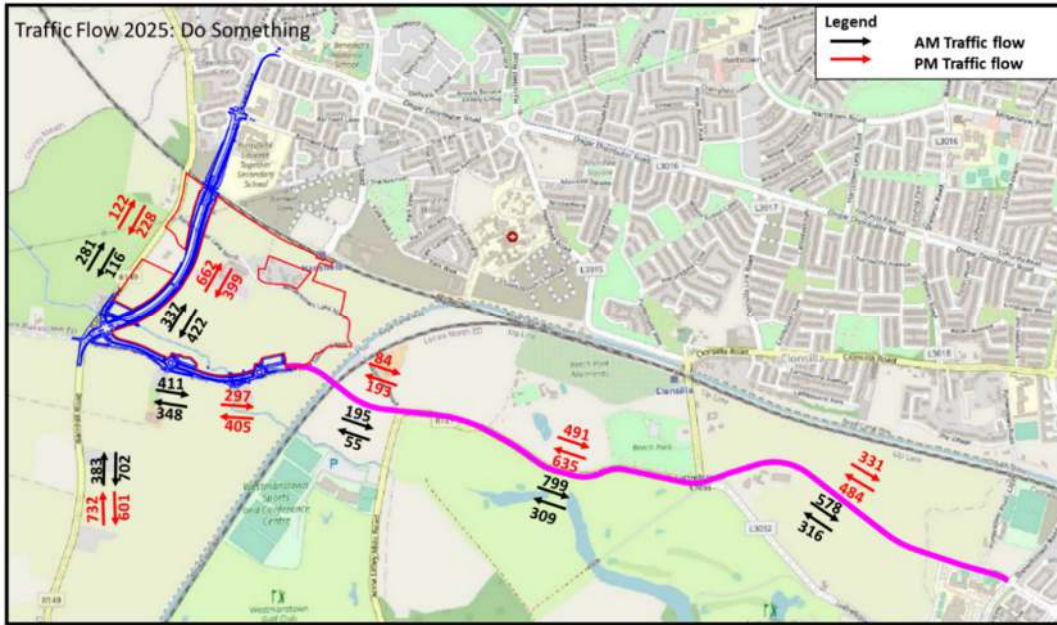


Figure 5.31 Traffic flow, year 2025, Do Something scenario (Indicative Red Line Boundary)

As shown above, with the development in place the main increased in traffic is expected to happen along Barberstown Lane South and the R121.

### 5.19.2 2030 Traffic Flows

#### Do Minimum

Figure 5.32, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2030 without the proposed development in place.

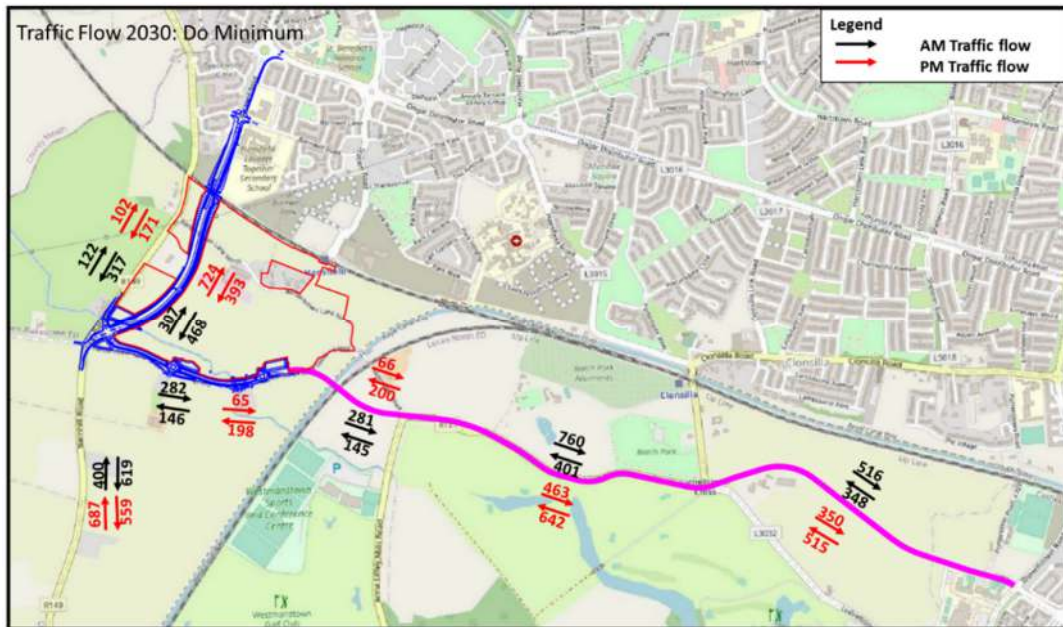


Figure 5.32 Traffic flow, year 2030, Do Minimum scenario (Indicative Red Line Boundary)

#### Do Something

Figure 5.33, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2030 with the proposed development in place.



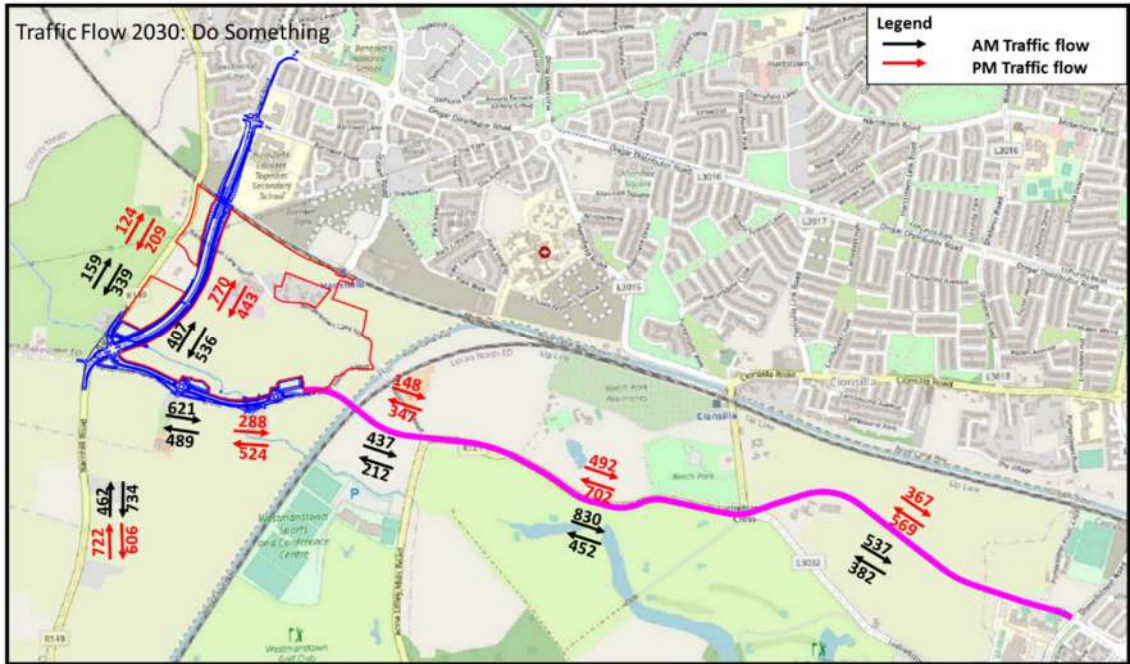


Figure 5.33 Traffic flow, year 2030, Do Something scenario (Indicative Red Line Boundary)

### 5.19.3 2040 Traffic Flows

#### Do Minimum

Figure 5.34, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2040 without the proposed development in place.

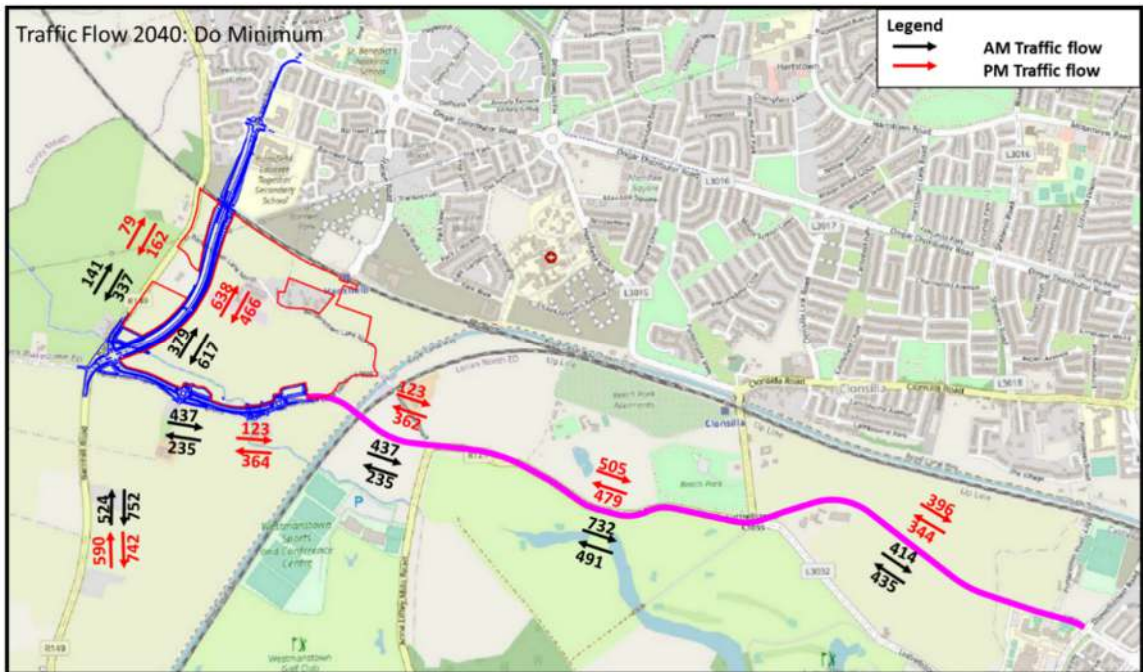


Figure 5.34 Traffic flow, year 2040, Do Minimum scenario (Indicative Red Line Boundary)

#### Do Something

Figure 5.35, below, presents the estimated traffic volumes for the network in the vicinity of the site in the year 2040 with the proposed development in place.

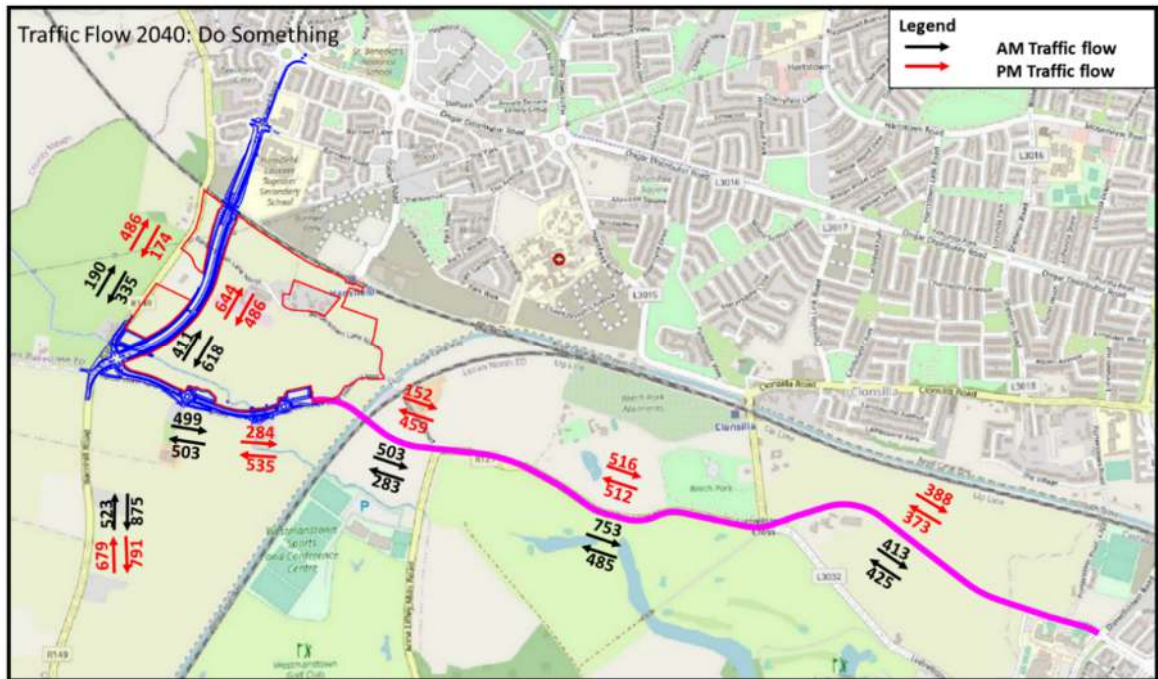


Figure 5.35 Traffic flow, year 2040, Do Something scenario (Indicative Red Line Boundary)

## 5.20 Barberstown Lane South Upgrades

Prior to the delivery of the proposed development, Barberstown Lane South will be upgraded. Junctions 3 and 4 currently do not exist, however, once the development is in place they will serve as access points from Barberstown Lane South. Two roundabouts will be delivered in the location of these junctions, which forms part of the upgrades proposed for Barberstown Lane South to be Delivered by Fingal County Council.

The development proposed development will provide the access arms to the Barnhill Site. All other works associate with the roundabout will be delivered by Fingal County Council. The layouts assessed for all junctions are presented within the remainder of this chapter.

## 5.21 Traffic Modelling Software and Outputs

### 5.21.1 Traffic Modelling Software

Different modelling software have been used to assess the junctions' performance. The industry standard ARCADY traffic modelling software have been used for predicting the capacities, queues, and delays at the roundabout junctions 1, 3,4, and 5. ARCADY is a modelling software dedicated for analysing the capabilities of priority-controlled roundabout. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Ration of Flow to Capacity (RFC).

PICADY was used for the assessment of the exiting layout of junction 5 in the year 2025. This road has been assumed to be upgraded to a roundabout by the year 2030.

The industry standard LinSig traffic modelling software has been used to assess the signalised junction 2. LinSig is a modelling software dedicated for analysing isolated signal-controlled junctions and small junction networks. The models analyse the junctions in relation to their geometry and traffic flows and calculate the Practical Reserve Capacity (PRC).

### 5.21.2 Traffic Modelling Outputs

#### ARCADY/PYCADY

The following outputs were obtained from the ARCADY models:

- Queue Length: The values are the total number of queueing vehicles on the arm in PCUs.
- Junction Delay: This is the total delay experienced by a quantity of traffic at a particular junction in a given time period.



- Ration of Flow to Capacity (RFC): The RFC provides a basis for judging the acceptability of junction designs and typically an RFC of less than 0.85 is considered to indicate satisfactory performance.
- Level of Service (LOS): The LOS shows the unsignalised, and equivalent signalised, level of service values for the time segment, based on the Average Delay per Arriving Vehicle. The transportation LOS system uses the letters A through F, with the definitions below being typical: A = Free flow; B = Reasonably free flow; C = Stable flow; D = Approaching unstable flow; E = Unstable flow; F = Forced or breakdown flow.

## LinSig

The following outputs were obtained from the LinSig models:

- Degree of Saturation: this output presents the ratio of demand flow to the maximum flow which can be passed through an junction from a particular approach i.e. number of vehicles that could cross the stop line in an hour on a particular lane. A lane with a degree of Saturation greater than 90% is considered to be approaching its theoretical capacity.
- Maximum Queue Length: queue lengths at junctions are measured in Passenger Car Units (PCU), which represents a standard vehicle length including a buffer length to the front and back. For the purposes of this assessment, a PCU length of 5.75 metres has been assumed.
- Delay: the delay is based on the estimated average delay per vehicle among all traffic passing through the junction. The delay per vehicle provides an insight into operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety. Average delays greater than 80 seconds per vehicle is considered generally considered to be excessive for signalised intersections.
- Practical Reserve Capacity (PRC): is the amount by which traffic demand can grow before Practical Capacity is reached. A PRC close to 0% suggest that the junction is operating at capacity. A negative PRC indicates the junction is operating over its practical capacity.

### 5.21.3 Assessment Junctions Turning Movements

The diagrams illustrating the turning movements estimated for each junction and utilised as input for the in the different assessment scenarios and modelling years and have been included in Appendix B of the full TTA Report submitted with the Planning Pack.

## 5.22 Junction 1 Assessment

### 5.22.1 Assessment Layout

The assessment of the Barnwell Roundabout (Junction 1) was conducted taking in consideration the existing layouts of the junction. Figure 5.36 illustrates the existing layout of this junction.



Figure 5.36 Existing Barnwell Roundabout Junction Layout (Junction 1)

## 5.22.2 Do- Minimum Traffic Modelling Results

### AM PEAK

Table 5.14, below, presents the traffic modelling results obtained for junction no.1 without the proposed development in place during the AM PEAK.

**Table 5.14 Junction 1 Do-Minimum AM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.11	0.50	A	1.61
	Ongar Distributor Road	0.14	0.50	A	
	Barnwell Road	0.14	0.50	A	
	Beechwood Gate	0.01	0.50	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.13	0.05	A	1.90
	Ongar Distributor Road	0.30	1.60	A	
	Barnwell Road	0.22	1.00	A	
	Beechwood Gate	0.01	0.50	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.19	1.63	A	1.91
	Ongar Distributor Road	0.25	2.07	A	
	Barnwell Road	0.23	1.99	A	
	Beechwood Gate	0.01	3.02	A	

As shown in Table 5.14, without the proposed development in place junction no. 1 will operated at satisfactory levels in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.30 on the Ongar Distributor Road in 2030.

### PM PEAK

Table 5.15, below, presents the traffic modelling results obtained for junction no.1 without the proposed development in place during the PM PEAK.

**Table 5.15 Junction 1 Do-Minimum PM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.19	0.50	A	2.21
	Ongar Distributor Road	0.24	1.30	A	
	Barnwell Road	0.42	2.60	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.12	0.50	A	2.62
	Ongar Distributor Road	0.34	2.40	A	
	Barnwell Road	0.51	1.50	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.17	0.50	A	2.26
	Ongar Distributor Road	0.26	1.40	A	
	Barnwell Road	0.44	2.10	A	
	Beechwood Gate	0.03	0.50	A	

As shown in Table 5.15, without the proposed development in place junction no. 1 will operated at satisfactory levels in all assessment years. Similar to the AM Peak, the maximum Ratio of Flow to Capacity was recorded on the Ongar Distributor Road in 2030, which resulted to be 0.51.

Overall, the performance of the junction is worst in the PM peak, when compared to the AM peak; However, the maximum RFC obtained for the junction is well below the 0.85 cutline for performance satisfaction. LOS should remain as A for all scenarios assessed in the do minimum.



### 5.22.3 Do- Something Traffic Modelling Results

#### AM PEAK

Table 5.16 presents the traffic modelling results obtained for junction no.1 with the proposed development in place during the AM PEAK.

**Table 5.16 Junction 1 Do-Something AM Peak Traffic Modelling Results**

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.14	0.5	A	1.70
	Ongar Distributor Road	0.17	0.5	A	
	Barnwell Road	0.20	0.5	A	
	Beechwood Gate	0.01	0.5	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.17	0.5	A	1.86
	Ongar Distributor Road	0.23	1.2	A	
	Barnwell Road	0.26	1.4	A	
	Beechwood Gate	0.01	0.5	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.20	0.5	A	1.94
	Ongar Distributor Road	0.26	1.3	A	
	Barnwell Road	0.25	1.4	A	
	Beechwood Gate	0.01	0.5	A	

As shown in Table 5.16, with the proposed development in place junction no. 1 will continue to operate at satisfactory levels in all assessment years. The LOS is expected to remain as A for all assessment years.

## PM PEAK

Table 5.17, below, presents the traffic modelling results obtained for junction no.1 with the proposed development in place during the PM PEAK.

**Table 5.17 Junction 1 Do-Something PM Peak Traffic Modelling Results**

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Littlepace Distributor Road	0.21	0.70	A	2.30
	Ongar Distributor Road	0.25	1.40	A	
	Barnwell Road	0.45	1.90	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening +5 2030	Littlepace Distributor Road	0.25	1.30	A	2.71
	Ongar Distributor Road	0.30	1.50	A	
	Barnwell Road	0.55	1.60	A	
	Beechwood Gate	0.03	0.50	A	
Year of Opening + 15 2040	Littlepace Distributor Road	0.17	0.50	A	2.21
	Ongar Distributor Road	0.26	1.40	A	
	Barnwell Road	0.42	2.50	A	
	Beechwood Gate	0.03	0.50	A	

As shown in Table 5.17, with the proposed development in place junction no. 1 will operate at satisfactory levels in all assessment years. The maximum Ratio of Flow to Capacity was recorded on the Barnwell Road in 2030 as 0.55.

## 5.23 Junction 2 Assessment

### 5.23.1 Assessment Layouts

As requested by Fingal County Council, the assessment of the Ongar Barnhill NS Link Rd/ R149 Barberstown Lane South Junction (Junction 2) was conducted taking in consideration two layouts, as described below:

- Layout 1: 3 no. approach lanes in the Ongar Barnhill NS Link; one accommodating right turns, one accommodating straight through movements, and one accommodating straightthrough/left turns movements.
- Layout 2: Only 2 no. approach lanes in the Ongar Barnhill NS Link, one accommodating right turns and one accommodating straight/ left

The layouts considered are presented in Figure 5.37 and 5.38, which follows.

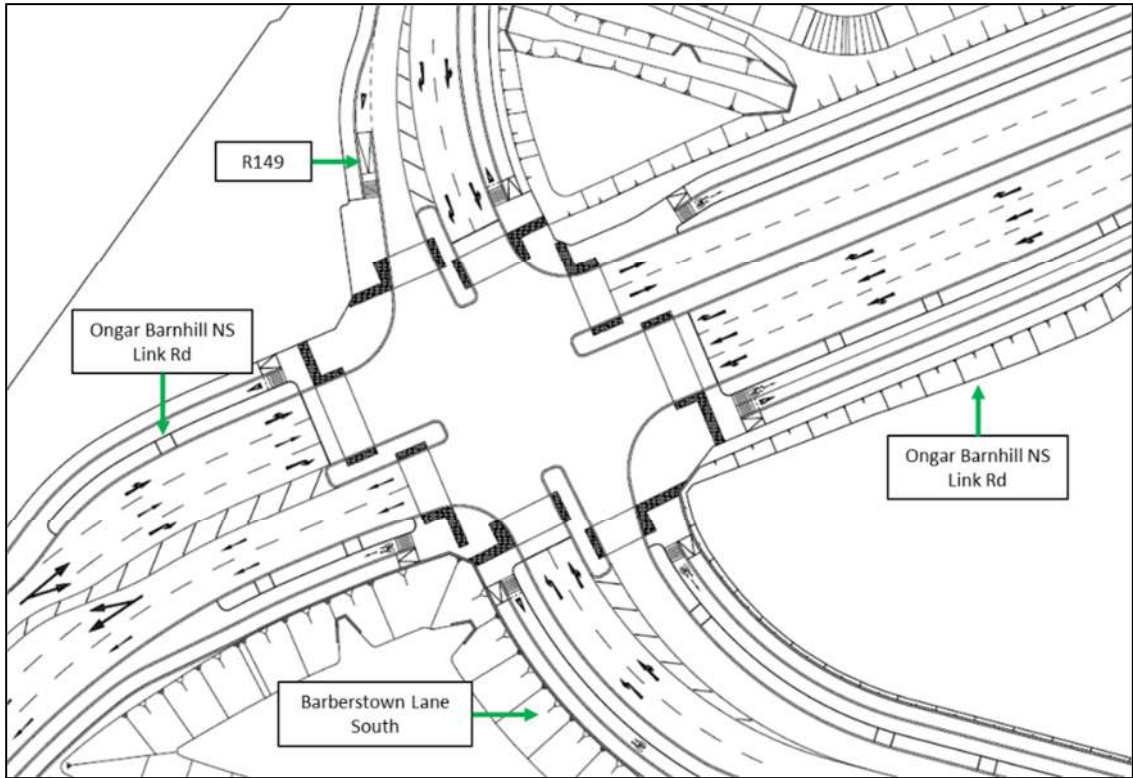


Figure 5.37 Proposed Ongar Barnhill NS Link Rd - R149 Barberstown Lane Junction (Layout 1)

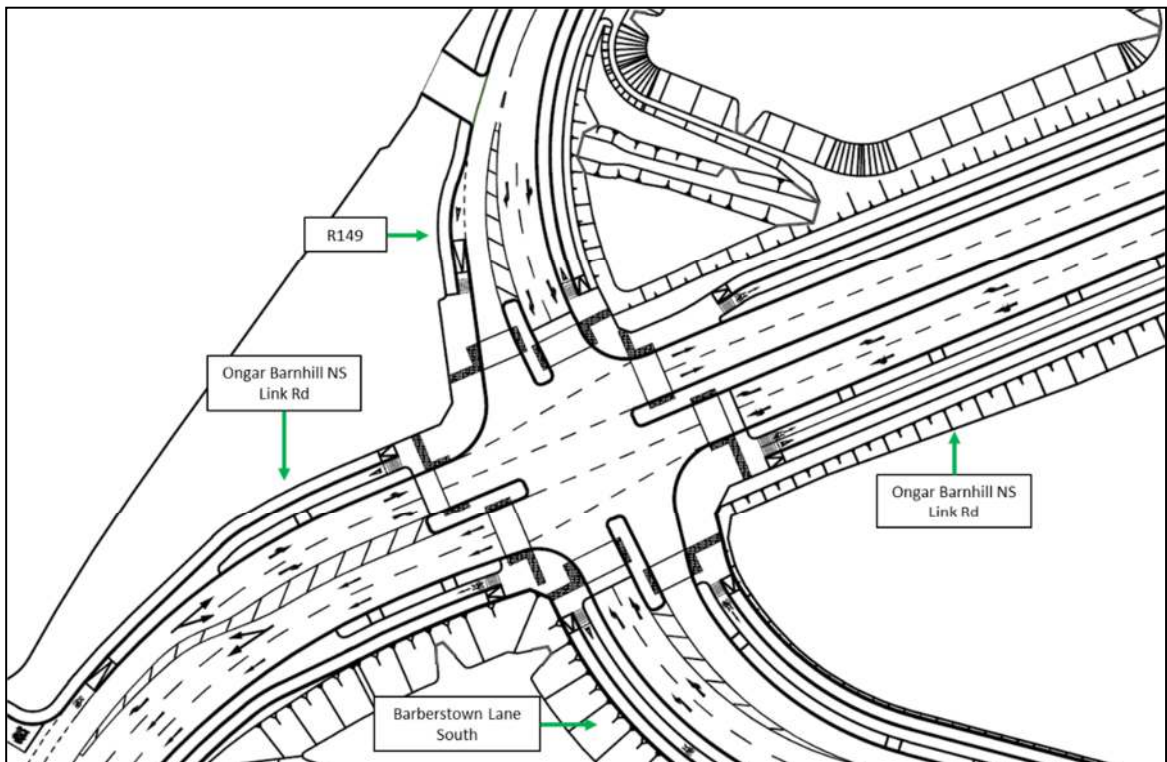


Figure 5.38 Proposed Ongar Barnhill NS Link Rd - R149 Barberstown Lane Junction (Layout 2)

### 5.23.2 Do- Minimum Traffic Modelling Results

#### AM PEAK Layout 1

Table 5.18, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and without the proposed development in place.

**Table 5.18 Junction 2 Layout 1 Do-Minimum AM Peak Traffic Modelling Results**

Assessment Year	Layout 1 Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	48.20%	6.1	14.4	86.90%
	Barberstown Lane South	30.90%	1.5		
	Ongar-Barnhill Link Rd (South)	40.40%	5.2		
	R149	48.10%	6.8		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	64.00%	8.7	21.1	40.70%
	Barberstown Lane South	60.60%	4.4		
	Ongar-Barnhill Link Rd (South)	59.30%	5.4		
	R149	62.40%	8.0		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	75.10%	12.4	28.5	17.70%
	Barberstown Lane South	76.50%	8.4		
	Ongar-Barnhill Link Rd (South)	74.70%	8.4		
	R149	75.40%	9.9		

As shown in Table 5.18, Junction no. 2 will operate at satisfactory level for all years during AM peak in the scenario where the proposed development is not in place. The lowest Practical Reserve Capacity is observed in the year 2040 which is 17.70 %, remaining well above the junction 0% cut-off value. The highest saturation level is observed in Barberstown Lane South in the same year 2040 as 76.5%.



## AM PEAK Layout 2

Table 5.19, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and without the proposed development in place.

**Table 5.19 Junction 2 Layout 2 Do-Minimum AM Peak Traffic Modelling Results**

Assessment Year	Layout 2 Minimum AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	68.40%	11.9	14.9	31.50%
	Barberstown Lane South	30.90%	1.5		
	Ongar-Barnhill Link Rd (South)	55.90%	9.1		
	R149	68.20%	8.2		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	85.10%	17.3	25.1	5.70%
	Barberstown Lane South	78.80%	5.4		
	Ongar-Barnhill Link Rd (South)	74.10%	9.3		
	R149	84.30%	2.3		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	99.00%	33	51.9	-10.10%
	Barberstown Lane South	96.90%	13.9		
	Ongar-Barnhill Link Rd (South)	96.30%	13.7		
	R149	99.10%	17.1		

Table 5.19 shows that layout 2 of junction 2 performs below the satisfactory level for the years 2030 and 2040 during AM peak, in the do minimum scenario. Year 2040 is the worst performing year with Practical Reserve Capacity as -10.10%, and degree of saturation as 99.1% in R149 arm. These values are outside the acceptable range of PRC and degree of saturation.

## PM PEAK LAYOUT 1

Table 5.20, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and without the proposed development in place.

**Table 5.20 Junction 2 Layout 1 Do-Minimum PM Peak Traffic Modelling Results**

Assessment Year	Layout 1 Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	31.00%	5.1	16.0	65.20%
	Barberstown Lane South	43.80%	2.0		
	Ongar-Barnhill Link Rd (South)	54.50%	10.0		
	R149	54.50%	5.7		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	41.60%	6.2	22.0	34.90%
	Barberstown Lane South	66.20%	6.4		
	Ongar-Barnhill Link Rd (South)	66.70%	11.4		
	R149	64.60%	6.0		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	53.10%	7.8	23.5	48.60%
	Barberstown Lane South	60.20%	6.3		
	Ongar-Barnhill Link Rd (South)	58.50%	9.1		
	R149	60.60%	5.3		

As seen in Table 5.20, layout 1 of Junction 2 operates at satisfactory levels during PM peak. The worst performance is observed in the year 2030 with PRC value of 34.90%; the highest degree of saturation was recorded to be 66.7% in Ongar-Barnhill Link Road (South). The values are still within the acceptable range.

## PM PEAK Layout 2

Table 5.21, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and without the proposed development in place.

**Table 5.21 Junction 2 Layout 2 Do-Minimum PM Peak Traffic Modelling Results**

Assessment Year	Layout 2 Do-Minimum PM Peak (17:00-18:00hrs)					
	Arm	Degree of Saturation (%)	Maximum (PCU)	Queue	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	43.80%	9.8		21.8	-1.60%
	Barberstown Lane South	91.50%	2			
	Ongar-Barnhill Link Rd (South)	85.60%	24.9			
	R149	85.60%	8.1			
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	59.60%	11.5		38.8	-10.30%
	Barberstown Lane South	99.20%	11.9			
	Ongar-Barnhill Link Rd (South)	97.60%	30.8			
	R149	96.90%	10.7			
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	76.70%	15.6		28.8	4.90%
	Barberstown Lane South	84.20%	8.3			
	Ongar-Barnhill Link Rd (South)	85.80%	19.4			
	R149	85.80%	7.3			

Table 5.21 shows that layout 2 of junction 2 performs below the satisfactory level for all the years during PM peak in the do minimum scenario. Year 2030 is the worst performing year with Practical Reserve Capacity as -10.30%, and degree of saturation as 99.2% in Barberstown Lane South arm. These values are outside the acceptable range of PRC >10 % and degree of saturation < 85%.

Overall, Layout 1 of Junction 2 performs better than Layout 2 in do minimum scenario where the development is not in place. Layout 1's performance is satisfactory in all cases assessed, whereas Layout 2 performs less than satisfactory in almost all cases.

### 5.23.3 Do- Something Traffic Modelling Results

#### AM PEAK Layout 1

Table 5.22, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and with the proposed development in place.

**Table 5.22 Junction 2 Layout 1 Do-Something AM Peak Traffic Modelling Results**

Assessment Year	Layout 1 Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	63.20%	7.9	22.5	37.00%
	Barberstown Lane South	64.60%	5.9		
	Ongar-Barnhill Link Rd (South)	62.70%	5.1		
	R149	65.70%	8.1		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	84.80%	12.0	35.8	3.50%
	Barberstown Lane South	83.30%	10.5		
	Ongar-Barnhill Link Rd (South)	86.90%	7.7		
	R149	83.90%	10		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	81.80%	13.4	34.6	9.40%
	Barberstown Lane South	81.40%	12.1		
	Ongar-Barnhill Link Rd (South)	80.70%	9.3		
	R149	82.30%	11.0		

As shown in Table 5.22, the junction performance the junction operates within acceptable levels in the years 2025 and 2040. For the year 2030, the PRC reduces to 3.5%, approaching its practical reserve capacity. The maximum degree of saturation recorded for this scenario was 86.90% in the Ongar-Barnhill Link Road (South) Arm.



## AM PEAK Layout 2

Table 5.23, below, presents the AM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and with the proposed development in place.

**Table 5.23 Junction 2 Layout 1 Do-Something AM Peak Traffic Modelling Results**

Assessment Year	Layout 2 Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Degree of Saturation (%)	Maximum Queue (PCU)	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	83.70%	15.6	26.8	6.60%
	Barberstown Lane South	84.40%	7.6		
	Ongar-Barnhill Link Rd (South)	78.40%	8.9		
	R149	82.10%	9.6		
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	111.60%	51.8	95.2	-24.00%
	Barberstown Lane South	109.30%	24.4		
	Ongar-Barnhill Link Rd (South)	104.30%	13.2		
	R149	104.90%	19.3		
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	104.90%	45.9	86.6	-16.60%
	Barberstown Lane South	104.90%	25.0		
	Ongar-Barnhill Link Rd (South)	103.00%	17.8		
	R149	104.70%	21.5		

As shown in Table 5.23, the performance indicators obtained for this scenario are below the satisfactory level for all the years during AM peak in the do something scenario. Year 2030 is the worst performing year with Practical Reserve Capacity as low as -24.00%, and degree of saturation as 111.60% in Ongar-Barnhill Link Road (North) arm. These values are outside the acceptable range of PRC >10 % and degree of saturation < 85%.

## PM PEAK Layout 1

Table 5.24, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 1 and with the proposed development in place.

**Table 5.24 Junction 2 Layout 1 Do-Something PM Peak Traffic Modelling Results**

Assessment Year	Layout 1 Do-Something PM Peak (17:00-18:00hrs)					
	Arm	Degree of Saturation (%)	Maximum (PCU)	Queue	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	56.10%	7.1		26.8	38.40%
	Barberstown Lane South	63.70%	6.4			
	Ongar-Barnhill Link Rd (South)	64.40%	10.5			
	R149	65.00%	6.1			
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	59.90%	8.0		29.5	20.40%
	Barberstown Lane South	74.00%	9.4			
	Ongar-Barnhill Link Rd (South)	74.80%	11.9			
	R149	74.00%	6.7			
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	71.20%	9.3		28.6	26.50%
	Barberstown Lane South	69.90%	7.6			
	Ongar-Barnhill Link Rd (South)	68.60%	8.5			
	R149	68.20%	5.6			

As seen in Table 5.24, layout 1 of Junction 2 operates at satisfactory level during PM peak as well. The worst performance is observed in the year 2030 with PRC value of 20.40% and degree of saturation being highest (74.80%) in Ongar-Barnhill Link Road (South). The values remain within the acceptable range of PRC>10% and degree of saturation <85%.

## PM PEAK Layout 2

Table 5.25, below, presents the PM PEAK traffic modelling results obtained for junction no. 2 with layout no. 2 and with the proposed development in place.

**Table 5.25 Junction 2 Layout 2 Do-Something PM Peak Traffic Modelling Results**

Assessment Year	Layout 2 Do-Something PM Peak (17:00-18:00hrs)					
	Arm	Degree of Saturation (%)	Maximum (PCU)	Queue	Average Delay (PCU/Hr)	Practical Reserve Capacity (PRC)
Year of Opening 2025	Ongar-Barnhill Link Rd (north)	73.40%	13.3		38.2	-5.80%
	Barberstown Lane South	93.00%	9.9			
	Ongar-Barnhill Link Rd (South)	95.20%	26.5			
	R149	90.00%	8.8			
Year of Opening +5 2030	Ongar-Barnhill Link Rd (north)	79.80%	15.4		72.7	-19.60%
	Barberstown Lane South	104.50%	20.2			
	Ongar-Barnhill Link Rd (South)	107.60%	50.6			
	R149	98.70%	11.5			
Year of Opening + 15 2040	Ongar-Barnhill Link Rd (north)	92.40%	20.5		39.8	-2.70%
	Barberstown Lane South	90.60%	10.5			
	Ongar-Barnhill Link Rd (South)	91.50%	18.9			
	R149	85.20%	7.2			

Table 5.25 shows that layout 2 of junction 2 performs below the satisfactory level for all the years during PM peak in the do something scenario. Year 2030 is the worst performing year with Practical Reserve Capacity as low as -19.60%, and degree of saturation as 107.60% in Ongar-Barnhill Link Road (South) arm. These values are outside the acceptable range of PRC >10 % and degree of saturation < 85%.

Similar to the do-minimum scenario, Layout 1 of junction 2 performs better than Layout 2. Layout 2's performance is below satisfactory during all peaks and all years, whereas Layout 1 remains within acceptable performance ranges. This could be attributed to the development of the new Barnhill site which would significantly increase the traffic flow through junction 2.

The results presented above show that all development traffic can be accommodated with Layout no. 1 in place without deteriorating the performance of the junction below acceptable levels.

# 5.24 Junction 3 Assessment

## 5.24.1 Assessment Layout

The assessment of the Barberstown Lane South/Barnhill Development South Access A (Junction 3) was conducted taking in consideration the most up-to-date junction layout to be implemented as part of the upgrades proposed for the Barberstown Lane South. These changes will be carried out by Fingal County Council prior to the development construction. Figure 5.39 below illustrates the proposed layout of this junction.

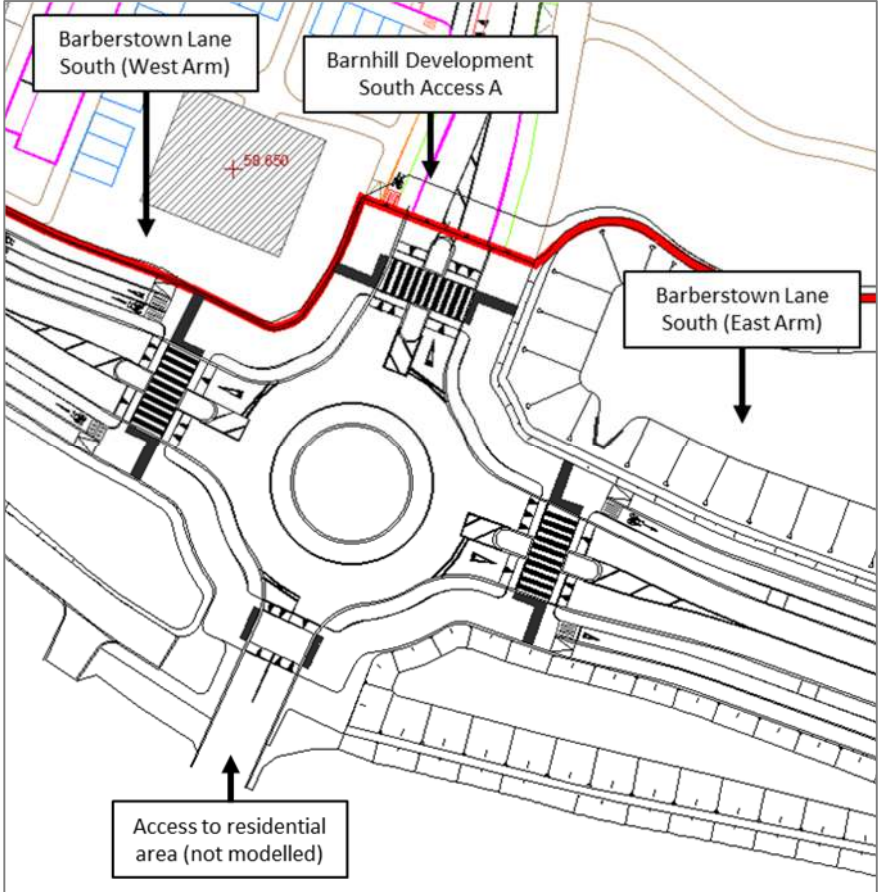


Figure 5.39 Proposed Barberstown Lane South/Barnhill Development Access A Junction Layout

## 5.24.2 Do- Minimum Traffic Modelling Results

### AM PEAK

Table 5.26 presents the traffic modelling results obtained for junction no.3 without the proposed development in place during the AM Peak.

**Table 5.26 Junction 3 Do Minimum AM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.9
	Barberstown Lane (East Arm)	0.01	0.6	A	
	Barberstown Lane (West Arm)	0.05	0.5	A	
Year of Opening +5 2030	Development Access	-	-	-	3.35
	Barberstown Lane (East Arm)	0.11	0.5	A	
	Barberstown Lane (West Arm)	0.23	1.3	A	
Year of Opening + 15 2040	Development Access	-	-	-	3.94
	Barberstown Lane (East Arm)	0.18	0.5	A	
	Barberstown Lane (West Arm)	0.37	2.7	A	

As shown in Table 5.26, without the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.37 on Barberstown Lane (West Arm) for the year 2040.



## PM PEAK

Table 5.27, below, presents the traffic modelling results obtained for junction no.3 without the proposed development in place during the PM Peak.

**Table 5.27 Junction 3 Do Minimum PM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.71
	Barberstown Lane (East Arm)	0.05	0.5	A	
	Barberstown Lane (West Arm)	0.03	0.5	A	
Year of Opening +5 2030	Development Access	-	-	-	2.93
	Barberstown Lane (East Arm)	0.15	0.5	A	
	Barberstown Lane (West Arm)	0.05	0.5	A	
Year of Opening + 15 2040	Development Access	-	-	-	3.34
	Barberstown Lane (East Arm)	0.27	1.2	A	
	Barberstown Lane (West Arm)	0.1	0.5	A	

As shown in Table 5.27, without the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.27 on Barberstown Lane (East Arm) for the year 2040.

Overall, the junction performance is better during AM peak than PM peak. However, even the worst recorded RFC is below the threshold of 0.85.

### 5.24.3 Do- Something Traffic Modelling Results

#### AM PEAK

Table 5.28, below, presents the traffic modelling results obtained for junction no.3 with the proposed development in place during the AM PEAK.

**Table 5.28 Junction 3 Do Something AM Peak Traffic Modelling Results**

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.19	0.7	A	3.21
	Barberstown Lane (East Arm)	0.14	0.5	A	
	Barberstown Lane (West Arm)	0.11	0.5	A	
Year of Opening +5 2030	Development Access	0.21	1.1	A	3.82
	Barberstown Lane (East Arm)	0.25	1.4	A	
	Barberstown Lane (West Arm)	0.3	1.8	A	
Year of Opening + 15 2040	Development Access	0.15	0.5	A	3.62
	Barberstown Lane (East Arm)	0.29	1.6	A	
	Barberstown Lane (West Arm)	0.2	0.9	A	

With the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.30 on Barberstown Lane (West Arm) for the year 2030.

## PM PEAK

Table 5.29 presents the traffic modelling results obtained for junction no.3 with the proposed development in place during the PM PEAK

**Table 5.29 Junction 3 Do Something PM Peak Traffic Modelling Results**

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.11	0.5	A	3.15
	Barberstown Lane (East Arm)	0.18	0.5	A	
	Barberstown Lane (West Arm)	0.12	0.5	A	
Year of Opening +5 2030	Development Access	0.11	0.5	A	3.39
	Barberstown Lane (East Arm)	0.27	1.5	A	
	Barberstown Lane (West Arm)	0.12	0.5	A	
Year of Opening + 15 2040	Development Access	0.05	0.5	A	3.63
	Barberstown Lane (East Arm)	0.34	2.4	A	
	Barberstown Lane (West Arm)	0.15	0.5	A	

As shown in Table 5.29, with the proposed development in place, junction no. 3 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.34 on Barberstown Lane (East Arm) for the year 2030.

When all the scenarios for Junction 3 are compared, it can be said that the junction performance is overall satisfactory. Junction performance is better during the AM peak than PM peak in this scenario. The least satisfactory performance is also below the cutline for the satisfactory performance, which is 0.85 RFC.

# 5.25 Junction 4 Assessment

## 5.25.1 Assessment Layout

The assessment of the Barberstown Lane South/Barnhill Development Access B (Junction 3) was conducted taking in consideration the most up-to-date junction layout to be implemented as part of the upgrades proposed for the Barberstown Lane South. This changes will be carried out by Fingal County Council prior to the development construction. Figure 5.40 illustrates the proposed layout of this junction.

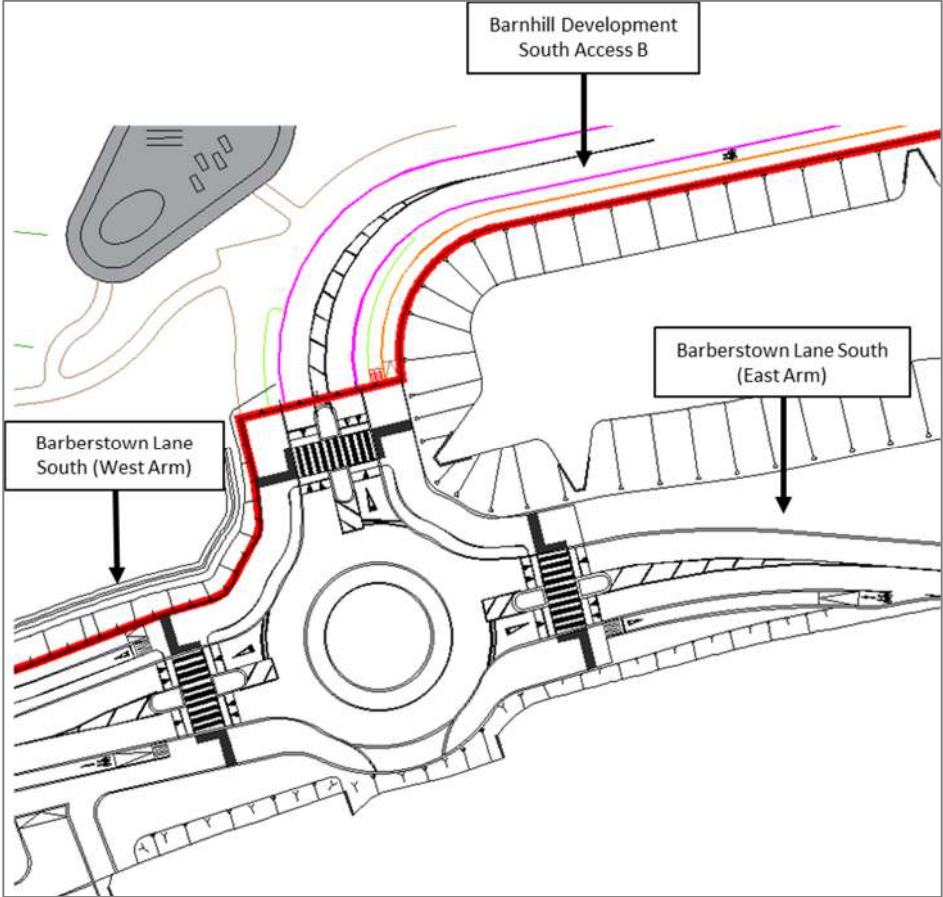


Figure 5.40 Proposed Barberstown Lane South/Barnhill Development Access B Junction Layout

## 5.25.2 Do- Minimum Traffic Modelling Results

### AM PEAK

Table 5.30, below, presents the traffic modelling results obtained for junction no.4 without the proposed development in place during the AM PEAK.

**Table 5.30 Junction 4 Do Minimum AM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.96
	Barberstown Lane (East Arm)	0.01	0.6	A	
	Barberstown Lane (West Arm)	0.05	0.5	A	
Year of Opening +5 2030	Development Access	-	-	-	3.44
	Barberstown Lane (East Arm)	0.11	0.5	A	
	Barberstown Lane (West Arm)	0.24	1.3	A	
Year of Opening + 15 2040	Development Access	-	-	-	4.06
	Barberstown Lane (East Arm)	0.18	0.5	A	
	Barberstown Lane (West Arm)	0.37	2.7	A	

As shown in Table 5.30, without the proposed development in place, junction no. 4 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.37 on Barberstown Lane (West Arm) for the year 2040.



**PM PEAK**

Table 5.31, below, presents the traffic modelling results obtained for junction no.4 without the proposed development in place during the PM PEAK.

**Table 5.31 Junction 4 Do Minimum PM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	-	-	-	2.77
	Barberstown Lane (East Arm)	0.05	0.50	A	
	Barberstown Lane (West Arm)	0.03	0.50	A	
Year of Opening +5 2030	Development Access	-	-	-	3.01
	Barberstown Lane (East Arm)	0.15	0.50	A	
	Barberstown Lane (West Arm)	0.05	0.50	A	
Year of Opening + 15 2040	Development Access	-	-	-	3.45
	Barberstown Lane (East Arm)	0.28	1.40	A	
	Barberstown Lane (West Arm)	0.10	0.50	A	

As shown in Table 5.31, without the proposed development in place, junction no. 4 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.28 on Barberstown Lane (East Arm) for the year 2040. Overall, junction performance is better during PM peak than AM peak.

### 5.25.3 Do- Something Traffic Modelling Results

#### AM PEAK

Table 5.32, below, presents the traffic modelling results obtained for junction no.4 with the proposed development in place during the AM PEAK.

**Table 5.32 Junction 4 Do Something AM Peak Traffic Modelling Results**

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.2	1.0	A	3.45
	Barberstown Lane (East Arm)	0.03	0.5	A	
	Barberstown Lane (West Arm)	0.18	0.5	A	
Year of Opening +5 2030	Development Access	0.22	1.2	A	4.2
	Barberstown Lane (East Arm)	0.14	0.5	A	
	Barberstown Lane (West Arm)	0.39	2.6	A	
Year of Opening + 15 2040	Development Access	0.15	0.5	A	3.64
	Barberstown Lane (East Arm)	0.21	1.1	A	
	Barberstown Lane (West Arm)	0.24	1.4	A	

As shown in Table 5.32, with the proposed development in place, junction no. 4 will operate at a satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.39 on Barberstown Lane (West Arm) for the year 2030.

## PM PEAK

Table 5.33, below, presents the traffic modelling results obtained for junction no.4 with the proposed development in place during the PM PEAK

**Table 5.33 Junction 4 Do Something PM Peak Traffic Modelling Results**

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Development Access	0.11	0.50	A	3.17
	Barberstown Lane (East Arm)	0.10	0.50	A	
	Barberstown Lane (West Arm)	0.14	0.50	A	
Year of Opening +5 2030	Development Access	0.11	0.50	A	3.36
	Barberstown Lane (East Arm)	0.20	1.00	A	
	Barberstown Lane (West Arm)	0.16	0.50	A	
Year of Opening + 15 2040	Development Access	0.05	0.50	A	3.64
	Barberstown Lane (East Arm)	0.32	2.00	A	
	Barberstown Lane (West Arm)	0.16	0.50	A	

As shown in Table 5.33, with the proposed development in place, junction no. 4 will operate at a satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.32 on Barberstown Lane (East Arm) for the year 2040.

Overall, with the proposed development in place junction 4 will continue to operate at satisfactory levels in all assessment years. Junction performance is better during PM peak than AM peak in all the scenarios. The least satisfactory performance is observed for the scenario when development is in place on Barberstown Lane (West Arm), with RFC 0.39 in the year 2030 during the AM peak, which is still well below the threshold for satisfactory performance (0.85 RFC).

## 5.26 Junction 5 Assessment

### 5.26.1 Assessment Layout

The assessment of the Milestown Road/Anna Liffey Mills Road/Woodwall Road Junction (Junction 5) was conducted taking in consideration the most up to date layout with the proposed upgrades to Barberstown Lane South. The upgraded layout is a roundabout which is planned to be opened in the year 2040. For the assessment years 2025 and 2030, the existing layout, which is a priority-controlled junction, has been modelled. These improvements should be delivered by Fingal County Council under the Kellystown Road Link Scheme. Figure 5.41 below illustrates the existing layout assessed for 2025 and 2030.



Figure 5.41 Existing Milestown Road/Anna Liffey Mills Road/Woodwall Road Junction Layout (Junction 5)

Figure 5.42 illustrates the proposed layout of Junction 5 which has been assessed for 2040. In the proposed layout, Barberstown Lane South is extended from West to East, along junction no. 5 and Milestown Road is turned into a cul-de-sac just providing access to the properties currently located along this stretch of road. The junctions have been designed as a roundabout, and Woodward Road will be referred to as Barberstown Lane (East Arm).

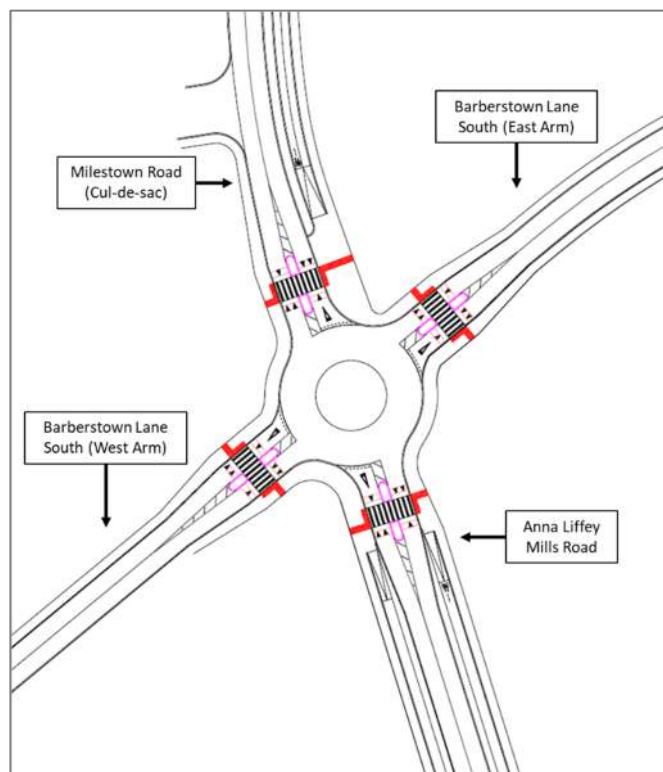


Figure 5.42 Proposed Milestown Road/Anna Liffey Mills Road/Woodwall Road Junction Layout (Junction 5)

Due to the low traffic activity estimated for Milestown Road once the level crossing is closed and the roundabout is in place, this arm of the junction has not been taken in consideration for the assessment.

## 5.26.2 Do- Minimum Traffic Modelling Results

### AM PEAK

Table 5.34, below, presents the traffic modelling results obtained for junction no.5 without the proposed development in place during the AM PEAK.

**Table 5.34 Junction 5 Do Minimum AM Peak Traffic Modelling Results**

Assessment Year	Do-Minimum AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.1	A	0.78
	Woodwall Road	0.19	1.1	A	
	Anna Liffey Hills Road	0.01	0.1	A	
Year of Opening +5 2030	Milestown Road	0.37	2.8	A	6.57
	Woodwall Road	0.38	2.7	A	
	Anna Liffey Hills Road	0.55	1.5	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.5	2.4	A	6.27
	Barberstown Lane (East Arm)	0.46	2.0	A	
	Anna Liffey Hills Road	0.39	2.7	A	

As shown in Table 5.34, without the proposed development in place, junction no. 5 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.59 on Anna Liffey Hills Road for the year of opening which is 2025.



## PM PEAK

Table 5.35, below, presents the traffic modelling results obtained for junction no.5 without the proposed development in place during the PM PEAK.

Assessment Year	Do-Minimum PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.1	A	0.94
	Woodwall Road	0.11	0.5	B	
	Anna Liffey Hills Road	0.16	1.2	A	
Year of Opening +5 2030	Milestown Road	0.08	0.5	A	7.03
	Woodwall Road	0.60	1.8	A	
	Anna Liffey Hills Road	0.48	2.1	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.15	0.5	A	6.25
	Barberstown Lane (East Arm)	0.45	2.2	A	
	Anna Liffey Hills Road	0.53	1.8	A	

**Table 5.35 Junction 5 Do Minimum PM Peak Traffic Modelling Results**

As shown in Table 5.35, without the proposed development in place, junction no. 5 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.53 on Anna Liffey Hills Road for the year 2040.

Overall, junction performance is better during PM peak than AM peak. The worst performing arm has RFC below the threshold of satisfactory performance which is 0.85.

### 5.26.3 Do- Something Traffic Modelling Results

#### AM PEAK

Table 5.36, below, presents the traffic modelling results obtained for junction no.5 with the proposed development in place during the AM PEAK.

**Table 5.36 Junction 5 Do Something AM Peak Traffic Modelling Results**

Assessment Year	Do-Something AM Peak (08:00-09:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.2	A	3.9
	Woodwall Road	0.57	5.4	C	
	Anna Liffey Hills Road	0.02	0.5	A	
Year of Opening +5 2030	Milestown Road	0.55	2.8	A	7.36
	Woodwall Road	0.44	2.4	A	
	Anna Liffey Hills Road	0.53	1.7	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.56	1.9	A	6.64
	Barberstown Lane (East Arm)	0.46	2.1	A	
	Anna Liffey Hills Road	0.39	2.7	A	

As shown in Table 5.36, with the proposed development in place, junction no. 5 will continue to operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.61 on Anna Liffey Hills Road for the year 2025.

## PM PEAK

Table 5.37, below, presents the traffic modelling results obtained for junction no.3 with the proposed development in place during the PM PEAK

**Table 5.37 Junction 5 Do Something PM Peak Traffic Modelling Results**

Assessment Year	Do-Something PM Peak (17:00-18:00hrs)				
	Arm	Ratio of Flow to Capacity (RFC)	Maximum Queue (PCU)	Level of Service (LOS)	Junction Delay (Seconds)
Year of Opening 2025	Milestown Road	0.10	0.2	A	2.08
	Woodwall Road	0.32	1.2	C	
	Anna Liffey Hills Road	0.25	1.2	A	
Year of Opening +5 2030	Milestown Road	0.17	0.5	A	8.17
	Woodwall Road	0.66	3.8	A	
	Anna Liffey Hills Road	0.54	1.8	A	
Year of Opening + 15 2040	Barberstown Lane (West Arm)	0.18	0.5	A	6.95
	Barberstown Lane (East Arm)	0.48	1.8	A	
	Anna Liffey Hills Road	0.58	1.8	A	

As shown in Table 5.37, with the proposed development in place, junction no. 5 will operate at satisfactory level in all assessment years. The maximum Ratio of Flow to Capacity recorded in this scenario was 0.66 on Barberstown Lane (East Arm) for the year 2030.

When all the scenarios are compared for Junction 5, it can be said that the junction performance is overall satisfactory. Junction performance is better during the AM peak than PM peak for this scenario. The least satisfactory arm also has RFC well below the threshold for satisfactory performance, which is 0.85.

Based on the modelling results obtained for all junctions, it can be concluded that the local road network will operate within capacity and at satisfactory levels during peak hours for all assessment years with the proposed development in place. Therefore, the impact of the proposed development is considered long-term, neutral, and imperceptible.

Full Reports containing the traffic modelling results for each junction can be made available upon request.

## 5.27 Pakenham Bridge and Barberstown Level Crossing Traffic

As discussed in section 5.5.4, the Pakenham Bridge and Barberstown Level Crossing have been assumed to accommodate traffic for the assessment years 2025 and 2030. Once the level crossing is closed (As part of the Dart Expansion Programme) and the Barberstown Lane South is upgraded (Road section 3 in Figure 5.12), these facilities will no longer cater for any traffic. This has been assumed to be in place by 2040.

Table 5.38, below, presents the level of traffic estimated to transit through the Pakenham Bridge and Barberstown Level Crossing during each assessment year.

**Table 5.38 Estimated Traffic Levels at Pakenham Bridge and Barberstown Level Crossing**

Approach	2019		2025				2030				2040			
	AM	PM	Do Min		Do Something		Do Min		Do Something		Do Min		Do Something	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
<b>Westbound</b>	24	51	10	61	55	193	145	199	212	347	0	0	0	0
<b>Eastbound</b>	133	38	60	30	195	84	281	66	437	148	0	0	0	0
<b>Two-Way</b>	158	89	70	92	250	277	427	265	649	495	0	0	0	0

As shown on Figure 5.13 (See section 5.7.3), the Coolmine Level Crossing at present successfully accommodates traffic volumes in the same ranges of the ones estimated for the Barberstown Crossing with the development in place. Given that the level crossings are similar in nature, the Barberstown Level Crossing will be able to accommodate the estimated traffic volumes with the development in place.

The Pakenham Bridge and the Barberstown level crossing has the capacity to cater for the traffic volumes presented in Table 5.38, taking account of level crossing closure times and width constraint of Pakenham bridge.

At present, Millerstown Road (east of the level crossing) has capacity to accommodate a queue of around 30 cars. Alternative routes exist via the Ongar Distributor Road or the Anna Liffey Mills Road.

A drawing illustrating the staging for the extension of Barberstown Lane South (Road Section 3 in Figure 2.3) in relation to the proposed development has been included in CSEA Drawing Pack, no. 16\_053\_034.

These Drawings set out the road connection arrangements for each scenario

- when the Ongar Barnhill Scheme is built,
- when the Barnhill SHD is constructed,
- During construction of the DART + west bridge with access to Pakenham Bridge and level crossing through the SHD road network. The developer has committed in writing to FCC to facilitate this phase as part of the land transfer for Ongar Barnhill Scheme.

Final scenario when Dart + bridge is complete and level crossing is closed, public road access to Pakenham bridge and adjoining properties via SHD road network.

## 5.28 Predicted Impacts of The Development

### 5.28.1 Construction Stage Impact

The potential impacts resulting from construction works for the proposed development are outlined in Table 5.39, below. It should be noted that these impacts would be short-term, negative, and not significant, and are not expected to result in significant residual impact.

**Table 5.39 Potential Impacts during Construction Stage.**

Activities	Potential Impact	Significance of Effects	Duration of Effects
Transportation of site machinery and materials	<ul style="list-style-type: none"> <li>• Noise/disturbance to other properties in the area.</li> <li>• Dust raised by construction traffic.</li> <li>• Dirt and mud dragged onto the road by construction traffic.</li> </ul>	<b>Moderate</b>	<b>Temporary</b>

Given the short-term nature of the peak construction phase, the overall impact of the construction phase involving the development is not estimated to be significant and shall not affect the performance of the junctions under study. Further details if the impacts associated with the proposed development at construction stage can be found in the Outline Construction and Environmental Management Plan (CEMP) submitted with the Planning Pack.

### 5.28.2 Operational Impacts

As discussed in preceding sections, the traffic modelling undertaken demonstrated that the junction under study will continue to operate successfully with the proposed development in place.

Based on the modelling results obtained for all junctions, it can be concluded that the local road network will operate within capacity and at satisfactory levels during peak hours for all assessment years with the proposed development in place. Therefore, the potential traffic impact associated with the development was found to be long-term, neutral and imperceptible.

The proposal has been designed to be a walking/cycling friendly scheme, very well served by public transport and with plenty of amenities available at a short walk distance. A Mobility Strategy has been created for the development, submitted as a separate document, to promote active travel and to minimising the potential car trips in the local area

### 5.28.3 Cumulative Impacts

The assessment undertaken has taken in consideration the traffic associated with all major schemes to be delivered in the vicinity of the site. This also has taken into account all road network and public transport modifications in the local area. All junctions will continue to operate successfully with all these schemes and the proposed development in place.

Therefore, the potential cumulative traffic impact associated with the development was found to be long-term, neutral, and imperceptible.

## 5.29 Mitigation Measures

During the construction phase of the development, the following measures will be put in place to reduce the impact on the surrounding environment:

- The contractor will be required to provide wheel cleaning facilities, and regular cleaning site access will be carried out.
- Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.
- Monitoring and control of construction traffic will be ongoing during construction works.
- Construction traffic routes shall be use strategically by construction vehicles to minimise traffic impact to surrounding properties.

Further details of the mitigation measures to be put in place at construction stage can be found in the Outline CEMP submitted with the Planning Pack.

## 5.30 Conclusion

CSEA has been commissioned to prepare a Traffic and Transport Assessment (TTA) for a proposed mixed-use development at a site located in the Barnhill, Clonsilla, Dublin 15.

The proposed development will consist of the demolition of the existing vacant industrial buildings and the construction of 1,243 residential units, approximately 3,174 m<sup>2</sup> of commercial and community facilities, and ancillary development. The commercial and community development will include:

- Creche of 942 m<sup>2</sup> with capacity for approximately 210 children.
- Medical centre (GP / Dental practice) of approximately 344 m<sup>2</sup> with 8 no. consulting rooms.
- Convenience retail unit of 370 m<sup>2</sup>
- Five independent retail / retail service units ranging in size from 57 m<sup>2</sup> to 127 m<sup>2</sup> sqm, with capacity to amalgamate some of the units, if required.
- A Café of 158 m<sup>2</sup>
- A Community Space of 359 m<sup>2</sup>. This multi-use space will be able to accommodate a range of activities, including for example multi-denominational worship, fitness classes, community meetings etc.
- An Office Hub of 501 m<sup>2</sup>. The office hub is designed to provide hot-desk and office support facilities to facilitate hybrid working.
- Provision of an access Plaza to Hansfield Train Station, including provision for a commuting bike storage area.
- Providing for pedestrianisation / cycle way along Barberstown Lane North (L-7010-0), with vehicle use restricted to local access only.
- Land set aside for a primary school to accommodate a minimum of 16 classrooms, to be delivered by the department of education.



A total of 1,593 no. car parking spaces are proposed with the development, including 55 no. disabled spaces and 154 no. electric charging spaces. Cycle parking includes the provision 3,337 spaces.

The assessment approach underpinning this TTA is consistent with Transport Infrastructure Ireland's Traffic and Transport Assessment Guidelines (May 2014). The proposed development has been designed in accordance with guidance set out within the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities, 2018, the Design Manual for Urban Roads and Streets (DMURS), and Fingal County Council Development Plan 2017-2023.

The Blanchardstown Local Area Model was used as a baseline to assess the development traffic impacts. Traffic survey data, collected in February 2019 was then used to calibrate and validate the 2019 base LAM to ensure that they provide an accurate representation of the worse case scenario for traffic flow within the study area.

The road assignment within the Blanchardstown LAM is undertaken using the SATURN suite of modelling software. It allocates road users to routes between their desired origin and destination taking cognisance of aspects such as capacity constraints and traffic congestion

The choice data contained within East Regional Model and the Greater Dublin Area (GDA) Strategy was utilised as a base for developing the LAM, with additional network and zonal detail included to provide an enhanced representation of the road network, and route choice, in the study area. The road network was reviewed to ensure that it provides a robust and accurate representation of existing conditions.

Traffic models of critical junctions in the network have been developed to assess the development's impacts to the operation of local road network. The industry standard ARCADY and LinSig traffic modelling software have been used for predicting the capacities, queues, and delays of these junctions.

The road network was modelled at both the AM and PM peak hour for a Do-Minimum and Do-Something. The development's impacts were assessed for the Year of Opening (YoO) which has been assumed to be 2025, Future Year 2030 (YO+5) and Horizon development 2040 (YoO+15).

The modelling results show that the road network will continue to operate successfully with the development in place in all assessment scenarios at both the AM and PM peak.

On that basis, the traffic impact of the proposed development can be described as long-term, neutral, and imperceptible. The assessment has demonstrated that the proposed development will have a no material impact on the operation of the local road network.

During construction stage the impact of the proposed development is expected to be short-term, negative, and not significant.

# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

## CHAPTER 6

Material Assets, Service Infrastructure  
and Utilities

# Volume II

Environmental Impact Assessment Report



**AECOM**

**ALANNA**  
HOMES

**Alcove Ireland**  
Four Limited

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**SLR**

July 2022

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## Chapter 6 Material Assets, Service Infrastructure & Utilities

### Contents

6	Material Assets, Service Infrastructure & Utilities .....	6-3
6.1	Introduction.....	6-3
6.1.1	Author Information and Competency .....	6-3
6.1.2	Reference to Guidelines Relevant to Discipline .....	6-3
6.1.3	Assessment Methodology .....	6-4
6.1.4	Significance Criteria .....	6-4
6.1.5	Difficulties Encountered in Compiling Information .....	6-5
6.2	Description of the Existing Environment.....	6-5
6.2.1	Existing Surface Water Drainage .....	6-5
6.2.2	Existing Foul / Wastewater Sewer Drainage .....	6-6
6.2.3	Existing Water Supply and Distribution.....	6-6
6.2.4	Existing ESB Power Supply Network.....	6-6
6.2.5	Existing Gas Supply Network.....	6-6
6.2.6	Existing Eir Network .....	6-6
6.2.7	Other Existing Telecommunications.....	6-7
6.2.8	Existing Public Lighting .....	6-7
6.3	Description of the Future Receiving Environment .....	6-7
6.3.1	Future Receiving Environment Surface Water Drainage.....	6-7
6.3.2	Future Receiving Environment Foul / Wastewater Sewer Drainage.....	6-7
6.3.3	Future Receiving Environment Water Supply and Distribution .....	6-8
6.3.4	Future Receiving Environment ESB Power Supply Network .....	6-8
6.3.5	Future Receiving Environment Gas Supply Network.....	6-8
6.3.6	Future Receiving Environment Virgin Media Network.....	6-8
6.3.7	Future Receiving Environment Eir Network .....	6-8
6.3.8	Future Receiving Environment Other Ducting .....	6-8
6.3.9	Future Receiving Environment Public Lighting.....	6-9
6.4	Proposed Development.....	6-9
6.4.1	Proposed Surface Water Drainage Network and SuDS Strategy.....	6-9
6.4.2	Proposed Foul Sewer Network.....	6-10
6.4.3	Proposed Water Supply and Distribution Network.....	6-10
6.4.4	Proposed Gas Supply Network.....	6-11
6.4.5	Proposed ESB Power Supply Network.....	6-11
6.4.6	Proposed Eir Network .....	6-11
6.4.7	Proposed Virgin Media Network .....	6-11
6.4.8	Proposed Public Lighting Network .....	6-12
6.5	Predicted Impacts.....	6-12
6.5.1	Do Nothing Scenario.....	6-12
6.5.2	Construction Stage .....	6-12
6.5.3	Operational Stage.....	6-13
6.5.4	Cumulative Impacts.....	6-14
6.6	Mitigation Measures .....	6-15

6.6.1	Construction Stage .....	6-15
6.6.2	Operational Stage.....	6-15
6.7	Monitoring.....	6-16
6.7.1	Construction Stage .....	6-16
6.7.2	Operational Stage.....	6-16
6.8	Residual Impacts .....	6-16
6.8.1	Construction Stage .....	6-16
6.8.2	Operational Stage.....	6-17
6.9	Waste Management .....	6-17
6.9.1	Impact Assessment during Construction Stage.....	6-17
6.9.2	Impact Assessment during Operational Stage .....	6-18

## Tables

Table 6.1	Significance criteria for impacts on Material Assets – Utilities .....	6-5
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## 6 Material Assets, Service Infrastructure & Utilities

### 6.1 Introduction

Chapter 6 of this document will assess the potentially significant effects of the Proposed Development upon the Material Assets, both existing and proposed, serving the subject lands and surrounding area. “Material Assets” are the physical resources serving a subject site or area that are of human origin, i.e., existing, and proposed utilities and service infrastructure. The material assets for the proposed development site that are evaluated in this chapter are surface water drainage, foul sewerage, water supply, gas supply, electrical supply, public lighting, and telecommunications / broadband. This chapter will also assess the proposed development in terms of construction and operational waste management.

As per Environmental Protection Agency (EPA) guidance on the information to be contained in EIAR documentation, the following topics require consideration under material assets for the Barnhill Strategic Housing Development (SHD).

- Built Services
- Roads and Traffic
- Waste Management

Roads and Traffic are to be assessed in “Chapter 5 Material Assets – Traffic and Transport” of the EIAR. This chapter is also be read in conjunction with “Chapter 7 - Land and Soils” and “Chapter 8 – Water” of the EIAR.

#### 6.1.1 Author Information and Competency

This chapter of the EIAR has been prepared by Conor Phillips, a Senior Design Engineer employed by Clifton Scannell Emerson Associates (CSEA) Consulting Engineers. He holds a BSc. (Hons) in Civil Engineering from Dundalk Institute of Technology. He has 15 years’ experience working on a wide range of projects including Road and Transportation Schemes, Pedestrian and Cycle Infrastructure Schemes, Urban Renewal Schemes and Site Development Works. As part of his design of such schemes, he has extensive knowledge in utility, wastewater and watermain design as well as on site surface water management. His experience ranges from the preliminary and planning stages of road and site development schemes, right through to scheme detailed design and on-site construction.

#### 6.1.2 Reference to Guidelines Relevant to Discipline

This chapter has been prepared having regard to the following guidance documents:

- The SuDS manual (CIRIA, 2015)
- Greater Dublin Strategic Drainage Study (GDSDS), 2005.
- Irish Water document IW-CDS-5030-01 (Revision 4), “*Wastewater Infrastructure Standard Details: Connections and Developer Services*”, July 2020
- Irish Water document IW-CDS-5030-03 (Revision 2), “*Code of Practice for Wastewater Infrastructure: Connections and Developer Services*”, July 2020
- Irish Water document IW-CDS-5020-01 (Revision 4), “*Water Infrastructure Standard Details: Connections and Developer Services*”, July 2020
- Irish Water document IW-CDS-5020-03 (Revision 2), “*Code of Practice for Water Infrastructure: Connections and Developer Services*”, July 2020
- Fingal County Council Barnhill Local Area Plan, February 2019.
- ESB Networks document, “*Housing Schemes: Guidebook for ESB Networks Standards for Electrical Services*”, January 2014
- ESB Networks document, “*Construction Standards for MV Substation Buildings*”, April 2019.
- Gas Networks Ireland document, “*Guidelines for Designers and Builders – Domestic Sites*”.
- Virgin Media document, “*New Build Handbook*”, December 2019.
- Local Government (Water Pollution) Act, 1977.

### 6.1.3 Assessment Methodology

A desktop survey was carried out to determine the material and economic assets of human origin that are associated with the site of the proposed development. Predictions of resource usage was undertaken for both the construction and operational stages of the development, and the impacts of these stages on existing and proposed material assets were assessed. Mitigation measures are proposed, where appropriate to limit negative impacts arising from the proposed development.

The methodology used to prepare this section of the EIAR is in accordance with the Environmental Protection Agency (EPA) document “*Guidelines on the Information to be contained in Environmental Impact Assessment Reports*” (EIAR), May 2022 and EPA Draft document “*Advice notes for Preparing Environmental Impact Statements*” (EIS), September 2015.

#### 6.1.3.1 Information Sources used for the identification of Existing Utilities and Site Conditions

The following sources have been used, by the author of this chapter, to gather information on existing built services within the vicinity of the site and its surrounding areas:

- Eir Telecommunications Network Plans
- ESB Network Plans
- Gas Networks Ireland (GNI) Gas Network Plans and Information
- Virgin Media Network Plans
- Vodafone Network Plans
- Aurora Telecom Network Plans
- Irish Water Foul Sewerage Network Plan
- Irish Water Watermain Network Plans
- Iarnród Éireann as built information & drawings of Hansfield Train Station & the Clonsilla – M3 Parkway Railway Line
- Strategic Flood Risk Assessments carried out for the subject site

The existing built services information has been checked for accuracy during numerous visits to the site and observations made from topographical surveys carried out in the area. On-site meetings with utility providers such as ESB and Eir have further enhanced the understanding of the existing material assets at the proposed development site.

#### 6.1.4 Significance Criteria

Significance criteria for impacts from the construction of the Barnhill SHD on material assets - Utilities are set out in Table 6.1, shown below, in accordance with the requirements of the following guidelines:

- “Guidelines to Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment” document published by the Department of Housing, Planning and Local Government, August 2018.
- Environmental Protection Agency (EPA) document “Guidelines on the Information to be contained in Environmental Impact Assessment Reports” (EIAR), May 2022.

**Table 6.1 Significance criteria for impacts on Material Assets – Utilities**

<b>Significance Level</b>	<b>Criteria</b>
Profound	Profound Impact occurs where there is permanent disruption to a utility service or where there is significant surcharging of an existing system.
Significant	Significant impact occurs where there is long term disruption to a utility service or where there is minor surcharging of an existing system.
Moderate	Moderate impact occurs where there is medium term disruption to a utility service or significant increase of flow within an existing system.
Slight	Slight impact occurs where there is short term disruption to a utility service or minor increase in flow within an existing system.
Imperceptible	Imperceptible impact occurs where there is temporary disruption to a utility service or no quantifiable increase in flow within an existing system.

### 6.1.5 Difficulties Encountered in Compiling Information

No difficulties were encountered in compiling the information for this chapter of the EIAR.

## 6.2 Description of the Existing Environment

The application site is located at Barberstown, Barnhill and Passifyoucan, Clonsilla, Dublin 15 and is situated approximately 3 km west of Blanchardstown and approximately 18 km, by road, from O’Connell Street, Dublin.

A more detailed description of the existing site is provided in Chapter 2 “Project Description”.

### 6.2.1 Existing Surface Water Drainage

There are currently no public surface water drainage networks located within, or immediately adjacent to, the site area designated for the Barnhill SHD. The existing lands are currently used for agricultural purposes and are drained by a series of existing ditches. These existing ditches discharge to the existing Barnhill Stream watercourse that traverses through the southern part of the site.

The existing Barberstown Lane North and Barberstown Lane South Roads are drained by means of ditch channels located at either side of the roads which also discharge to the Barnhill Stream. The existing section of the R149 Regional Road between the Barberstown Lane North and Barberstown Lane South junctions are also drained by ditches which also discharge to the Barnhill Stream.

The Barnhill SHD lands were assessed for risk of flooding in accordance with the Planning System and Flood Risk management Guidelines for Planning Authorities 2009 issued by the Department of the Environment, Heritage, and Local Government (DoEHLG) and as updated by the Department Circular PL 02/2014.

A Strategic Flood Risk Assessment (SFRA) was carried out for the Barnhill SHD by Garland Consultancy on behalf of Fingal County Council. Flooding within the area is associated with both Pluvial and Fluvial occurrences. To assess the Fluvial flooding within the area, the existing stream that passes through the lands was surveyed as part of the Liffey River catchment and for the Local Area Plan and a flood risk map for this stream was prepared for the 1% (1 in 100 year) and 0.1% (1 in 1000 year) probabilities of flooding including an allowance for climate change. This flood analysis also took into consideration the future Ongar to Barnhill Distributor Road (which will be part of the future receiving environment prior to the commencement of construction of the Barnhill SHD) to determine its effect on the flood plain. The flood modelling carried out for the subject site indicates that there are large areas of low-lying lands located to the north and south of the existing stream that are susceptible to flooding. At the time when the SFRA was carried out, it was found that this flooding was largely caused by the capacity of the stone arch culvert that conveys the stream under the Royal Canal and the Dublin – Maynooth Railway line, located to the south of the site. It was discovered that the stone arch culvert was extended by means of a 1m Ø pipe. This caused the stream to back up during both the 1% and 0.1% rainfall events and this in turn inundated the low-lying areas on both banks of the stream with

flood waters. Since the completion of the SFRA, this restrictive section of 1m Ø pipe has been removed and the existing stone arch culvert has been extended by means of a larger precast concrete box culvert. The removal of the culvert restriction has undoubtedly increased the flow capacity of this culvert.

An additional Flood Risk Assessment was carried out for the Barnhill SHD site by McCloys Consulting on behalf of the Clients, Alanna Homes and Alcove Ireland Four Limited.

*“Flood Risk Assessment – Barnhill, Dublin 15” report (June 2022), prepared by McCloys Consulting, accompanies the Barnhill SHD Planning Application.*

A site investigation carried out on the site determined that the soakage capacity of the soil and existing drainage infrastructure of the area has been exceeded during periods of intense rainfall. Therefore, it is generally assumed that the percolation and infiltration characteristics of the site are very poor. This increases the amount of SuDS storage capacity required in the surface water network proposed for the site as very little surface water run-off will dissipate as a result of soil infiltration / percolation.

### 6.2.2 Existing Foul / Wastewater Sewer Drainage

There are currently no public foul / wastewater sewer drainage networks located within, or immediately adjacent to, the site area designated for the Barnhill SHD. The existing residential and farm properties situated within the centre of the development site have independent foul sewerage tanks and treatment systems.

### 6.2.3 Existing Water Supply and Distribution

At present, there is a 4” Ø uPVC watermain, installed in 1965, that travels through the site along the Barberstown Lane North Road. This watermain continues across the Royal Canal, via Pakenham Bridge, and traverses the existing Dublin to Maynooth Railway Line at the existing Barberstown Lane Level Crossing. This watermain services the existing dwellings and farm buildings located along the Barberstown Lane North Road. There are 2 no. hydrants and 2 no. air valves located on this section of watermain. The site is also serviced by a 4” Ø uPVC watermain, installed in 1965, and a 200mm Ø uPVC watermain, installed in 2004. Also, there is a 4” Ø uPVC watermain, installed in 1965, and a 200mm Ø uPVC watermain, installed in 2004, located within the existing R149 regional road that runs adjacent to the western boundary of the site.

### 6.2.4 Existing ESB Power Supply Network

At present, there is no existing underground ESB duct infrastructure located within, or immediately adjacent to, the site area designated for the Barnhill SHD. An existing 110kV High Voltage (HV) overhead power line passes over the northwest corner of the site with 2 no. associated pylons located within this area of the site. A pylon was required to be relocated in order to facilitate the future construction of the Ongar to Barnhill Distributor Road Scheme. This pylon and its associated HV overhead power lines were relocated by ESB Networks in 2007.

Also, an existing 10-20 kV overhead power line traverses the northern part of the site. This power line spits in two near the centre of the site, with one overhead line terminating immediately south of the existing Clonsilla – M3 Parkway Railway Line and passing beneath it via an existing duct arrangement. The other overhead power line runs towards Pakenham Bridge over the Royal Canal and the Barberstown Lane Level Crossing. The existing residential and farm properties situated within the centre of the development site are powered by means of existing Low Voltage (LV) overhead power lines that are fed from the HV overhead power line crossing the northern part of the site.

### 6.2.5 Existing Gas Supply Network

There are no existing gas mains located within, or immediately adjacent to, the site area designated for the Barnhill SHD.

### 6.2.6 Existing Eir Network

There are overhead Eir telecoms lines located along the northern side of the existing Barberstown Lane North Road. There is no existing underground Eir duct infrastructure located within the site area designated for the Barnhill SHD. Adjacent to the development site, Eir ducts are present within the T50 fibre infrastructure network. The T50 ducts run along the existing R149 Clonee – Leixlip Road to the West of the development site and along the existing R121 Barberstown Lane South Road to the south of the development site.

### 6.2.7 Other Existing Telecommunications

There are some other fibre broadband / telecommunications service providers with ducts within the T50 fibre infrastructure network. The T50 ducts run along the existing R149 Clonee to Leixlip Road to the West of the Barnhill SHD site and along the existing R121 Barberstown Lane South Road to the south of the development site. Virgin Media, Vodafone and Aurora Fibre Telecoms ducting are among those who have fibre telecoms infrastructure within the existing T50 network.

### 6.2.8 Existing Public Lighting

There is no existing public lighting infrastructure located within, or immediately adjacent to, the site area designated for the Barnhill SHD.

## 6.3 Description of the Future Receiving Environment

The future Ongar-Barnhill Distributor Road (to be delivered by Fingal County Council) is to be constructed to provide access to the Barnhill SHD. The main section of this future road shall connect to the existing Ongar Distributor Road roundabout located to the north of the Barnhill SHD site. From here, the proposed road shall run in a southerly direction across the existing Clonsilla – M3 Parkway Railway Line by means of a new railway overbridge and connect to Barberstown Lane South and the existing R149 regional road by means of a new signalised junction. This scheme will also include the realigned upgrade of the Barberstown Lane South Road, complete with the 2 no. roundabouts which will provide access to the Barnhill SHD lands. The Barberstown Lane South Road will be upgraded to just after the 2<sup>nd</sup> roundabout access to the site where it shall tie back with the existing Barberstown Lane South Road. The Ongar to Barnhill Distributor Road Scheme is expected to commence construction in early 2023. It will also facilitate the Dart+ West Scheme which includes a new bridge from the end of the Barberstown Lane South realignment over the Dublin to Maynooth Railway Line and the Royal Canal which will allow for the future closure of the existing Barberstown Level Crossing.

The main road of the proposed Ongar to Barnhill Distributor Road shall run in a north-south direction through the western side of the Barnhill development lands. The Barnhill SHD lands located to the west of the Ongar to Barnhill Distributor Road shall have an area of approximately 4.3 hectares. The Barnhill SHD lands located to the east of the Ongar to Barnhill Distributor Road shall have an area of approximately 26 hectares. The Ongar to Barnhill Distributor Road Scheme shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.1 Future Receiving Environment Surface Water Drainage

A storm water drainage network shall be constructed as part of the future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council. This drainage network will be constructed to cater for the surface water runoff generated by the Distributor Road. The surface water network for the future road shall have 3 no. detention basins that have been designed to provide adequate attenuation storage for the predicted runoff from the Ongar to Barnhill Distributor Road for the 1% rainfall event. Additional capacity has been given within these detention basins so that they can accommodate some of the surface water runoff generated by the Barnhill SHD.

The Ongar to Barnhill Distributor Road Scheme surface water network and associated detention basins shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.2 Future Receiving Environment Foul / Wastewater Sewer Drainage

As part of their feasibility study for the proposed Barnhill SHD wastewater connection to their existing sewer in Ongar Road, Irish water have determined that an upgrade of a section of the existing Ongar Road sewer network upgrade is required to be constructed in order to cater for the wastewater generated by the Barnhill SHD. This will entail the upgrade of approximately 900m of an existing section of 375mm Ø foul sewer to be increased to 700mm Ø foul sewer.

The upgrade of this section of existing foul sewer on the Ongar Road is required to be completed prior to the commencement of the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD. The size of the upgrade is to be agreed, in future, upon Irish Water's completion of their modelling assessment of the existing network.



### 6.3.3 Future Receiving Environment Water Supply and Distribution

A 300mm Ø MoPVC watermain is proposed to be installed along the length of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, that shall be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council. This proposed watermain is required to service the future Barnhill SHD and will have spurs to which the development watermain are to be connected to, when required.

The Ongar to Barnhill Distributor Road Scheme watermain shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.4 Future Receiving Environment ESB Power Supply Network

4x160mm Ø ESB ducting infrastructure is proposed to be installed along the length of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council. This ESB ducting has the potential to service the future Barnhill SHD and will have a number of spurs to allow ESB connections to the internal ESB network within the proposed development.

The Ongar to Barnhill Distributor Road Scheme ESB ducting shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.5 Future Receiving Environment Gas Supply Network

It is proposed to install a 180mm Ø PE 4 bar gas main along the length of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council.

The Ongar to Barnhill Distributor Road Scheme gas main shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.6 Future Receiving Environment Virgin Media Network

It is proposed to install 2x110mm Ø Virgin Media ducts along the length of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council. These proposed Virgin Media ducts have to potential to service the future Barnhill SHD and will have spurs to allow Virgin Media connections to the internal telecoms duct infrastructure within the proposed development.

The Ongar to Barnhill Distributor Road Scheme Virgin Media ducting shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.7 Future Receiving Environment Eir Network

It is proposed to install 2x110mm Ø Eir ducts along the length of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council. These proposed Eir ducts have the potential to service the future Barnhill SHD and will have spurs to allow Eir connections to the internal telecoms duct infrastructure within the proposed development.

The Ongar to Barnhill Distributor Road Scheme Eir ducting shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.8 Future Receiving Environment Other Ducting

It is proposed to install 4x110mm Ø ducts Fingal County Council spare ducts along the length of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council. These proposed Fingal County Council spare ducts have the potential to service the future Barnhill SHD and will have spurs to allow connections to internal duct infrastructure to allow potential future utility providers, such as additional broadband service providers, within the proposed development.

The Ongar to Barnhill Distributor Road Scheme Fingal County Council spare ducting shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.9 Future Receiving Environment Public Lighting

It is proposed to install Public Lighting and its associated ducting and power supplies as part of the proposed future Ongar – Barnhill Distributor Road and realigned Barberstown Lane South Road, to be constructed as part of the Ongar to Barnhill Distributor Road Scheme by Fingal County Council.

The Ongar to Barnhill Distributor Road Scheme public lighting infrastructure shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the future receiving environment of the Barnhill SHD.

### 6.3.10 Proposed Development

The Proposed Development is described, in detail, in chapter 2, “Project Description” of the EIAR.

### 6.3.11 Proposed Surface Water Drainage Network and SuDS Strategy

It is proposed to design and construct a surface water drainage system for the Barnhill SHD in compliance with the requirements of the following guidelines:

- The SuDS manual (CIRIA, 2015)
- Greater Dublin Strategic Drainage Study (GDSDS)

An internal surface water pipe network shall be constructed as part of the proposed development to convey surface water runoff generated by the development to the Barnhill Stream that runs through the south of the site. Typical pipe sizes of the surface water network shall be 225 – 900mm in diameter. This surface water network will be constructed so that surface water runoff is collected from the Sustainable Urban Drainage Strategy (SuDS) source control features of the development and carried to the main SuDS features of the development, from where it will be discharged, at a controlled flow rate, to the existing stream. The retention of existing hedgerows, trees and ditches allows the site to naturally drain and will assist in conveying stormwater to the newly constructed surface water network elements.

SuDS source controls such as rainwater butts, rain gardens, green / sedum roofs, tree pits, permeable paving blocks / asphalt, underground stormwater arched chamber systems and infiltration trenches are proposed to collect and store surface water runoff at its source before discharging to the sealed main surface water pipe networks across the site.

The main overall SuDS site feature for the development is a proposed infiltration area situated under the proposed football pitch. This infiltration area has been designed to cater for the attenuation of the vast majority of surface water runoff generated by the proposed development during the more extreme storm events. The design of the infiltration area beneath the proposed football pitch will allow for the surface of the pitch to drain quickly once a storm event has passed and will allow treated water to be discharged to the existing stream at a controlled rate.

The provision of a pond / wetland in the floodplain area of the parkland will create an aesthetic and year-round amenity for the residents of the development to avail of.

The proposed surface water and its ancillary source and main SuDS features will be designed so that the surface water runoff generated by the construction of the proposed development will be adequately attenuated without exacerbating any flooding within the site, its surrounding areas or within areas downstream of the site.

As part of the internal surface water network, it is also proposed to install petrol interceptors and silt trap manholes at all of the discharge points to the detention basins and the infiltration area, beneath the proposed football pitch, to filter out any remaining hydrocarbon pollutants & silt deposits from the development site runoff.

*Drawing 16\_053\_046 - Proposed Surface Water Network Layout and Main SuDS Storage Systems, accompanies the Barnhill SHD Planning Application.*

*Drawing 16\_053\_047 - Section A-A - SuDS Infiltration Basin and Outfall Details to Wetland Pond, accompanies the Barnhill SHD Planning Application. The location of Section A-A is indicated on Drawing 19\_053\_046 which accompanies the Barnhill SHD Planning Application.*

*Barnhill SHD SuDS Strategy Report, (July 2022), by Clifton Scannell Emerson Associates on behalf of Alanna Homes and Alcove Ireland Four Limited, accompanies the Barnhill SHD planning application.*

### 6.3.12 Proposed Foul Sewer Network

Foul / wastewater discharge requirements have also been designed with respect to the following guidelines and processes:

- Irish Water document IW-CDS-5030-01 (Revision 4), “Wastewater Infrastructure Standard Details: Connections and Developer Services”, July 2020
- Irish Water document IW-CDS-5030-03 (Revision 2), “Code of Practice for Wastewater Infrastructure: Connections and Developer Services”, July 2020
- Completion of Irish Water’s Pre-Connection Enquiry Application Process (with associated Water Demand and Wastewater Loading estimated calculations attributed to the future proposed development)

The calculated post development average discharge is approximately 585m<sup>3</sup>/day for the Barnhill SHD, with a post development peak discharge of approximately 1790m<sup>3</sup>/day. Foul sewerage / wastewater will be collected by means of manholes and underground pipework networks which are to be laid primarily along the internal road networks traversing the development site. Typical pipe sizes of the foul sewer network shall be 225–450mm Ø. The wastewater will discharge via gravity to a proposed pumping station located within the south-east of the site. The proposed pumping station is to be a wet well type arrangement with 6 hours storage capacity at three times the dry weather flow to allow for breakdown of pumps or maintenance works to be carried out. The proposed pumping station is located a minimum of 35m from the nearest residential units within the development in compliance with Fingal County Council Guidelines.

The foul sewerage / wastewater will then be pumped, via a 200mm Ø SDR 17 PE rising main, from the proposed pumping station to the existing services culvert that passes beneath the existing Clonsilla – M3 Parkway Railway line immediately east of Hansfield Train Station. The maximum pumped flow from the site is to be approximately 20 l/s. From here, the foul rising main will connect to a foul rising main discharge manhole constructed within the Hansfield development. This foul effluent will then flow, via gravity, by means of the as constructed internal 375mm ø Hansfield foul sewer to the existing foul sewer infrastructure located along the existing Ongar Distributor Road, from where it will ultimately discharge to the Ringsend Wastewater Treatment Plant (WWTP). The Ringsend WWTP is currently undergoing upgrade works to increase its capacity and will therefore have sufficient capacity to cater for the foul sewer effluent created by the development.

*Drawing 16\_053\_036 - Proposed Foul Sewer Layout, Foul Pumping Station Location and Indicative Rising Main accompanies the Barnhill SHD Planning Application.*

*Drawing 16\_053\_037 - Proposed Foul Pumping Station Layout, accompanies the Barnhill SHD Planning Application.*

*The Barnhill SHD Pumping Station – Sizing and Design Methodology Report, (July 2022) prepared by Clifton Scannell Emerson Associates, accompanies the Barnhill SHD Planning Application.*

### 6.3.13 Proposed Water Supply and Distribution Network

The proposed Water supply and distribution networks for the proposed development have been designed with respect to the following guidelines and processes:

- Irish Water document IW-CDS-5020-01 (Revision 4), “Water Infrastructure Standard Details: Connections and Developer Services”, July 2020
- Irish Water document IW-CDS-5020-03 (Revision 2), “Code of Practice for Water Infrastructure: Connections and Developer Services”, July 2020
- Completion of Irish Water’s Pre-Connection Enquiry Application Process (with associated Water Demand and Wastewater Loading estimated calculations attributed to the future proposed development)

The calculated post development average water demand for the Barnhill SHD is approximately 530m<sup>3</sup>/day, with a post development peak water demand of approximately 3310m<sup>3</sup>/day. A proposed internal watermain network is to be constructed to supply the units within the development. This will be connected from the watermain infrastructure installed during the construction of the future Ongar to Barnhill Distributor Road that is to be in place prior to the construction of the Barnhill SHD. Watermain pipes are proposed to range in size from 110 - 225mm ø.

The watermain network for the proposed development will include fire hydrants located at no more than 46m from any unit as per Irish Water Requirements and subject to agreement with the relevant Fire Authority. The relevant Fire Authority shall be notified in relation to the proposed development during detailed design stage and their fire flow requirements satisfied. All sluice valves, scour valves and air valves shall be designed, sited, and constructed in accordance with Irish Water requirements.

*Drawing 16\_053\_035 - Proposed Watermain Network Layout, accompanies the Barnhill SHD Planning Application.*

### 6.3.14 Proposed Gas Supply Network

No gas network is proposed to be constructed for the future Barnhill SHD.

### 6.3.15 Proposed ESB Power Supply Network

The proposed ESB distribution system of the Barnhill SHD site consists of double substations and unit substations to distribute the LV network throughout the site. The local area HV network adjacent to the site provides ready-made access to the ESB network and will integrate into the Barnhill distribution network seamlessly, without the requirement for large scale excavation or enhancements outside the site boundary.

An existing overhead 10-20kV ESB power line within the northern part of development site is required to be diverted underground as part of the proposed ESB power supply network for the development. The poles associated with this section of existing ESB overhead power line, to be undergrounded, shall be retired as part of the ESB construction works. Further liaison with ESB Networks shall be made to fully ascertain the extent of the overhead ESB infrastructure that will require to be undergrounded. Implementation of the undergrounding works will be adequately planned so as to reduce impacts to power supply to the existing dwellings in the development area.

*Drawing 20034-MCE-ZZ-XX-DR-E-001 – ESB Site Services, accompanies the Barnhill SHD Planning Application.*

### 6.3.16 Proposed Eir Network

The proposed EIR distribution system for the Barnhill SHD site consists of several distribution cabinets throughout the site linking the entire ducted network together. The local EIR network is situated adjacent to the site and can be accessed easily and will give full high-speed fibre services across the site. The local area EIR network adjacent to the site provides readymade access to the EIR network and will integrate into the Barnhill distribution network seamlessly without the need for large scale excavation or enhancements outside the site boundary.

*Drawing 20034-MCE-ZZ-XX-DR-E-003 – Eir Site Services, accompanies the Barnhill SHD Planning Application.*

### 6.3.17 Proposed Virgin Media Network

The proposed Virgin Media distribution system for the Barnhill SHD site consists of several distribution cabinets & nodes throughout the site linking the entire ducted network together. The local Virgin Media network is situated adjacent to the site and can be accessed easily and will give full high-speed services across the site. The local area Virgin Media network adjacent to the site provides readymade access to the Virgin Media network and will integrate into the Barnhill distribution network seamlessly without the need for large scale excavation or enhancements outside the site boundary.

*Drawing 20034-MCE-ZZ-XX-DR-E-005 – Virgin Media Site Services, accompanies the Barnhill SHD Planning Application.*

### 6.3.18 Proposed Public Lighting Network

Public Lighting is to be installed as part of the development along the internal roads network and within the public realm and parkland areas of the development. The public lighting for the development will be designed, and constructed, in accordance with the public lighting requirements of Fingal County Council. The public lighting for the development shall be powered from the internal site ESB network infrastructure.

*Drawings SES 09121 Sheet 1 – Public Lighting Layout and SES 09121 Sheet 2 – Public Lighting Layout, accompany the Barnhill SHD Planning Application.*

## 6.4 Predicted Impacts

The predicted impact, the mitigation measures required, and the residual impacts of the proposed development are considered under four separate headings:

- Do Nothing Scenario
- Construction Stage
- Operational Stage
- Cumulative Impact

### 6.4.1 Do Nothing Scenario

In order to provide a qualitative and equitable assessment of the proposed development, the “Do Nothing” Impact considers the proposed development in the context of likely impacts upon the existing and future receiving environment should the delivery of the proposed development not take place. In this scenario, the effects described within this chapter would not arise and for this reason the “Do Nothing” scenario is considered to have a neutral effect with regards to utilities.

As with the above, all utility companies have indicated that there is no intention to undertake improvements in the vicinity other than standard maintenance or repairs, if required, to their infrastructure should the development not be pursued.

### 6.4.2 Construction Stage

Surface water run-off from construction activities has the potential to be contaminated. There is also potential for unrestricted surface water runoff from the site, ingress of groundwater and overland flows into excavations during construction. Contaminated, or excessive, surface water runoff generated during the Construction Stage has the potential to have a direct negative impact on the existing surface water ditches traversing the site, and the existing Barnhill Stream to the south of the site into which they discharge. This may result in a moderate short term negative impact on the water quality within the aforementioned ditches and stream. Uncontrolled discharge of surface water runoff during the construction stage also has the potential to lead to increased flood risk within the development site and the surrounding areas.

Construction of the development will generate wastewater effluent and sanitary waste from the convenience facilities provided for the on-site construction stage personnel. There is currently no foul sewer network within, or adjacent to the site area. This may have the potential to result in a slight, short term negative impact on the site area and its surrounds. The construction of the foul sewer network for the development will, however, have an imperceptible impact on the foul arrangements of the existing properties within the site area given by the fact that they each have independent foul sewerage tanks and treatment systems.

The development construction will necessitate provision of a water supply for construction stage personnel, for sanitary and potable use. An adequate water supply will also be required for use in construction activities and processes. This will result in an increase in water demand. This has potential to directly negatively impact the existing water supply infrastructure in the vicinity of the site. Construction activity may also result in existing water infrastructure being damaged, therefore increasing the possibility of the disruption of water supply to the existing properties within, and adjacent to, the development site. The provision of spurs connecting into the site from the future receiving environment watermain network infrastructure, constructed as part of the Ongar to Barnhill Distributor Road, will allow for simple connections to be made to the internal development watermain network infrastructure during the construction of the development. The Ongar to Barnhill Distributor Road shall



be constructed prior to the commencement of construction of the Barnhill SHD. This eliminates the need for any temporary traffic and pedestrian management measures on the Ongar to Barnhill Distributor Road whilst the internal development watermain network connections are being made to the Ongar to Barnhill Distributor Road watermain network infrastructure. The construction of the development has the potential to result in slight, short term negative impacts on the existing watermains within the confines of the site, and its surrounds.

Construction related activities will require temporary connections to be made to the local ESB power supply network. Additionally, the construction of the development will require the diversion of a section of existing ESB overhead power supply line that passes through the northern part of the site. The poles associated with this section of existing ESB overhead power line, to be undergrounded, shall be retired as part of the ESB construction works. If diversion of the overhead power supply line is not suitably planned, and carried out, there is the potential to lead to the temporary disruption of electrical supply to the existing properties within, and adjacent to, the development site. The provision of spurs connecting into the site from the future receiving environment ESB network infrastructure, constructed as part of the Ongar to Barnhill Distributor Road, will allow for simple connections to be made to the internal development ESB network infrastructure during the construction of the Barnhill SHD development. The Ongar to Barnhill Distributor Road shall be constructed prior to the commencement of construction of the Barnhill SHD. This eliminates the need for any temporary traffic and pedestrian management measures on the Ongar to Barnhill Distributor Road whilst the internal development ESB network connections are being made to the Ongar to Barnhill Distributor Road ESB network infrastructure. This may possibly result in a slight, short term negative impact on the properties within the site area, and its surroundings.

The construction stage will also require the diversion of an existing Eir telecommunications overhead line which is located along the northern side of the existing Barberstown Lane North Road. Should the diversion of this Eir telecommunications overhead line not suitably planned and carried out, there is the potential to lead to the temporary disruption of local telecoms supply to the existing properties within, and adjacent to, the development site. This could potentially result in a slight, short term negative impact on the properties within the site area, and its surroundings.

The construction of the internal Barnhill SHD Virgin Media and Eir telecoms networks will require connections to be made to the Virgin Media and Eir infrastructure that is to be installed as part of the Ongar to Barnhill Distributor Road Scheme. Connection to the existing infrastructure may result in disruption of Eir, and Virgin Media telecoms supply to the existing properties in the vicinity of the development site. The provision of spurs connecting into the site from the future receiving environment Eir and Virgin Media network infrastructure, constructed as part of the Ongar to Barnhill Distributor Road, will allow for simple connections to be made to the internal development Eir and Virgin Media network infrastructure during the construction of the Barnhill SHD development. The Ongar to Barnhill Distributor Road shall be constructed prior to the commencement of construction of the Barnhill SHD. This eliminates the need for any temporary traffic and pedestrian management measures on the Ongar to Barnhill Distributor Road whilst the internal development Eir and Virgin Media network connections are being made to the Ongar to Barnhill Distributor Road Eir and Virgin Media network infrastructure. This may result in slight, short term negative impacts.

The installation of the internal public lighting network for the scheme will be planned appropriately so that there will be an imperceptible impact on the properties within the localised area.

### 6.4.3 Operational Stage

The operational stage of the development has the potential to generate an increased volume of surface water runoff in the absence of the provision of appropriate on-site storage SuDS controls and measures. The proposed Barnhill SHD will include an overall SuDS strategy that will cater for the proposed site surface water runoff to the stored-on site during periods of heavy rainfall in accordance with Greater Dublin Strategic Drainage Study (GSDSDS) guidelines. The surface water runoff will be discharged at a controlled rate to the existing Barnhill Stream, traversing through the south of the site, to mitigate against any potential increased flood risk within the development site and the surrounding areas. The SuDS measures proposed will also allow for the treatment of the surface water runoff generated by the development, prior to it being discharged to the stream, removing any potential contamination of the stream. The design of the proposed surface water network and its associated SuDS measures have been informed by the recommendations set out in the Flood Risk assessments carried out for the site. Should provision of adequate SuDS storage and discharge measures be implemented as part of the

proposed development it is envisaged that the operational stage of the Barnhill SHD will have a slight to moderate, long-term impact on the local area.

The development, once operational, will give rise to an increase in the flow of the foul sewer network to which it will discharge. As part of their feasibility study for the proposed Barnhill SHD wastewater connection to their existing sewer in Ongar Road, Irish Water have determined that an upgrade of a section of the existing Ongar Road sewer network upgrade is required to be constructed in order to cater for the wastewater generated by the Barnhill SHD. This will entail the upgrade of approximately 900m of an existing section of 375mm Ø foul sewer to be increased to a 700mm Ø foul sewer. The upgrade of this section of existing foul sewer on Ongar Road is required to be completed prior to the commencement of the Barnhill residential development. The size of the upgrade is to be agreed, in future, upon Irish Water's completion of their modelling assessment of the existing network. The proposed development internal foul sewer network and its associated foul pumping station and rising main shall be constructed in line with Irish Water's Code of Practice and Standard Details for Wastewater Infrastructure. Adherence to these Irish Water Guidelines will allow for provision of a modern, high quality, foul sewer network that will serve the subject lands. The existing properties within the development site can be potentially connected to the foul sewer network. The foul sewer of the operational Barnhill SHD is anticipated to have a slight to moderate, long-term positive impact.

The operational stage of the proposed development will also result in increased water demand from the watermain to which it is proposed to connect. In their assessment of feasibility for a water connection to their network, Irish Water have stipulated that it is necessary to upgrade approximately 310m of existing 200mm nominal bore watermain, to a new 300mm nominal bore main, along Barnwell Road as well as the provision of a new 300mm nominal bore watermain both of which are to form part of the proposed Ongar to Barnhill Distributor Road Scheme to be constructed in advance of the development. The Ongar to Barnhill Distributor Road watermain, to which the Barnhill SHD watermain network is to connect, has been designed, and appropriately sized, so that it will cater for the water demand of the proposed development. The proposed development internal water infrastructure network shall be constructed in accordance with Irish Water's Code of Practice and Standard Details for Water Infrastructure. This will allow for the provision of a modern, high quality, watermain that will have sufficient capacity to meet the water demand requirements of the development and its existing adjacent properties. The construction of the internal Barnhill SHD watermain will allow for the existing watermain along Barberstown Lane North Road (installed in 1965) to potentially be decommissioned and the existing properties within the development area be supplied with potable water by means of a high standard new watermain. The proposed watermain, during the operational stage of the Barnhill SHD is anticipated to have a slight to moderate, long-term positive impact.

The internal, operational, Barnhill development Eir and Virgin Media telecoms infrastructure will allow for connection to high-speed fibre broadband for the proposed and existing properties within the development area. Strengthening the telecoms infrastructure within the confines of the site, and its surrounds, will result in a moderate, long term positive impact and is in keeping with national objectives to provide enhanced broadband connection.

The proposed development will also facilitate the strengthening of the ESB networks within the development site and its neighbouring areas. The strengthening of the ESB network, including the future planning of an ESB smart Grid allows for the future development and integration of renewables through the ESB's smart grid program. The strengthening of the existing ESB network will result in a slight to moderate, long term positive impact on the local community.

The provision of a new PL network as part of the development will allow for safe pedestrian and cyclist travel throughout the site.

#### 6.4.4 Cumulative Impacts

A review of the development applications within close proximity of the proposed development was undertaken to ascertain if the proposed development would give rise to any potential cumulative impacts on material assets during the operational stage of the Barnhill SHD. The nearby development applications / projects considered are as follows:

- The proposed future Dart+ West Scheme to be delivered by Irish Rail.

The future Dart+ West Scheme is proposed to connect to the eastern side of the second roundabout of the future realigned Barberstown Lane South Road, to be constructed as part of the proposed future Ongar to Barnhill Distributor Road Scheme. As part of the Dart+ West Scheme it is proposed build a

new bridge over the Royal Canal and the Dublin to Maynooth Railway Line which will connect to, by means on a newly constructed roundabout, the future realigned section of the R121 regional road just north of Westmanstown Golf Course. The construction of the Bridge over the Dublin to Maynooth Railway Line and Royal Canal proposed under the Dart+ West Scheme will allow for the future closure of the Barberstown Level Crossing.

As part of the Ongar to Barnhill Distributor Road Scheme, it is proposed to provide a watermain spur and ESB, FCC spare duct, Eir duct and Virgin Media duct spurs which will enable easy connection to the future potential utilities infrastructure to be constructed as part of the future Dart+ West Scheme.

## **6.5 Mitigation Measures**

The following section discusses approaches that will be followed to reduce any negative impacts created by the delivery of the Barnhill Strategic Housing Development (SHD) during its construction and operational stages.

### **6.5.1 Construction Stage**

Appropriate environmental controls will be put in place during construction of the development to ensure that negative impacts on existing watercourses from construction processes are mitigated against. The contractor will be obliged to put temporary measures in place to limit the rate of surface runoff from the site. The contractor will also be obliged to manage the quality of surface water runoff and ensure runoff from the site does not result in excessive siltation of the receiving drainage channels.

The construction compound will include adequate temporary welfare facilities including toilets and cleaning facilities and shall be supplied with a potable water supply. Foul drainage discharge from the compound will be removed, and disposed of, off site to an appropriately licensed facility for disposal until a connection to the public internal development foul sewer network has been established.

The existing 4"  $\varnothing$  uPVC watermain, installed in 1965, that travels through the site along the Barberstown Lane North Road is to be fully protected during construction of the development so that water supply to the existing properties within and surrounding the development is not disturbed as a result of construction activities. Irish Water are to be notified in advance of any construction works on, or adjacent to, any existing watermains within the development area so as to mitigate against the potential disruption of water supply.

Extensive liaison with ESB Networks shall be made to fully ascertain the extent of the overhead ESB infrastructure that will require to be undergrounded. Implementation of the undergrounding works will be adequately planned so as to reduce impacts to power supply to the existing dwellings in the development area.

The aforementioned mitigation measures have been included in the Outline Construction and Environmental Management Plan (CEMP), which accompanies the planning application, and should be included in the final CEMP issued at construction stage.

### **6.5.2 Operational Stage**

A suitable SuDS network system shall be constructed as part of the development to ensure that all surface water runoff generated by the proposed development is appropriately stored, and treated, during heavy rainfall events. Treated runoff shall be subsequently discharged to the existing watercourses at a controlled rate. To ensure that all surface water network and SuDS measures are operating to optimum efficiency during the operational stage of the development, all SuDS features, petrol interceptors and silt trap manholes shall be regularly, maintained, cleaned of litter and debris, and checked that all inlets and outlets where water enters or leaves a SuDS feature are clear of obstructions. Maintenance of planting, such as grass cutting, within and adjacent to the SuDS features is to be undertaken at regular intervals. The proposed SuDS features are to be regularly inspected for damage and remedial works carried out when necessary. Maintenance of the Surface Water Network and SuDS features proposed as part of the scheme will be carried out in accordance with the Taking in Charge strategy for the development.

The proposed development internal foul sewer network and its associated foul pumping station and rising main shall be constructed in line with Irish Water's Code of Practice and Standard Details for Wastewater Infrastructure. Adherence to these Irish Water Guidelines will allow for provision of a modern, high quality, foul sewer network, something which does not currently exist within the site area

and its surrounds. The upgrade of the existing foul sewer on Ongar Road, to be completed prior to the commencement of the Barnhill SHD shall increase the capacity of the existing network. Therefore, the additional wastewater generated by the development shall be fully catered as part of this upgrade. Connection agreements will be made with Irish water regarding wastewater discharge off site.

The proposed development internal water infrastructure network shall be constructed in accordance with Irish Water's Code of Practice and Standard Details for Water Infrastructure. This will allow for the provision of a modern, high quality, watermain that will have sufficient capacity to meet the water demand requirements of the development and its existing adjacent properties.

The provision of enhanced watermains infrastructure as part of the proposed development is anticipated to have slight, long-term positive impacts for the site area and its surrounds as it will allow for increased water supply and has the potential to allow for the removal / upgrade of the older existing watermains passing through the site.

As utility operators predominately upgrade their networks in anticipation of future opportunities, it is anticipated surrounding businesses and residents are likely to benefit from the provision of utilities without any requirement for long-term mitigation measures. As noted previously, this will positively impact the local community with strengthening of the existing utilities in the locality although there may be slight short-term negative impacts such as local outages as the utilities tie into these existing networks.

## **6.6 Monitoring**

### **6.6.1 Construction Stage**

Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development and liaison with the ESB, gas, water, foul and utility providers will be controlled by the main contractor to the construction of the development. All respective utility / service providers shall be notified, in a timely manner, when construction activities are undertaken in close proximity to existing services within the development area.

### **6.6.2 Operational Stage**

All utilities will be monitored and metered in accordance with the service agreements made with each utility provider.

In an effort to monitor the effectiveness of the SuDS measures proposed for the Barnhill SHD Fingal County Council (FCC) have requested that monitoring devices be installed at appropriate locations along the "SuDS train". This will allow for rates of flow to be measured and compared with previous measurements, thus giving an indication as to the overall effectiveness of the SuDS system within the site. The installation of a number of flow monitoring devices at focal locations along the SuDS network would allow for problem areas to be pinpointed with less difficulty and, as such, allow for greater ease of maintenance.

Sampling by an appointed ecologist of the water discharging from the wetland pond to the existing stream will be undertaken and documented in a SuDS maintenance report that will be updated annually as per FCC requirements.

## **6.7 Residual Impacts**

### **6.7.1 Construction Stage**

The site currently discharges freely to the existing Barnhill Stream watercourse to the south of the development site and has limited silt management and maintenance measures in place. The mitigation measures put in place during the construction of the scheme are expected to result in a direct positive impact on the receiving watercourse as it is expected that the contractor's approach to surface water runoff and silt management of this runoff will be an improvement on the current situation. This positive impact is expected to be slight and short-term.

Irish Water, in their letter of feasibility for a watermain connection, have said that there will be sufficient capacity, to serve the finished development, in the upgraded and newly installed watermain to be delivered as part of the Ongar to Barnhill Distributor Road Scheme. This watermain shall be in place prior to the commencement of the construction of the development.

As the water demand during the construction stage of the development is expected to be far less than that required for the finished development, there is no expected construction stage residual impacts on the Irish Water Watermain networks in the vicinity. Irish Water shall be notified, in a timely manner, when construction activities are undertaken in close proximity to existing services within the development area.

Connection spurs into the Barnhill SHD lands for Irish Water watermains and ESB, Eir and Virgin Media infrastructure shall be provided as part of the Ongar to Barnhill Distributor Road Scheme. The provision of these spurs eliminates the need for any temporary traffic and pedestrian management measures on the Ongar to Barnhill Distributor Road whilst connections to existing infrastructure is being carried out. These connections to be made during the construction stage will have an imperceptible impact on the local area.

### 6.7.2 Operational Stage

The site currently discharges freely to the existing Barnhill Stream watercourse to the south of the development site and has limited silt management and maintenance measures in place. A suitable SuDS network system is to be constructed as part of the development to ensure that all surface water runoff generated by the proposed development is appropriately stored, and treated, during heavy rainfall events. Treated runoff shall be subsequently discharged to the existing watercourses at a controlled rate. Provision of these improved controls on surface water runoff is expected to result in an improvement in the quantity and quality of discharge to the existing watercourse. This is expected to give slight to moderate, long-term beneficial effects.

The provision of enhanced watermains infrastructure as part of the proposed development is anticipated to have slight to moderate, long-term positive impacts for the site area and its surrounds as it will allow for increased water supply and has the potential to allow for the removal / upgrade of the older existing watermains passing through the site.

The provision of a modern, high quality, foul sewer network that will serve the subject lands. The existing properties within the development site can be potentially connected to the foul sewer network. The foul sewer of the operational development is anticipated to have a slight to moderate, long-term positive impact.

The strengthening of the existing ESB network will result in a slight to moderate, long term positive impact on the local community.

It shall be ensured that the proposed development will not in any way affect the existing TV infrastructure of the adjacent dwellings. The new development will also generate a more robust Virgin Media, EIR and Sky distribution network in and around the new development, these upgrade works will enhance the capacity of the existing networks within and around the Barnhill development. This is expected to give moderate, long-term beneficial effects.

## 6.8 Waste Management

The following section of this chapter gives an insight into the characteristics of the proposed development specifically in relation to waste management. The proposed Barnhill Strategic Housing Development (SHD) residential development will be planned, designed, constructed and operated to manage generated waste at all times. This section has taken consideration of the guidance document *“Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects”*, (Environmental Protection Agency, 2021).

### 6.8.1 Impact Assessment during Construction Stage

The proposed development will generate a range of hazardous and non-hazardous waste material during the construction stage. Any waste generated during the construction stage will be collected, separated at source and stored in dedicated receptacles within the temporary site compounds.

The following wastes are envisaged to arise during the construction phase of the development:

- Native Non-Contaminated Soils.
- Hardstanding waste arising from demolition of buildings and their associated yards; reinforced concrete, stone, bricks, concrete blocks etc.
- Plasterboard and insulation.



- wood / timber waste; timber off cuts, pallets, timber shuttering, etc.
- metal waste; rebar, sheet metals, lead flashings, copper pipework, etc.
- paper and cardboards.
- plastics and packaging wastes.
- canteen / office wastes and other wastes, i.e., compostable / organic waste, soiled paper, cloth, etc.

Segregated material containers will be made available on site at suitable locations and within the confines of all site compounds for timber, ferrous metals, aluminium, dry mix recyclables and packaging wastes and general / food waste.

Where possible, materials will be re-used on site for other suitable purposes such as:

- Excavated soils not required for back filling or track construction. Acceptable soil material has the potential to be utilised for landscaping purposes elsewhere on site.
- Re-use of timber offcuts and shuttering etc., where it is deemed safe to do so.
- Re-use of acceptable excavated stone / hardstanding material fill, where suitable.
- Re-use of stone of demolished sheds / buildings for use in the construction of walls within the development.

Where waste disposal is unavoidable, the waste collected will be disposed of in a responsible manner so as to minimise any adverse impacts on the surrounding environment. Such wastes materials will be stored in suitable locations and enclosed containers to avoid pollution of the surrounding areas and the generation of wind-blown litter and debris. All waste to be disposed off site will be collected by an appointed, suitable waste collection and disposal service provider.

Burning of waste material generated during the construction of the proposed development will not be allowed under any circumstances.

With the implementation of appropriate mitigation measures, the potential effect of construction waste generated from the proposed development is considered to be slight, and short term.

A more detailed description of the waste management proposals to be employed during the construction stage of the Barnhill SHD is outlined in the Construction Environmental Management Plan (CEMP) that accompanies the application.

## 6.8.2 Impact Assessment during Operational Stage

The following are examples of operational waste which are expected to be generated by the proposed development:

- Mixed general / non-recyclable waste.
- Glass.
- Organic / food waste.
- Dry mixed recyclable waste.
- Textiles.
- Liquid wastes.

The individual housing / duplex units will have waste storage within the confines of their curtilage areas. Waste generated by apartment, commercial units and the proposed crèche will be stored in dedicated waste storage areas to which they shall be assigned.

Municipal waste collections will service the development on a regular basis to remove waste from all areas of the proposed development in compliance with all regional and national waste collection, and disposal, legislation.

A more detailed description of the waste management proposals to be employed during the operational stage of the Barnhill SHD is outlined in the Operational Waste Management Plan (OWMP) that accompanies the application.

# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 7

Land

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 7 Land

### Contents

7	Land .....	7-3
7.1	Introduction .....	7-3
7.1.1	Author Information and Competency .....	7-3
7.1.2	Legislative Context.....	7-3
7.1.3	Methodology.....	7-3
7.1.4	Study Area .....	7-5
7.1.5	Difficulties Encountered in Compiling Information .....	7-5
7.2	Description of Existing Environment .....	7-5
7.2.1	Site Description .....	7-5
7.2.2	Topography .....	7-5
7.2.3	Surrounding Land Use .....	7-5
7.2.4	Quaternary Deposits .....	7-6
7.2.5	Bedrock .....	7-6
7.2.6	Geoheritage .....	7-6
7.2.7	Economic Geology .....	7-6
7.2.8	Hydrogeology .....	7-6
7.2.9	Designated Sites .....	7-7
7.2.10	Regulatory Database Search.....	7-7
7.2.11	Summary of Baseline Conditions.....	7-7
7.3	Predicted Impacts .....	7-7
7.3.1	Do Nothing Scenario .....	7-7
7.3.2	Construction Phase.....	7-7
7.3.3	Operational Phase .....	7-9
7.3.4	Cumulative .....	7-10
7.4	Mitigation Measures .....	7-10
7.4.1	Construction Phase.....	7-10
7.4.2	Operational Phase .....	7-12
7.4.3	Monitoring .....	7-12
7.5	Residual Impacts.....	7-12
7.6	References .....	7-12

### Tables

Table 7.1	Describing the Significance of Effects (Source: 2022 EPA EIAIAR Guidance).....	7-4
Table 7.2	Surrounding Land Use .....	7-5
Table 7.3	Summary of Baseline Conditions.....	7-7
Table 7.4	Cut and Fill Volumes .....	7-8

## Figures

Figure 7.1 Determination of the Significance of the Impact (Source: 2022 EPA EIAIR Guidance).....7-4



## 7 Land

### 7.1 Introduction

This chapter of the EIAR assesses and evaluates the potentially significant impacts on the land, soils, geology and hydrogeology of the site and surrounding area from the Proposed Development. A description of the Proposed Development is provided in Chapter 2 of the EIAR.

In order to assess baseline conditions, a desktop environmental investigation was carried out, including a review of all available environmental reports pertaining to the Proposed Development site. In assessing potential significant impacts associated with construction and operational phases of the Proposed Development on land, soils, geology, and hydrogeology, both the importance of the attributes and the predicted scale and duration of likely impacts have been considered.

#### 7.1.1 Author Information and Competency

David Misstear is a Senior Environmental Scientist within the AECOM Dublin Office. David completed a BA BAI in civil, structural and environmental engineering, and a PhD in environmental engineering. David has 11 years' experience in environmental consultancy, with a particular focus on contaminated land. He has carried out environmental impact assessments for land, soils, geology, and hydrogeology on a variety of proposed development types.

In accordance with Article 5(3)(a) of the EU Directive<sup>1</sup>, by appointing AECOM the Applicant has ensured that this Chapter has been prepared by 'competent experts'.

#### 7.1.2 Legislative Context

This assessment meets the requirements for an EIAR as outlined in the relevant National<sup>2</sup> and EU legislation. This chapter has been prepared in accordance with the Environmental Protection Agency (EPA) guidance document 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports', 2022<sup>3</sup>, and the Institute of Geologists of Ireland (IGI) guidance document 'Guidelines for Preparation of Soils, Geology, Hydrogeology Chapters of Environmental Impact Statements'<sup>4</sup>.

#### 7.1.3 Methodology

##### 7.1.3.1 Appraisals Methodology

The appraisal methodology considered a description of the impact i.e. the "quality" of the effects (i.e. whether it is adverse or beneficial), the "significance" of the effects (i.e. the magnitude of the effect in terms of the environment), the "probability" of the event occurring, and the "duration" of the effects (i.e. whether it is short or long term) and also considers the significance/sensitivity of the existing environment. Terminology for describing the quality, significance, extent, probability and duration of effects is set out in Section 3.7.3 of the 2022 EPA EIAR guidance.

A qualitative approach was used in this evaluation and Figure 7.1 taken from the EPA EIAR guidance shows how comparison of the character of the predicted impact to the sensitivity of the receiving environment can determine the significance of the impact. Table 7.1 provides a description of each significance level.

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<sup>1</sup> Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

<sup>2</sup> European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018)

<sup>3</sup> EPA (2022) EPA Guidelines on the information to be contained in Environmental Assessment Reports, 2022; Environmental Protection Agency, Co. Wexford, Ireland

<sup>4</sup> IGI, (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements

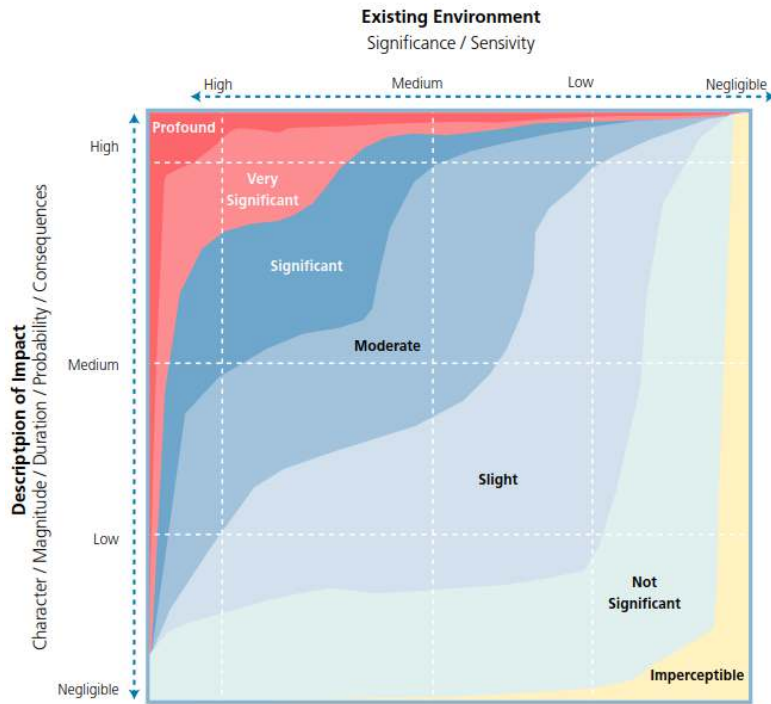


Figure 7.1 Determination of the Significance of the Impact (Source: 2022 EPA EIAR Guidance)

Table 7.1 Describing the Significance of Effects (Source: 2022 EPA EIAR Guidance)

Significance Level	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 Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

### 7.1.3.2 Sources of Information

This assessment has been prepared from a desktop review of existing information and a site walkover survey. The following is a list of publicly available sources of information consulted for use in the preparation of this chapter:

- EPA website Envision for groundwater and surface water information;
- Geological Survey of Ireland (GSI) website Spatial Resources Viewer for geological and hydrogeological information; and
- Ordnance Survey of Ireland (OSI) website for historical maps of 1:2,500 scale and 1:10,560 scale (1837 to 1913) and aerial photographs (1995, 2000, 2005, 2012), and topography data.

The following is a list of relevant reports provided to AECOM for use in the preparation of this chapter:

- Site Investigations Limited (2008) Site Investigation for the Proposed Ongar to Barnhill Distributor Road, County Dublin. Volume 2 – Interpretive Report; and,
- Site Investigations Limited (2018) Barnhill, Westmanstown, Dublin 15: Soakaway Investigation.

A site walkover survey was carried out by an AECOM Senior Environmental Scientist on Friday 10 June 2022 to assess the baseline conditions at the Proposed Development site.

#### 7.1.4 Study Area

The study area comprises of the Proposed Development site and lands within a 2 km radius to allow an assessment of the potential impacts of the Proposed Development on the surrounding environment.

#### 7.1.5 Difficulties Encountered in Compiling Information

No difficulties were encountered in compiling information.

### 7.2 Description of Existing Environment

#### 7.2.1 Site Description

The Proposed Development site is located directly south of the M3 Dunboyne-Clonsilla railway line and Hansfield train station along this line. The R149 – Regional Road forms the western boundary of the application area and a local road the southern/south-eastern boundary. The Royal Canal and Dublin-Maynooth railway line are located to the east.

The Proposed Development site comprises predominantly greenfield agricultural lands. A cluster of residential properties are located in the northern portion of the Proposed Development site, accessed via a local road which dissects the Proposed Development site from east to west. A single residential property is located along the western boundary, with private access to the R149. A series of sheds and outbuildings of various ages and condition are located within a yard area to the south of the local road which runs through the Proposed Development site.

The buildings within the yard area are utilised for a mixture of agricultural uses, metal fabrication and storage. A number of shipping containers are stored on a gravel area to the south of the main yard.

A stream (Barnhill Stream) flows to the southeast through the fields in the southern portion of the Proposed Development site. During the site walkover, a number of open field drains were noted along existing field boundaries throughout the Proposed Development site.

Historical mapping and aerial photography indicate the Proposed Development site was in agricultural use throughout the nineteenth and twentieth century, with evidence of farm buildings and a residential property occupying the existing yard area from the late 1800s. The railway line to the north is also visible on maps from the late 1800s / early 1900s. On aerial photography from 1995 onwards, residential properties are visible in the north of the Proposed Development site, and the buildings within the yard area go through various minor layout changes until the present day. The residential property in the west of the Proposed Development site is visible from the late 1990s and the gravel storage area to the south of the yard is in use after 2005.

#### 7.2.2 Topography

The Proposed Development site is at an elevation of approximately 60m above Ordnance Datum (m AOD). The surrounding topography slopes very gently to the south, with some localised gentle undulating topography in the agricultural fields.

#### 7.2.3 Surrounding Land Use

Land use in the immediate vicinity of the Proposed Development site is predominantly agricultural land with some residential. Land use in the vicinity of the Proposed Development site is summarised in Table 7.2 below.

**Table 7.2 Surrounding Land Use**

Direction	Land Use
North	Beyond the railway line to the north, the urban area of Ongar is located.
East	Land use to the east of the Proposed Development site is predominately agricultural in close proximity to the Proposed Development site, with the urban area of Clonsilla beyond. Several golf courses are also in the vicinity.
South	Land use to the south is dominated by agricultural lands with sparse residential properties.
West	Land use to the west is dominated by agricultural lands with sparse residential properties.

#### 7.2.4 Quaternary Deposits

According to the GSI database, the majority of the Proposed Development site is underlain by till derived from limestones. A bedrock outcrop is located in the northwest portion of the Proposed Development site and a linear band of alluvium deposits is associated with the stream in the southern portion of the Proposed Development site.

According to the GSI Geotechnical data base, immediately north of the Proposed Development site, beyond Hansfield railway station, the stratigraphic sequence is recorded as being topsoil to a depth of 0.4 metres below ground level (m bgl), overlying a layer of brown sandy gravelly clay to a depth of 6.3 m bgl. The investigation did not reach bedrock and was terminated due to the presence of boulders at 6.3 m bgl.

The quaternary stratigraphy encountered during previous site investigations in 2008 and 2018 within the Proposed Development site boundary generally comprised topsoil over soft to stiff brown sandy gravelly clay with some cobbles and boulders, above stiff to very stiff black sandy gravelly clay with some cobbles and occasional boulders.

#### 7.2.5 Bedrock

The GSI Bedrock Geology Map (scale 1:100,000) indicates the Proposed Development site is underlain by dark fine-grained limestone and shale of the Lucan formation. A fault is orientated across the Proposed Development site from northeast to southwest.

Bedrock was encountered during previous site investigations in 2008 and 2018 at depths of between 1.5 m bgl and 5.1 m bgl and comprised an upper layer of closely fractured weathered limestone above strong to very strong dark grey limestone with occasional weak black mudstone bands.

#### 7.2.6 Geoheritage

There are no Geological Heritage Sites within 2 km of the Proposed Development, according to GSI mapping.

#### 7.2.7 Economic Geology

There are no recorded active quarries within 2 km of the Proposed Development, according to GSI mapping.

#### 7.2.8 Hydrogeology

According to the GSI spatial resources viewer, the underlying bedrock is a locally important aquifer which is moderately productive in local zones. There are no gravel aquifers in the vicinity of the Proposed Development site. The inferred groundwater flow direction is to the southeast. Groundwater vulnerability varies across the Proposed Development site in accordance with the variation in thickness of the quaternary sediments. Groundwater vulnerability across the majority of the Proposed Development site is 'moderate' (M); this rises to 'high' (H) in the northwest and eastern corners of the Proposed Development site, with a small portion of the northwestern corner of the Proposed Development site in an area of 'extreme' (E) vulnerability, and rock at or near surface (X). Subsoil permeability is recorded as low beneath the site, apart from the area of mapped bedrock outcrop in the northwest. Groundwater recharge rates are recorded as between 49 mm/yr and 89 mm/yr across the site, with the recharge rate in the northeastern corner indicated to be 200 mm/yr.

According to the GSI website, there are no groundwater wells within the Proposed Development site. However, within a 2 km radius, ten wells are noted, all of which appear to be for domestic or agricultural use. The closest well (a dug well for domestic use) is located 0.9 km to the southwest of the Proposed Development site. The current status (i.e. whether they are in use) of the wells is unknown. It should be noted that there is no requirement to register abstraction wells with the GSI and there may be unregistered wells in the vicinity of the Proposed Development site. The Proposed Development site is not located within a Public Supply or Group Scheme Source Protection Area, according to EPA mapping.

Groundwater was generally encountered in the previous site investigations in 2008 and 2018 as a perched water table at the top of the stiff black clay or a perched water table at the bedrock surface.

### 7.2.9 Designated Sites

The Royal Canal, which lies 50 m east of the Proposed Development site, is a proposed Natural Heritage Area (pNHA). The Liffey Valley pNHA is located 1.6 km southwest of the Proposed Development site at its closest point.

There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within a 2 km radius of the Proposed Development site.

### 7.2.10 Regulatory Database Search

#### 7.2.10.1 EPA Licensing

The EPA database of Industrial Emissions (IE) and Integrated Pollution Control (IPC) and Waste licences was consulted, and no licensed facilities were identified within 2 km of the Proposed Development site.

### 7.2.11 Summary of Baseline Conditions

A summary of baseline conditions at the Proposed Development site is presented in Table 7.3 below.

**Table 7.3 Summary of Baseline Conditions**

<b>Item</b>	<b>Description</b>
Context	<p>The site comprises predominantly greenfield agricultural land, with a number of residential properties and light industrial sheds.</p> <p>The geology generally comprises limestone-derived till over limestone bedrock, the top of which was encountered at between 1.5 m and 5.1 m bgl during previous site investigations.</p>
Character	<p>The underlying bedrock is classified as a locally important aquifer which is moderately productive in local zones. Groundwater vulnerability across the majority of the Proposed Development site is 'moderate' (M); this rises to 'high' (H) in the northwest and eastern corners of the Proposed Development site, with a small portion of the north-western corner of the Proposed Development site in an area of 'extreme' (E) vulnerability, and rock at or near surface (X). The Proposed Development site is not located within a Drinking Water Protection Area, although a number of wells are recorded within 2 km, which are for domestic and agricultural use.</p>
Significance	<p>The majority of the site comprises greenfield agricultural land.</p> <p>The Royal Canal, which lies 50 m east of the Proposed Development site, is a proposed Natural Heritage Area (pNHA). The Liffey Valley pNHA is located 1.6 km southwest of the Proposed Development site at its closest point.</p>
Sensitivity	<p>Ground conditions beneath the Proposed Development site consist of varying thicknesses of limestone-derived till over limestone bedrock. The site overlies a locally important aquifer, with varying groundwater vulnerability.</p> <p>The land, soil and groundwater environment can be considered medium sensitivity.</p>

## 7.3 Predicted Impacts

An analysis of the potential impacts of the Proposed Development on the land, soils, geology and hydrogeological environment during the construction and operational phases is outlined below. Due to the inter-relationship between land, soils and water (hydrology), the following impacts will be considered applicable to Chapter 8: Water.

### 7.3.1 Do Nothing Scenario

The 'Do Nothing' alternative describes the circumstance where no development occurs. Under a 'Do-Nothing' scenario, the land remains in its current use and no likely significant implications arise in respect of soil, geology or hydrogeology.

### 7.3.2 Construction Phase

The Proposed Development is deemed to have a number of potential impacts on the land, soils, geology and hydrogeology of the area during the construction phase. The impacts to be assessed include:

- Accidental spills and leaks;
- Use of concrete and lime;



- Soil excavation and filling;
- Use of natural resources; and,
- Land take.

### 7.3.2.1 Accidental spills and leaks

During construction of the Proposed Development, there is a risk of accidental pollution incidents from the following sources:

- Spillage or leakage of stored oils and fuels;
- Spillage or leakage of oils and fuels from construction machinery or site vehicles; and
- Spillage of oil or fuel from refuelling machinery on site.

Accidental spillage of fuels or chemicals may potentially result in the impact of soils underlying the Project site if inappropriately handled or stored, during construction.

This is considered a potential direct negative impact but unlikely to occur and, if it occurs, would be confined to one-off releases. The impact could alter the character of soil and groundwater at the local site. Therefore, it is considered to be a medium impact on a medium sensitivity environment. The significance of the effect is moderate.

### 7.3.2.2 Use of concrete and lime

Lime and concrete (specifically, the cement component) is highly alkaline and any spillage which migrates through subsoil could impact groundwater quality. The activities most likely to result in contamination include concreting during building construction, pipeline construction and culverting/bridge works.

The impacts are considered a direct negative impact but unlikely to occur and, if they occur, would be confined to one off releases. The impact could alter the character of soil and/or groundwater at the local site but would be temporary in nature. Therefore it is considered to be a medium impact to a medium sensitivity environment and the significance of the impact is moderate.

### 7.3.2.3 Soil excavation and filling

Excavation and infilling of soil and subsoil will be required for levelling of the Proposed Development site to render it suitable for the building platform and for installation of foundations and utilities.

A process of “cut and fill” will be employed in order to level the footprint of the proposed buildings and achieve the desired platform level from which to commence construction works. There will be 12,900m<sup>3</sup> of demolition waste arising from the demolition of existing structures on the site. The majority of this waste will be recycled on and off the site (concrete, timbers and metals). Non-recyclable materials will be disposed off site to a licenced facility. In addition to demolition waste from existing buildings, the anticipated cut and fill figures are shown below in Table 7.4.

**Table 7.4 Cut and Fill Volumes**

Item	Cut (m <sup>3</sup> )	Fill (m <sup>3</sup> )
Topsoil	88,300	88,300
Subsoils from roads and footpaths	24,500	
Subsoils from underground services	45,000	
Subsoils from excavation of foundations and basements	71,000	
Subsoils from SUDS detention areas	7,200	
Subsoils from foul sewer pumping station	3,600	
Imported fill		90,000
<b>TOTAL</b>	<b>239,600</b>	<b>178,300</b>

Where suitable, excavated material (cut) will be reused on-site as fill for construction purposes such as ground raising, berm construction, landscaping and grading. It may also be reused offsite, subject to approval of an Article 27 application by the EPA which would be applied for separately and is not part of this application. Material which cannot be re-used on-site (currently estimated to be 159,400m<sup>3</sup>) will be required to be transported off-site and will require disposal at appropriately licensed/permitted

facilities subject to waste classification in accordance with relevant waste legislation. An outline Construction and Environmental Management Plan (CEMP) accompanies the planning application. A final CEMP will be prepared on appointment of the contractor, and agreed with Fingal County Council prior to the commencement of development.

Excavation and infilling are considered a permanent direct impact which is certain to occur. This is considered to be a low impact on a soil environment of medium sensitivity. The significance of the effect is considered slight.

#### 7.3.2.4 Use of natural resources

It is proposed that topsoil to be excavated will be retained on site for re-use.

It is expected that there will be a requirement for approximately 90,000 m<sup>3</sup> of geotechnically-suitable imported fill material for beneath buildings, roads and hardstanding areas comprising general fill material and structural fill. The source of imported fill material will involve careful selection and vetting in order to ensure that it is of a known origin and that it is 'clean' (i.e. will not cause contamination to the environment).

Aggregates may also be imported for temporary use in the establishment of contractor's compounds, building works and other works. The sourcing of these aggregates from reputable, authorised quarries is mandated by applicant requirements and for ensuring regulatory compliance.

Aggregate components are natural non-renewable resources and their use results in depletion of the national stock of these. While Ireland produces approximately 36 million tonnes of aggregates annually (ICF, 2020), a proportion of this is exported. Therefore, the Project's requirements have been assessed more conservatively against national demand for aggregates to determine the significance of natural resource use.

Based on recent industry figures (ICF, 2019), the Project aggregate requirements have been compared against national demand figures, with the aggregate demand representing 0.27% of the national demand.

Use of natural resources is considered a permanent direct impact which is certain to occur and irreversible. Based on the Project aggregate requirements compared to the national demand (0.27%), the overall significance of effect of the use of natural resources is considered to be not significant.

#### 7.3.2.5 Land take

The existing site is predominantly undeveloped, comprising agricultural land, with some residential properties and light industrial buildings. The loss of agricultural land can be considered to be permanent and the impact is considered negative in terms of natural resources; however, the site is located within an agricultural setting where adjoining land use is predominantly of agricultural nature. This is considered to be a low impact to a medium sensitivity environment. The significance of the effect is slight.

### 7.3.3 Operational Phase

The Proposed Development is deemed to have a number of potential impacts on the land, soils, geology and hydrogeology of the area during the operational phase. The impacts to be assessed include:

- Discharge to ground;
- Accidental spills and leaks; and
- Water balance changes.

#### 7.3.3.1 Discharge to ground

The only direct discharge to the soil environment during the operational phase is likely to be associated with infiltration through landscaped areas. Based on the past uses of the site, it is considered unlikely significant sources of contamination will exist in these areas.

Therefore, direct drainage to soils is considered to be a negligible impact to a medium sensitivity environment. The significance of the effect is imperceptible.

### 7.3.3.2 Accidental spills and leaks

There will be no significant storage or use of hazardous materials during the operational phase of the Project.

Accidental emissions of petrol/diesel from parked vehicles could cause contamination should they enter the soil environment. If they were to occur, in the absence of mitigation, they would be considered to be direct negative impacts of temporary duration given that they will be confined to one-off releases. This is considered to be a low impact to a medium sensitivity environment. The significance of the effect is slight.

### 7.3.3.3 Water balance changes

The construction of impermeable areas such as hard standing and roofed areas will prevent rainfall percolation to ground beneath the site in these areas. However, the existing shallow soils are generally poorly drained, with relatively low groundwater recharge rates. Overall water balance changes are considered to be a negligible impact to a medium significance/sensitivity environment and the significance of the impact is imperceptible.

## 7.3.4 Cumulative

As set out in EIAR Chapter 1 Introduction, there are a number of consented residential developments within the Hansfield Strategic Development Zone (SDZ). It is assumed each of these residential developments will have drainage designs reviewed by the planning authority ahead of development. Therefore, it is considered there will be no significant cumulative impacts to the land and soil environment.

## 7.4 Mitigation Measures

### 7.4.1 Construction Phase

In order to prevent / minimise potential significant impacts, a number of mitigation measures will be adopted as part of the construction works on the Proposed Development site. An outline Construction and Environmental Management Plan (CEMP) accompanies the planning application. A final CEMP will be prepared on appointment of the contractor, and agreed with Fingal County Council prior to the commencement of development.

#### 7.4.1.1 Fuel and Chemical Handling

In order to prevent spillages to ground of fuels, and to prevent any consequent soil or groundwater quality impacts, it will be necessary to adopt mitigation measures during the construction phase of the Proposed Development, which include:

- Secondary containment will be constructed of chemically resistant, impervious material designed to withstand exposure to the elements and hazardous substances contained. These storage areas will be at least 50 m from the Barnhill Stream. A dedicated bunded area will be present onsite for the supply of fuel. The bunded area will be fitted with a locking penstock valve that will be opened only to allow stormwater to discharge to interceptor;
- Tracked machines and static equipment may be refuelled locally by an onsite mobile bowser over secondary containment;
- Drip trays are to be used during refuelling operations if performed outside of a contained area and spill kits will be carried in the fuel bowser vehicle;
- Refuelling of rubber tyre vehicles will only be carried out at designated areas using appropriate funnels or fuel nozzles. All mobile equipment which is either fuelled or uses hydraulic power shall be placed on suitably sized drip trays;
- If spills occur within the drip trays, these will be cleaned up immediately using a spill kit. Drip trays should always be kept free of rainwater;
- No flammable liquids will be stored within the enclosures and all plant operating within the enclosures will be refuelled in designated refuelling areas;
- Spill kit stations will be established at a number of key locations on the site and staging area and will be regularly checked and restocked; and
- An emergency response plan will be developed and implemented throughout the duration of the Proposed Development, which will detail the measures to be taken in the event of spills and leaks

#### 7.4.1.2 Control of Concrete and Lime

Ready-mixed concrete will be brought to the Proposed Development site by a suitable 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 water to the underlying subsoil and groundwater.

The pouring of concrete will take place within a designated area protected to prevent concrete runoff into the soil/groundwater media. Washout of concrete transporting vehicles will take place at an appropriate facility, offsite where possible, alternatively, where wash out takes place on-site, it will be carried out in carefully managed on-site wash out areas.

#### 7.4.1.3 Soil Excavation and Filling

Temporary storage of soil will be carefully managed in such a way as to prevent potential negative impact on the receiving environment. Spoil and temporary stockpiles including stone stockpile areas will be positioned in locations which are distant from drainage systems and the Barnhill Stream and away from areas subject to flooding so as not to cause potential run off to soil and groundwater. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. To help shed rainwater and prevent ponding and infiltration, the sides and top of the stockpiles will be regraded to form a smooth gradient with compacted sides reducing infiltration and silt runoff.

Soil requiring off-site disposal will be managed in accordance with relevant waste legislation.

The imported fill materials will be brought to the site on the public road network, prior to being distributed throughout the Proposed Development Site via the internal site haul routes. Any hard core required along the haul routes during construction stage will be reused where possible and subject to testing for suitability.

Temporary drainage during construction stage will be managed so as to reduce the direct runoff to ground and water. Surface water runoff from the Proposed Development site may impact the surrounding soils and groundwater introducing silts and increased chemical concentrations to the existing environment.

#### 7.4.1.4 Sources of Aggregates and Clean Fill for the Project

It is considered from the site Investigation that topsoil from the Proposed Development site will be suitable for re-use within the Proposed Development. The source of the remaining fill material requirement will be sourced where possible from local quarries. Prior to construction, these shall be reviewed and only those quarries that conform to all necessary statutory consents will be used in the construction phase. Soils/fill material to be brought to the Proposed Development site will be vetted with chemical soil testing if necessary, in order to check that it is of a reputable origin and that it is 'clean' (i.e. will not introduce contamination to the environment; soil and groundwater). All potential suppliers will be vetted for the following criteria:

- Environmental management status; and
- Regulatory and legal compliance status of the company.

'Clean' fill material will be sourced from suppliers which comply with the above requirements. If recycled aggregate is used as imported fill, chemical testing will be undertaken to confirm that it is 'clean' (i.e. will not introduce contamination to the environment).

#### 7.4.1.5 Construction Environmental Management Plan

An outline CEMP (OCEMP) for the Proposed Development accompanies the planning application. The OCEMP incorporates relevant environmental avoidance or mitigation measures to reduce potential environmental impact, to include all mitigation measures set out in this chapter. Prior to construction, the Contractor will further refine and develop the OCEMP into a detailed site-specific CEMP. The CEMP will include a Construction, Erosion and Sediment Control Plan (CESCP) and a Resource and Waste Management Plan (RWMP), to be prepared in accordance with Department of Environment, Community & Local Government guidelines<sup>5</sup> and any construction related requirements imposed as

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<sup>5</sup> Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects. EPA, 2021.

conditions of any planning permission granted. It will also include details of proposed environmental monitoring for the duration of the construction works, be this good practice or as a planning condition requirement.

#### 7.4.2 Operational Phase

The operation of the Proposed Development (i.e. residential development) is unlikely to have any significant adverse impacts on the local geological / hydrogeological environment due to the nature of the Proposed Development and the embedded control measures that have been incorporated into the Proposed Development site.

There will be no direct discharges to groundwater or soil environment during the operational phase.

#### 7.4.3 Monitoring

The proposed CEMP will include requirements for monitoring during the construction phase. It is not anticipated any monitoring will be required during the operational phase with respect to soil, geology or hydrogeology.

### 7.5 Residual Impacts

The implementation of mitigation measures highlighted above will significantly reduce the likelihood and magnitude of the potential impacts on land, soil, geology and hydrogeology occurring during the construction and operational phases.

The magnitude of the potential residual impact is therefore considered to be low on an environment of medium sensitivity, therefore the significance of the potential impact of the Proposed Development is considered to be slight on the surrounding land and soils environment.

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# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 8

### Water

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 8 Water

### Contents

8	Water.....	8-2
8.1	Introduction .....	8-2
8.1.1	Author Information and Competency .....	8-2
8.1.2	Methodology.....	8-2
8.1.3	Study Area .....	8-3
8.2	Description of Existing Environment .....	8-4
8.2.1	Site Description .....	8-4
8.2.2	Topography .....	8-4
8.2.3	Regional Hydrology.....	8-4
8.2.4	Local Hydrology .....	8-4
8.2.5	Water Quality .....	8-5
8.2.6	Flood Risk .....	8-5
8.2.7	Designated Sites .....	8-5
8.2.8	Summary.....	8-5
8.3	Predicted Impacts .....	8-5
8.3.1	Do Nothing Scenario .....	8-5
8.3.2	Construction Phase.....	8-5
8.3.3	Operational Phase .....	8-7
8.3.4	Cumulative Impacts.....	8-8
8.4	Mitigation Measures .....	8-8
8.4.1	Construction Phase.....	8-8
8.4.2	Operational Phase .....	8-9
8.5	Residual Impacts.....	8-10
8.5.1	Construction Phase.....	8-10
8.5.2	Operational Phase .....	8-10
8.6	References.....	8-10

### Tables

Table 8.1	Describing the Significance of Effects (Source: 2022 EPA EIAR Guidance) .....	8-3
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### Figures

Figure 8.1	Determination of the Significance of the Impact (Source: 2022 EPA EIAR Guidance).....	8-3
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## 8 Water

### 8.1 Introduction

Chapter 8 of this EIAR will assess potentially significant effects upon the water environment from the Proposed Development. A description of the Proposed Development is provided in EIAR Chapter 2.

Essentially, the assessment will consider the potential for non-conformance with the EU Water Framework Directive<sup>1</sup> (WFD) objectives including:

- The need for the avoidance and reduction of effects on the water environment to be taken fully into account in the environmental evaluation; and
- The selection of appropriate means of preventing any significant predicted effect is being made through modification of the drainage design, choice of discharge location(s) and/or adoption of runoff treatment methods, with the objective of designing-out potential adverse environmental impacts.

This section of the report describes water, hydrology and flooding issues associated with the Proposed Development and should be read in conjunction with Chapter 7 (Land) and Chapter 9 (Biodiversity), of this EIAR which address the potential for impacts upon the hydrogeological and aquatic/riparian environments respectively.

In order to assess baseline conditions, a desktop environmental investigation was carried out. In assessing potential significant effects associated with construction and operational phases of the Proposed Development on the water environment, both the importance of the attributes and the predicted scale and duration of likely impacts have been considered.

#### 8.1.1 Author Information and Competency

David Misstear is a Senior Environmental Scientist within the AECOM Dublin Office. David completed a BA BAI in civil, structural and environmental engineering, and a PhD in environmental engineering. David has 11 years' experience in environmental consultancy, with a particular focus on contaminated land. He has carried out environmental impact assessments with regards to the water environment for a variety of proposed development types.

In accordance with Article 5(3)(a) of the EU Directive<sup>2</sup>, by appointing AECOM the Applicant has ensured that this Chapter has been prepared by 'competent experts'.

#### 8.1.2 Methodology

##### 8.1.2.1 Appraisals Methodology

The appraisal methodology will consider a description of the impact i.e. the "quality" of the effects (i.e. whether it is adverse or beneficial), the "significance" of the effects (i.e. the magnitude of the effect in terms of the environment), the "probability" of the event occurring, and the "duration" of the effects (i.e. whether it is short or long term) and considers the significance/sensitivity of the existing environment. Terminology for describing the quality, significance, extent, probability and duration of effects is set out in Section 3.7.3 of the EPA EIAR guidance (EPA 2022).

A qualitative approach will be used in this evaluation and Figure 8.1 taken from the EPA EIAR guidance shows how comparison of the character of the predicted impact to the sensitivity of the receiving environment can determine the significance of the impact. Table 8.1 provides a description of each significance level.

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<sup>1</sup> Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for the Community action in the field of water policy

<sup>2</sup> Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment



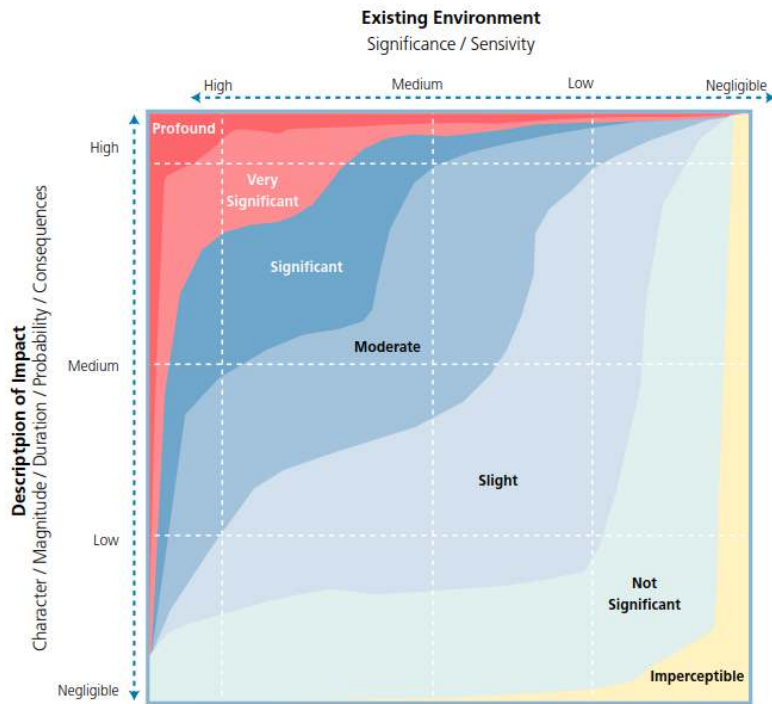


Figure 8.1 Determination of the Significance of the Impact (Source: 2022 EPA EIAR Guidance)

Table 8.1 Describing the Significance of Effects (Source: 2022 EPA EIAR Guidance)

Significance Level	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 Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

### 8.1.2.2 Sources of Information

This assessment has been prepared from a desktop review of existing information and a site walkover survey. The following is a list of publicly available sources of information consulted for use in the preparation of this chapter:

- EPA website for groundwater and surface water information;
- Office of Public Works (OPW) website for flood data (Flood Maps); and,
- Ordnance Survey of Ireland (OSI) website for historical maps of 1:2,500 scale and 1:10,560 scale (1837 to 1913) and aerial photographs (1995, 2000, 2005, 2012), and topography data.

A site walkover survey was carried out by an AECOM Senior Environmental Scientist on Friday 10 June 2022 to assess the baseline conditions at the Proposed Development site.

### 8.1.3 Study Area

The study area comprised of the Proposed Development site and lands within a 2 km radius to allow an assessment of the potential impacts of the Proposed Development on the surrounding environment.

## 8.2 Description of Existing Environment

### 8.2.1 Site Description

The Proposed Development site is located directly south of the M3 Dunboyne-Clonsilla railway line and Hansfield train station along this line. The R149 – Regional Road forms the western boundary of the application area and a local road the southern/southeastern boundary. The Royal Canal and Dublin-Maynooth railway line are located to the east.

The Proposed Development site comprises predominantly greenfield agricultural lands. A cluster of residential properties is located in the northern portion of the Proposed Development site, accessed via a local road which dissects the Proposed Development site from east to west. A single residential property is located along the western boundary, with private access to the R149. A series of sheds and outbuildings of various ages and condition are located within a yard area to the south of the local road which runs through the Proposed Development site.

The buildings within the yard area are utilised for a mixture of agricultural uses, metal fabrication and storage. A number of shipping containers are stored on a gravel area to the south of the main yard.

A stream (Barnhill Stream) flows to the southeast through the fields in the southern portion of the Proposed Development site. During the site walkover, a number of open field drains were noted along existing field boundaries throughout the Proposed Development site.

Historical mapping and aerial photography indicate the Proposed Development site was in agricultural use throughout the nineteenth and twentieth century, with evidence of farm buildings and a residential property occupying the existing yard area from the late 1800s. The railway line to the north is also visible on maps from the late 1800s / early 1900s. On aerial photography from 1995 onwards, residential properties are visible in the north of the Proposed Development site, and the buildings within the yard area go through various minor layout changes until the present day. The residential property in the west of the Proposed Development site is visible from the late 1990s and the gravel storage area to the south of the yard is in use after 2005.

### 8.2.2 Topography

The Proposed Development site is at an elevation of approximately 60 m above Ordnance Datum (m OD). The surrounding topography slopes very gently to the south, with some localised gentle undulating topography in the agricultural fields.

### 8.2.3 Regional Hydrology

The River Liffey is the principal surface water body in the area. At its closest point, it is located approximately 1.8 km south of the Proposed Development site.

The Proposed Development site lies within the Liffey and Dublin Bay WFD catchment (WFD catchment 09) and, more specifically, within the Liffey sub-catchment (Liffey\_SC\_100) and the Liffey-180 sub-basin.

The River Liffey originates in the Wicklow mountains, and flows in a circuitous route first inland through County Wicklow, north and east through County Kildare, then eastwards through County Dublin to discharge into Dublin Bay.

### 8.2.4 Local Hydrology

The Barnhill Stream (EPA name: 'Rusk') flows through the southern portion of the Proposed Development site from west to east. The stream flows in an open channel through the majority of the Proposed Development site but enters a short length of concrete pipe before re-emerging at the local road on the southeastern site boundary. During the site walkover a low flow was noted, and the water was observed to be a brown colour with moderate turbidity.

Drainage ditches were identified along several of the field boundaries and along the road which defines the southeastern site boundary. The ditches were of variable depth, with some observed to be dry at the time of the site visit. No significant flow of water was observed in any of the ditches.

There is the potential for buried field drains to be present within the agricultural lands. Lands to the immediate north of the stream slope gently southwards, indicating that surface run-off currently enters the stream directly via overland flow and via field drains / ditches.

The Barnhill Stream passes beneath the Royal Canal and discharges to the River Liffey at a point c. 2.4 km to the southeast of the Proposed Development site.

The Royal Canal, located immediately to the east of the Proposed Development site, is referred to as an Artificial Water Body (AWB) by the EPA under the WFD.

### 8.2.5 Water Quality

The Barnhill Stream has a WFD Status of 'moderate', as does the River Liffey within the Liffey\_180 sub-basin. Upstream and downstream of the Proposed Development site, in the neighbouring sub-basins, the River Liffey has a WFD Status of 'moderate'. Both the Barnhill Stream and the River Liffey are deemed 'at risk' (IE\_EA\_09L012350) by the EPA.

Records consulted as part of this assessment do not indicate any discharge licences issued under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990, in respect of the discharge of trade effluent and / or sewage effluent to surface water or groundwater in the vicinity of the Proposed Development site.

### 8.2.6 Flood Risk

A Flood Risk Assessment was prepared by McCloy Consulting in June 2022 and is included within the planning application.

The Flood Risk Assessment states that hydraulic modelling indicated there was no out-of-bank 1% Annual Exceedance Probability (AEP, (Flood Zone A) flooding within the site but areas in the south adjacent to the watercourse are affected by the 0.1% AEP floodplain (Flood Zone B).

### 8.2.7 Designated Sites

The Royal Canal, which lies immediately adjacent of the Proposed Development site, is a proposed Natural Heritage Area (pNHA). The Liffey Valley pNHA is located 1.6 km southwest of the Proposed Development site at its closest point (i.e. upstream of the Proposed development site).

There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within a 2 km radius of the Proposed Development site.

It is noted that the River Liffey discharges into Dublin Bay at a distance of 17 km downstream from the site to the southeast. Parts of Dublin Bay are an SAC, SPA and NHA.

Further information on designated sites and aquatic ecology is presented in Chapter 9: Biodiversity.

### 8.2.8 Summary

The surface water environment is considered to be a medium sensitivity environment. The Barnhill Stream passes through the south of the site and has been assigned a moderate WFD status. The flow was noted to be low at the time of the site walkover and it is not a designated site.

## 8.3 Predicted Impacts

This section provides an analysis of the potential effects of the Proposed Development on the water environment during the construction and operational phases. This section of the report provides a brief description of the possible effects, without appropriate mitigation measures in place. Mitigation measures are outlined in section 8.4 and residual impacts in section 8.5 of this chapter.

Due to the inter-relationship between water (hydrology) and land, soils and hydrogeology, the following effects will be considered applicable to EIAR Chapter 7: Land.

### 8.3.1 Do Nothing Scenario

The 'Do Nothing' alternative describes the circumstance where no development occurs. Under a 'Do-Nothing' scenario, the land remains in its current use and no likely significant effects arise in respect of the water environment.

### 8.3.2 Construction Phase

The Proposed Development is deemed to have a number of possible effects on the water environment of the area during the construction phase. The possible construction effects, without mitigation measures in place, are:

- Sedimentation (suspended solids) associated with surface water run-off from ground works have the potential to have a negative effect on watercourses within the EIAR study area and environs;
- Accidental spills and leaks have the potential to contaminate surface water discharge and risk pollution to watercourses within the EIAR study area and environs;

- Use of concrete and lime used during the construction process have the potential to contaminate surface water run-off and have a negative effect on watercourses within the EIA study area and environs; and
- Culverting and drainage works during the construction phase have the potential to interfere with the flow of watercourses and could have a negative effect on localised flood risk.

#### 8.3.2.1 Sedimentation

Pollution of surface waters including the Barnhill Stream by mobilised suspended solids can have significant negative ecological impacts. Various construction activities have the potential to release sediment and raise suspended solids levels in the catchment area. Vegetation removal, site stripping and bulk earthworks as part of the landscaping and building construction would leave deposits exposed to erosion by wind or rain and this could potentially lead to increases in sediment loading of the surface water and sewerage network.

Contamination from suspended sediments may also be caused by runoff from material stockpiles.

Attention will also need to be paid to preventing the build-up of dirt on road surfaces, caused by lorries and other plant entering and exiting the site and appropriate mitigation measures put in place.

Runoff containing large amounts of suspended solids could potentially negatively impact on surface water. The impact will likely result in a direct effect of a negative nature and temporary duration given it is associated with the construction programme. Large volumes of run off containing large amounts of suspended solids entering watercourses is considered unlikely to occur given the phased nature of the development, and should it occur is likely to be temporary. Therefore, in the absence of mitigation measures, it is considered to be a negative impact and the significance of the effect is moderate and temporary in duration.

#### 8.3.2.2 Accidental Spills and Leaks

During demolition and construction there is a risk of accidental pollution incidents to the Barnhill Stream from the following sources:

- Spillage or leakage of stored chemicals, oils and fuels
- Spillage or leakage of oils and fuels from construction machinery or site vehicles
- Spillage or leakage of residual chemicals during removal of external pipework
- Spillage of oil or fuel from refuelling machinery

Accidental spillage of fuels or chemicals may potentially result in the impact of soils and groundwater underlying the site if inappropriately handled or stored. Potential contaminants could migrate through the subsoils and impact underlying groundwater and subsequently the Barnhill Stream. In addition, any demolition and construction activities carried out close to surface waters involve a risk of pollution due to accidental spillage and leaks. The refuelling of general plant also poses a significant risk of pollution, depending on how and where it is carried out. Pollution as a result of accidental spillage could potentially affect fish, aquatic flora and could also have an effect on invertebrate communities.

Spills and leaks may also enter the drainage system and discharge to the Barnhill Stream or be mobilised across the site surface by rainwater.

Taking the above into account, the impact from accidental spills and leaks during the construction phase is considered to be a direct, negative, temporary impact, local in nature, but occasional in frequency. It is therefore considered a medium magnitude of effect on a medium sensitivity receptor and the overall significance of the impact is moderate.

#### 8.3.2.3 Use of concrete and lime

Lime and concrete (specifically, the cement component) is highly alkaline and any spillage could enter surface water directly or migrate through subsoils and groundwater impacting surface water quality. The activities most likely to result in contamination include concreting during road and bridge construction and concreting for culverts.

The impact is considered a direct effect of a negative nature and of a temporary duration given it is only associated with the construction programme. Impacts associated with the use of concrete and lime are considered unlikely to occur and should they occur are likely to be confined to one-off releases. Therefore, the construction phase use of lime and concrete is considered to result in a medium impact to an environment of medium sensitivity and the significance of the impact is moderate.

#### 8.3.2.4 Flood Risk

The Flood Risk Assessment prepared by McCloy Consulting and submitted with the planning application has concluded the Proposed Development will have no negative impact on the existing floodplain or on flood risk elsewhere. This includes consideration of a potential 50% culvert blockage scenario. On this basis, the predicted impact is negligible on an environment of medium sensitivity and the significance of the impact is imperceptible.

#### 8.3.3 Operational Phase

The Proposed Development is deemed to have possible effects on the water environment of the area during the operational phase. The possible operational effects, without mitigation measures in place, are:

- Increased surface water run-off from the site has the potential to increase the risk of flooding, if surface water design does not limit the discharge from the site; and
- Accidental spills and leaks from development use / leaking pipes has the potential to contaminate surface water run-off, if adequate interceptors are not incorporated within the Proposed Development.

##### 8.3.3.1 Flood Risk

The SUDS approach for the site, as set out in the July 2022 SUDS Strategy Report for the site by Clifton Scannell Emerson Associates, takes into account the recommendations and conclusions of the Barnhill Strategic Flood Risk Assessment. The site is to be subdivided into a number of discrete surface water catchment areas.

Source controls such as rainwater butts, rain gardens, green / sedum roofs, tree pits, permeable paving blocks / asphalt and infiltration trenches are proposed to collect and store surface water runoff at its source before discharging to the closed main surface water network traversing the site.

Site controls such as the retention of existing hedgerows, trees and ditches allows the site to naturally drain and will assist in conveying stormwater to the newly constructed surface water network elements. A pond/wetland area is proposed in the south of the site for treatment of collected surface water runoff. The proposed infiltration area situated under the proposed football pitch is seen as a necessary component of the SUDS train as it will cater for the most extreme rainfall events. The design of the infiltration area beneath the proposed football pitch will allow for the surface of the pitch to drain quickly once the storm event has passed and will allow treated water to be discharged to the existing stream at a controlled rate. The installation of a number of monitoring devices along the SUDS network will be fully agreed with FCC prior to installation.

As detailed in the Flood Risk Assessment by McCloy Consulting, proposed levels and the freeboard they provide are as follows:

- The lowest proposed finished floor level (FFL) within the site is 58.20 m OD which is 560 mm above the 0.1% AEP flood level at the upstream extent of the site.
- The lowest proposed finished ground level (FGL) in the western half of the site is 57.93 m OD which is 570 mm above the 1% AEP flood level at the upstream extent of the site.
- The lowest proposed FGL in the eastern half of the site is 57.39 m OD which is 510 mm above the 1% AEP flood level at the centre of the site.

The Flood Risk Assessment completed by McCloy Consulting has concluded that:

- The Proposed Development is sited in 'appropriate' Flood Zones, i.e. 'highly vulnerable development' in Flood Zone C and 'less vulnerable development' in Flood Zone C and Flood Zone B) and have been shown to be resilient to flooding during climate change and culvert blockage events. It is noted that all proposed development is sited in Flood Zone C with the exception of watercourse crossings which, by definition, must be over / within the floodplain.
- The Proposed Development will have no negative impact on the existing floodplain or on flood risk elsewhere.
- Proposed FFLs and FGLs provide sufficient freeboard to design flood levels, taking into account both climate change and potential culvert blockages.

Based on the embedded mitigation measures, the predicted impact is negligible on an environment of medium sensitivity and the significance of the impact is imperceptible.



### 8.3.3.2 Spills and Leaks

Interceptors will be included in the drainage system, at all of the discharge points to the detention basins and the infiltration area, to mitigate against potential pollution of surface water features from spills/leaks of oils/fuels from parked vehicles.

Taking the above into account, the impact from accidental spills and leaks during the operational phase is considered a negligible magnitude of effect on a medium sensitivity receptor and the overall significance of the impact is imperceptible.

### 8.3.4 Cumulative Impacts

As set out in Chapter 1 Introduction, there are a number of consented residential developments within the Hansfield Strategic Development Zone (SDZ). It is assumed each of these developments will have drainage designs reviewed by the planning authority ahead of development. Therefore, it is considered there will be no significant cumulative impacts to the water environment.

## 8.4 Mitigation Measures

### 8.4.1 Construction Phase

#### 8.4.1.1 Sedimentation

During the construction phase, the mitigation measures below, as included in the outline construction and environmental management plan (OCEMP, see Section 8.4.1.4), will ensure that no sediment contamination, contaminated runoff or untreated wastewater will enter watercourses on or near the site.

- Excavations will only remain open for the shortest possible time to reduce groundwater ingress. Silt traps will be placed around the site to reduce silt loss and these will be inspected and cleaned or replaced regularly.
- Runoff from spoil heaps will be prevented from entering watercourses by diverting it through the on-site settlement ponds and removing material off-site as soon as possible to designated storage areas.
- Silt traps will be placed at crossing points to avoid siltation of watercourses and, if the need arises, silt fences shall be used within nearby watercourses during the course of works in order to reduce the potential for pollution of watercourses. These will be maintained and cleaned regularly throughout the construction phase.
- Good construction practices will also be used during the construction phase, such as wheel washers and dust suppression on site roads and at site access points, as well as road sweepers.
- A Construction, Erosion and Sediment Control Plan (CESCP) and a Water Quality Management Plan will be implemented during the construction phase.
- Drains carrying high sediment load will be diverted through settlement ponds. Surface water runoff from working areas will not be allowed to discharge directly to the local watercourses. To achieve this, the drainage system and settlement ponds should be constructed prior to the commencement of major site works. All design and construction will be carried out in accordance with CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.

#### 8.4.1.2 Fuel and Chemical Handling

Due to the presence of a locally important aquifer beneath the site and the presence of surface water drainage, it will be necessary to adopt the following mitigation measures at the construction site in order to prevent spillages to ground and drains of fuels, and to prevent any consequent surface water impacts.

- Designate a bunded storage area at the contractor's compound(s) and away from surface water gullies or drains for oils, solvents and paints used during construction. The fuel storage tanks shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area.
- Drainage from the bunded area shall be diverted for collection and safe disposal. All containers within the storage area will be clearly labelled so that appropriate remedial action can be taken in the event of a spillage. When moving drums from the bunded storage area to locations within the site plot, a suitably sized spill pallet will be used for containing any spillages during transit.
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in designated impermeable refuelling areas isolated from surface water drains. Spill kit facilities shall be provided at the fuelling area in order to provide for any accidental releases or spillages in and around the area. Any used spill kit materials should be disposed of using a hazardous waste contractor.
- Where mobile fuel bowsers are used on the site in the event of a machine requiring refuelling outside of the designated area, fuel will be transported in a mobile double skinned tank. Any flexible pipe, tap or

valve must be fitted with a safety lock where it leaves the container and locked shut when not in use. Each bowser should carry a spill kit and each bowser operator must have spill response training. No refuelling will be allowed within 50 m of a stream.

- Adequate stocks of hydrocarbon absorbent materials (e.g. spill-kits and/or booms) shall be held on-site in order to facilitate response to accidental spills. Spill response materials shall also be stored on all construction vehicles.

#### 8.4.1.3 Control of Concrete and Lime

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 washwater to the surface water drainage system or to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate bunded area and direct discharge of wash water to surface waters will be strictly prohibited.

#### 8.4.1.4 Construction Environmental Management Plan

The mitigation measures set out in this chapter have been included in an OCEMP for the Proposed Development, which accompanies the planning application. Prior to construction, the Contractor will further refine and develop the OCEMP into a detailed site-specific CEMP. The final CEMP will include a CEMSP, a Water Quality Management Plan and any construction related requirements imposed as conditions of any planning permission granted. It will also include details of proposed environmental monitoring for the duration of the construction works, be this good practice or as a planning condition requirement.

### 8.4.2 Operational Phase

During the operational phase, a management plan will be implemented by the relevant bodies (refer to Taking in Charge Layout plan) to govern the operation and maintenance of drainage and attenuation systems, to include cleaning of all interceptors and silt traps. As set out in the SUDS Strategy Report, a SUDS maintenance report will be updated annually as per FCC requirements. Maintenance requirements as presented in the Flood Risk Assessment include the following:

#### 8.4.2.1 Watercourse Maintenance

The ultimate owner / occupier(s) of the site shall be required to include general watercourse / culvert maintenance which will reduce the risk of blockage at downstream culverts and screens and maintain the capacity of the channels. The following measures are intended to inform any future maintenance programme for watercourses and culverts:

- Maintenance should consist of removal of any items within the channel that can impede its flow including (small) trees, excess vegetation etc.
- Riverbanks should be due adequate attention which would normally consist of removal of brambles, bushes, and stiff vegetation; these reduce flow capacity and can encourage collection of debris increasing the risk of blockages. Grass and nettles do not always need removing as they will lay flat during high flows.
- Weed growth should be removed from the centre of the channel as this will impede the flow and increase water levels up stream. Hand picking is best but cutting off under the water level is acceptable if it is done on an annual basis.
- Build-up of silt in watercourse channels and at culvert inlets should be removed and disposed of appropriately.
- Cyclical (min. annual) visual inspection of culvert inlets and screens and removal of debris as required, ensuring debris removed is not deposited in an area likely to fall back into the channel.

#### 8.4.2.2 Drainage System Maintenance

The owner / occupier(s) will be responsible for the maintenance of site drainage systems. Where drainage assets have not been taken in charge, provision for the maintenance of these assets should be made as part of the overall site management plan. The detailed drainage layout for the site should ensure that key SUDS features requiring maintenance are situated in accessible locations.

Maintenance plans for drainage assets should, where applicable, include:

- Cyclical (min. annual) check of all surface water drainage features (in particular, clearing of debris).

- Cyclical (min. annual) visual inspection of any surface or underground features (blockages and obstructions should be removed by jetting as required).

## 8.5 Residual Impacts

### 8.5.1 Construction Phase

The implementation of mitigation measures highlighted in Section 8.4.1 above will significantly reduce the likelihood and magnitude of the potential impacts on the water environment occurring during the construction phase. The magnitude of the potential residual impact during construction phase is therefore considered to be low on an environment of medium sensitivity, therefore the significance of the potential impact of the Proposed Development is considered to be slight on the surrounding water environment.

### 8.5.2 Operational Phase

There are no likely significant permanent water effects associated with the Proposed Development. Embedded control measures outlined in Chapter 2: Project Description and mitigation measures outlined in Section 8.4.2 will significantly reduce the likelihood and magnitude of the potential impacts on the water environment occurring during the operational phase.

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# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 9

### Biodiversity

# Volume II

Environmental Impact Assessment Report



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## Chapter 9 Biodiversity

### Contents

9	Biodiversity .....	9-3
9.1	Introduction .....	9-3
9.1.1	Author Information and Competency .....	9-3
9.1.2	Legislative Context.....	9-3
9.1.3	Planning policy relevant to biodiversity .....	9-4
9.1.4	Methodology.....	9-5
9.1.5	Study Area .....	9-14
9.1.6	Difficulties Encountered in Compiling Information .....	9-14
9.2	Description of Existing Environment .....	9-14
9.2.1	Nature conservation designations.....	9-14
9.2.2	Habitats .....	9-16
9.2.3	Protected and notable species.....	9-19
9.2.4	Future baseline .....	9-27
9.3	Predicted impacts.....	9-27
9.3.1	Do Nothing Scenario .....	9-27
9.3.2	Features excluded from assessment.....	9-28
9.3.3	Importance of ecological features .....	9-28
9.3.4	Embedded mitigation .....	9-31
9.3.5	Construction Phase.....	9-32
9.3.6	Operational Phase .....	9-41
9.3.7	Cumulative assessment.....	9-44
9.4	Mitigation Measures .....	9-45
9.4.1	Construction Phase Mitigation .....	9-45
9.4.2	Operational Phase Mitigation.....	9-47
9.4.3	Monitoring .....	9-48
9.5	Residual Impacts.....	9-48
9.6	References.....	9-49

### Tables

Table 9.1	Desk study data sources.....	9-7
Table 9.2	Ecological features excluded from field survey, with justification .....	9-8
Table 9.3	Details of dusk emergence / dawn re-entry bat roost surveys.....	9-10
Table 9.4	Details of walked transect bat activity surveys .....	9-10
Table 9.5	Details of static bat detector monitoring.....	9-11
Table 9.6	Importance of Ecological Features .....	9-12
Table 9.7	Statutory designated nature conservation sites.....	9-15

Table 9.8 Trees / structure with bat roost suitability requiring further survey .....	9-20
Table 9.9 Summary of walked transect bat activity surveys .....	9-21
Table 9.10 Static detector bat activity results ('<1' = 0.1-0.9%; '<<1' = less than 0.1%).....	9-22
Table 9.11 Importance of ecological features .....	9-29
Table 9.12 Embedded ecological mitigation and local biodiversity policy compliance .....	9-31

## Figures (included at the end of the chapter)

Figure 9.1:	Bat transects routes/listening points and static detector locations
Figure 9.2:	European sites and pNHAs
Figure 9.3:	Habitat map
Figure 9.4:	Locations of features with bat roost suitability
Figure 9.5:	Results of bat activity transects
Figure 9.6	Confidential figure (not for public viewing)

## 9 Biodiversity

### 9.1 Introduction

This chapter of the EIAR assesses and evaluates the impacts of the Proposed Development on biodiversity. It details the results of desk study and field surveys to establish baseline ecological conditions, sets out predicted effects on ecological features caused by the Proposed Development (accounting for embedded mitigation), prescribes, where appropriate, proportionate mitigation measures, and evaluates residual effects.

The Site Boundary for the Proposed Development is detailed in EIAR Chapter 1 – Introduction and is shown on Figure 1.1. A detailed description of the Proposed Development is given in EIAR Chapter 2 – Project Description. The Study Area is as shown on Figures 9.1 to 9.6; for certain ecological features the survey extended further, as described in Section 9.1.4, and for desk study purposes the area reviewed was as also described in Section 9.1.4.

Throughout this Chapter, species are given their scientific and common name on first mention and common name only thereafter. Distances quoted are cited as the shortest boundary to boundary distance ‘as the crow flies’, unless otherwise specified.

Note that there are not considered to be any Human Health implications arising from biodiversity and that element is considered scoped out.

#### 9.1.1 Author Information and Competency

This Chapter was produced by, and informed by surveys carried out by, the following qualified and experienced AECOM ecologists:

- Nick Dadds BSc (Hons) MCIEEM – A Principal Ecologist and full member of the Chartered Institute of Ecology & Environmental Management, Nick has a range of expertise in ecological survey, assessment, and mitigation gained over 15 years of professional consultancy. This has included large masterplan, transport, wind farm and hydroelectric projects, and many smaller-scale developments. He is an accomplished field ecologist, possessing specialist habitat expertise as well as a wide experience of protected species survey and mitigation for various species. He has considerable experience of ecological reporting in support of planning applications and other consents, having produced well-received Ecological Impact Assessments, Environmental Impact Assessment chapters, and Habitats Directive-related reporting including Natura Impact Statements and Appropriate Assessment Screening Reports. He also has a knowledge of biodiversity net gain assessment.
- Jenny Hunter BSc (Hons) MSc AMRSB – Principal Ecologist with over eight years’ professional experience of ecological consultancy. She has extensive field experience of a variety of species and habitat survey techniques, and is proficient in habitat survey across a range of habitats including hedgerow assessments. She has extensive experience of protected species surveys for bats, badger *Meles meles*, otter *Lutra lutra*, pine marten *Martes martes* and smooth newt *Lissotriton vulgaris*, as well as invasive species identification and survey. Jenny leads AECOM Ecology’s digital data capture, for high quality data collection in the field, which she constantly reviews and provides training to colleagues.
- Laura Cappelli BSc (Hons ) MSc – Consultant Ecologist with three years professional experience in ecological survey and the preparation of ecological reports, including Ecological Impact Assessments, Natura Impact Statements and Preliminary Ecological Appraisals, to support planning applications for a range of commercial development projects such as national road schemes, underground cable projects, residential developments, transport improvements, waste to energy developments and waste remediation. She is proficient in several types of ecological field survey including flora, habitats, amphibians and mammals (including bats, otter and badger).
- Alison Donnelly BSc (Hons ) MSc – Consultant Ecologist with three years professional experience working on a range of commercial and residential infrastructure projects as well as offshore wind developments, transport developments and power-related schemes including renewable energy projects. She worked on a variety of ecological reports including biodiversity chapters of Environmental Impact Assessments, Ecological Impact Assessments, Appropriate Assessments, Preliminary Ecological Appraisals (PEAs) and Invasive Species Management Plans (ISMPs). Her field survey competencies include birds (include breeding bird, wintering and vantage point surveys), protected mammals (including badger, otter and bats) and amphibians.

#### 9.1.2 Legislative Context

This assessment has been carried out within the context of the following relevant legislation:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (the ‘Habitats Directive’);

- Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive');
- Council Directive 2000/60/EC establishing a framework for Community action in the field of water policy (the 'Water Framework Directive');
- Regulation 1143/2014 on the prevention and management of the introduction and spread of invasive alien species (the 'Invasive Alien Species Regulations');
- Convention on Wetlands of International Importance ('Ramsar Convention');
- The Planning & Development Act 2000 S.I. 30/2000 as amended; the Planning and Development (Amendment) Act 2010 S.I. 30/2010 as amended; The Planning & Development (Amendment) Act 2010 S.I. 16/2018 as amended (collectively known as the 'Planning Acts');
- European Communities (Birds and Natural Habitats) Regulations 2011 and 2015 (the 'Habitats Regulations');
- The Wildlife Act 1976 and the Wildlife (Amendment) Act 2000 (the 'Wildlife Acts');
- Flora (Protection) Order 2015 S.I. 356/2015 (the 'Flora Protection Order' (FPO));
- Fisheries Consolidation Act 1959 (No. 14 of 1959) as amended, the Inland Fisheries Act 2010 (No. 10 of 2010) as amended, and the Local Government (Water Pollution Acts) 1977-1990, as amended; and,
- EC Environmental Objectives (Surface Waters) Regulations 2009 (SI 272 of 2009).

### 9.1.3 Planning policy relevant to biodiversity

#### 9.1.3.1 Project Ireland 2040 National Planning Framework (NPF)

Project Ireland 2040 National Planning Framework (NPF) sets out the Government's planning policies for Ireland and how these should be applied. NPF sets out that to achieve sustainable development, the planning system must incorporate an environmental objective, which should include:

- integrated planning for green infrastructure and ecosystem services;
- enhancing the conservation status and improving management of protected areas/species;
- using natural resources prudently;
- minimising waste and pollution; and,
- mitigating and adapting to climate change.

There is a presumption in favour of sustainable development in NPF.

#### 9.1.3.2 National Biodiversity Plan 2017-2021

The National Biodiversity Plan 2017-2021 for Ireland outlines six main objectives to meet commitments under the Convention on Biological Diversity (CBD) and EU Biodiversity Strategy. These objectives include:

- mainstream biodiversity into decision-making across all sectors;
- strengthen the knowledge base for conservation, management and sustainable use of biodiversity;
- increase awareness and appreciation of biodiversity and ecosystem services;
- conserve and restore biodiversity and ecosystem services in the wider countryside;
- conserve and restore biodiversity and ecosystem services in the marine environment;
- expand and improve management of protected areas and species; and,
- strengthen international governance for biodiversity and ecosystem services.

#### 9.1.3.3 Fingal Development Plan 2017-2023

The Fingal Development Plan 2017-2023 sets out the aims, policies, and objectives for topics such as development, green infrastructure, natural heritage for Fingal County in accordance with the Planning Acts. Several objectives are relevant to biodiversity and the Proposed Development, including:

- NH02 – Integrate provision for biodiversity with public open space provision and sustainable water management measures (including SuDS) where possible and appropriate;
- NH07 – Actively support the aims and objectives of the All Ireland Pollinator Plan 2015-2020 by encouraging bee keeping and other measures to protect and increase the population of bees and other pollinating insects in Fingal;
- NH15 – Strictly protect areas designated or proposed to be designated as European sites;
- NH16 – Protect designated areas of national importance, such as Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs);
- NH17 – Ensure development does not have a significant adverse impact on sites of national importance or Annex II species contained therein, or on rare and threatened species including those protected by law and their habitats;
- NH24 Protect rivers, streams and other watercourses and maintain them in an open state capable of providing suitable habitat for fauna and flora, including fish (this Objective is allied to WQ05);



- NH27 – Protect existing woodlands, trees and hedgerows which are of amenity or biodiversity value and/or contribute to landscape character and ensure that proper provision is made for their protection and management; and,
- WQ05 – Establish riparian corridors free from new development along all significant watercourse and streams in the County (this Objective is allied to NH24).

#### 9.1.3.4 Draft Fingal Development Plan 2023 -2029

The draft Fingal Development Plan 2023-2029 includes similar policies to those set out above for the current Fingal Development, as summarised below:

- GINHP5 – development of green infrastructure network to conserve and enhance biodiversity, and strengthen ecological links, including provision of biodiversity in public open space;
- GINHP7 – protection/enhancement of watercourses, flood plains, riparian corridors and wetlands, including an objective to create wetland and/or enhance existing through SuDS;
- GINHP11 – support of Fingal Biodiversity Action Plan and All Ireland Pollinator Plan;
- GINHP12 – protection of designated or proposed nature conservation sites;
- GINHP17 – strict protection of European sites;
- GINHP18 – protection of protected and threatened species; and,
- GINHP21/22 – protection of trees, woodlands and hedgerows of amenity or biodiversity value, and planting in appropriate locations.

Of particular note in the draft Fingal Development Plan is the specifically stated objective under GINHP7 to create wetland – the Proposed Development importantly includes provision of a wetland area, with standing water and surrounding wetland vegetation, near the Barnhill Stream.

#### 9.1.3.5 Barnhill Local Area Plan (LAP) 2019-2025

The Barnhill Local Area Plan (LAP) 2019-2025 sets out development objectives for the area south of the Dunboyne-Clonsilla rail line, west of the Royal Canal and Dublin-Maynooth railway line and east of the R149 in Fingal County. The Proposed Development occupies the majority but not all of the Barnhill LAP area – the south-eastern-most field in the LAP, which borders the Royal Canal, is not part of the Proposed Development, nor are the two proposed roads along the south edge of the Proposed Development and north-south through the western part of the Proposed Development.

General ecological objectives and green infrastructure objectives in the Barnhill LAP relevant to the Proposed Development are as follows:

- general measure – protection of the stream passing through the lands;
- general measure – provision of protection for otters along the stream;
- general measure – protection of bats and bat fauna by appropriate surveys and maintenance of flora, including appropriate planting/replacement where required;
- GI06 – Retain hedges forming links to other habitats or replace with tree/shrub/hedge planting;
- GI10 – take account of habitat sensitivities in design of green corridors, avoiding excessive impacts from noise, lighting, etc.;
- GI11 – include measures to protect and enhance biodiversity;
- GI12 – protection of a minimum 10 m riparian corridor from each bank along the Barnhill Stream<sup>1</sup> and widening of the corridor to incorporate flood zones and parks;
- GI14 – provision for biodiversity and Sustainable Drainage Systems (SuDS) in open space;
- GI16 – maintenance where feasible of 5 m or more grassland buffer along retained hedges; and,
- GI17 – implementation of All Ireland Pollinator Plan (2015-2020).

### 9.1.4 Methodology

#### 9.1.4.1 Target ecological features

For the purposes of all desk study and field survey, the target ecological features for this assessment comprised:

- designated or proposed nature conservation sites at international, national or local levels;
- habitats and species listed on Annex I and II respectively of the Habitats Directive, indicating European importance, and which can be designated as a Qualifying Interest (QI) of a Special Area of Conservation (SAC);
- species listed on Annex IV of the Habitats Directive, known as ‘European Protected Species’;

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<sup>1</sup> Note – the Barnhill Stream is referred to as the Rusk Stream by the EPA.

- birds listed on Annex I of the Birds Directive, indicating European importance, and which can be designated as a Special Conservation Interest (SCI) of a Special Protection Area (SPA);
- species listed on the Wildlife Acts;
- fish and habitats protected under the Fisheries Consolidation Act 1959 (No. 14 of 1959) as amended, the Inland Fisheries Act 2010 (No. 10 of 2010) as amended, and the Local Government (Water Pollution Acts) 1977-1990, as amended;
- plants listed on the Flora Protection Order;
- species and habitats listed on the National Biodiversity Action Plan 2017-2021;
- birds of conservation concern (red or amber list species) listed on Birds of Conservation Concern in Ireland (BoCCI), 4<sup>th</sup> assessment 2020-2026 (Gilbert *et al*, 2021);
- species that are Nationally Rare, Nationally Scarce or listed in Red Data Lists, as published by the National Parks and Wildlife Service (NPWS); and,
- invasive non-native species of plants and animals listed on the Third Schedule of Habitats Regulations (hereafter 'scheduled invasive species'), those of EU concern under the EU Invasive Alien Species Regulation, and those listed by the National Biodiversity Data Centre (NBDC) as High Risk in Ireland.

Other species or habitats that may be scarce or otherwise notable are included where deemed appropriate through available information and/or professional judgement.

Note that the Fingal Development Plan lists proposed Natural Heritage Areas (pNHAs) as well as fully designated Natural Heritage Areas (NHAs) as nationally important protected areas, stating that NHAs are being designated and quoting examples that are currently pNHAs. Additionally, NPWS state that pNHAs are subject to limited protection including "Recognition of the ecological value of pNHAs by Planning and Licencing Authorities." It is therefore taken for this assessment that both NHAs and pNHAs are of national importance.

#### 9.1.4.2 Zone of influence

The 'zone of influence' (Zol) is the area over which ecological features may be subject to significant effects as a result of the Proposed Development at any phase. The Zol can extend beyond the boundary of the Proposed Development, for example where there are hydrological links or species ranges extending beyond the Proposed Development.

The Zol varies for different ecological features depending on their sensitivity to environmental change. As recommended by CIEEM (2019), professionally accredited or published studies have been used where available, and otherwise published guidance or professional judgement, to determine the initial potential Zol, taking into account the nature of the Proposed Development. This has informed the desk study and field surveys extents. Further consideration at the impact assessment stage can reduce the Zol.

#### 9.1.4.3 Desk study methodology

A desk study was carried out to identify relevant nature conservation designations, and records of protected and notable habitats and species potentially relevant to the Proposed Development. The desk study areas were defined using a stratified approach based on the initial potential Zol of the Proposed Development on different ecological features, as set out above. Accordingly, the desk study sought to identify:

- international nature conservation designations (e.g. SACs and SPAs) within 15 km of the Site Boundary;
- national statutory nature conservation designations within 2 km of the Site Boundary;
- local nature conservation designations within 2 km of the Site Boundary; and,
- records of protected and notable habitats and species within 2 km of the Site Boundary.

For designated sites, in particular for international sites (including European sites (SACs and SPAs)) and national sites, sites further afield were considered where potential connectivity to the Proposed Development was deemed to exist.

The desk study was carried out using the sources detailed in Table 9.1.

**Table 9.1 Desk study data sources**

<b>Data source</b>	<b>Date accessed</b>	<b>Data obtained</b>
Environmental Protection Agency (EPA) maps website ( <a href="https://gis.epa.ie/EPAMaps/">https://gis.epa.ie/EPAMaps/</a> )	26/05/2022	Statutory and non-statutory designations. Information on watercourses, water quality, soils, and geology.
NPWS Protected Sites in Ireland website ( <a href="https://www.npws.ie/protected-sites">https://www.npws.ie/protected-sites</a> )	26/05/2022	Details on relevant statutory and non-statutory designations.
NPWS map viewer ( <a href="http://webgis.npws.ie/npwsviewer/">http://webgis.npws.ie/npwsviewer/</a> )	26/05/2022	Biological records
National Biodiversity Data Centre (NBDC) ( <a href="https://maps.biodiversityireland.ie/">https://maps.biodiversityireland.ie/</a> )	26/05/2022	Biological records including High Risk invasive species.
<i>The Status of EU Protected Habitats and Species in Ireland</i> (Article 17 Report) ( <a href="https://www.npws.ie/publications/article-17-reports/article-17-reports-2019">https://www.npws.ie/publications/article-17-reports/article-17-reports-2019</a> )	26/05/2022	Information on the status of habitats and species of European interest in Ireland.
Irish Red Lists (e.g. Marnell <i>et al</i> , 2019; Regan <i>et al</i> , 2010, King <i>et al</i> , 2011, Lockhart <i>et al</i> , 2012, Nelson <i>et al</i> , 2011; Nelson <i>et al</i> , 2019; Colhoun and Cummins, 2013; Wyse-Jackson <i>et al</i> , 2016)	26/05/2022	Conservation status of plants, amphibians, reptiles, freshwater fish, invertebrates, birds and terrestrial mammals (including bats).
Ordnance Survey Ireland maps and aerial photography ( <a href="https://www.osi.ie/">https://www.osi.ie/</a> )	26/05/2022	Habitats/connectivity relevant to interpretation of planning policy and potential protected/notable species constraints.
National Inventory of Architectural Heritage ( <a href="https://www.buildingsofireland.ie/">https://www.buildingsofireland.ie/</a> )	26/05/2022	Information on historical structures in the local area.
<i>Biodiversity, Flora and Fauna at Barnhill, Clonsilla</i> (Keeley and Wilkowska, 2017)	07/07/2020	Previous ecology data recorded from ecological surveys carried out in 2017.
<i>Flora and Fauna Report Ecological Assessment: Appendix 5 of the Barnhill LAP</i> (Keeley and Wilkowska, 2018a)	07/07/2020	Previous ecology data recorded from ecological surveys carried out in 2017.

#### 9.1.4.4 Field survey methodology

##### **Scope of field survey**

The scope of field survey was determined based on review of desk study information (including data from previous surveys at Barnhill) and the habitat context of the local area. Based on this review, a number of ecological features were excluded from targeted field survey, for the reasons given in Table 9.2.

**Table 9.2 Ecological features excluded from field survey, with justification**

Ecological feature(s)	Reason(s) for exclusion from field survey
Irish hare <i>Lepus timidus hibernicus</i> , hedgehog <i>Erinaceus europaeus</i> , pygmy shrew <i>Sorex minutus</i> , Irish stoat <i>Mustela erminea hibernica</i>	It can be assumed that at least hedgehog, pygmy shrew and Irish stoat are present since they are widespread. Irish hare is also widespread and could occur in the Study Area, although there are no desk study records nearby (see Section 9.2.3.4). The heavily-grazed pastures dominating the Study Area are not especially favourable but at least Irish hare and hedgehog could forage in the fields, and all four species could utilise the hedgerows. Standard mitigation measures can be implemented to minimise risk of harm during construction.
Red squirrel <i>Sciurus vulgaris</i> and pine marten	The Study Area has negligible potential to support these species due to its sub-optimal habitat (largely agricultural grassland with no significant woodland). There are also no records of these species within 2 km of the site on the NPWS and NBDC databases.
Birds	<p>Sufficient baseline data on breeding birds is available in Keeley and Wilkowska (2018a) and Keely and Wilkowska (2017) for the purposes of impact assessment. These studies indicate that the breeding bird assemblage is not of special note and it is very unlikely, given that the Study Area continues to be dominated by species-poor and heavily-grazed fields with peripheral hedges, that there would have been any significant change to the species present or their abundance.</p> <p>The Site is highly unlikely to be important to notable populations of non-breeding birds because of its relatively small size within extensive similar agricultural habitat. Moreover, Appropriate Assessment Screening of the Barnhill LAP (Fingal County Council, 2019) determined that there was no Likely Significant Effect on European sites including those with qualifying wintering birds. This conclusion was also made for the Proposed Development itself in the Natura Impact Statement (AECOM, 2021).</p>
Common lizard <i>Zootoca vivipara</i> and smooth newt	The Site has low potential to support these species, which are widespread. The heavily-grazed pasture that dominates the Study Area is not favourable habitat for either. Common lizard may occur in very limited numbers along the hedgerows and road verges. There is no optimal breeding habitat for smooth newt (i.e. there are no ponds) either in the Study Area or within 250 m. Running water is not favoured by smooth newt, and although a stretch of nearly stagnant water was noted on the Barnhill Stream, there is a likely presence of stickleback <i>Gasterosteus aculeatus</i> which is well-known to predate amphibians (there are NBDC records on the River Liffey shortly downstream, and stickleback exhibits high environmental tolerance including muddy and polluted streams/ditches). The Royal Canal is known to contain large predatory fish and is also unfavourable. The small ditches beside some hedges are of limited value owing to suboptimal terrestrial habitat (largely heavily-grazed pasture), and Keely and Wilkowska (2017) report drying out in dry weather, and most of these ditches will be retained. Embedded design measures in accordance with the Barnhill LAP preserve and enhance the stream and significant lengths of hedgerow/small ditches, and moreover provide a substantial natural pond with adjacent meadows and woodland, thereby providing a significant enhancement for amphibians and other wildlife. Precautionary mitigation can be put in place during construction to minimise risks to amphibians.
Freshwater aquatic species, including fish and invertebrates	Desk study sources are considered sufficient for determining baseline data for impact assessment of these features in the Study Area, particularly in view of the limited ecological note of the one water feature in the Study Area (the Barnhill Stream, which is small and subject to livestock disturbance and covering by shrubs).

A description of the methods adopted for the ecological field surveys carried out is provided below. All ecological field survey was carried out by experienced AECOM ecologists, with the exception of the bird surveys which are reported in Keeley and Wilkowska (2018a; 2017).

### Habitat and flora survey

Survey for habitats and rare, protected and invasive flora were carried out on 01 and 02 July 2020 by suitably qualified AECOM ecologists with extensive survey experience. An ecological walkover survey was carried out on 30 September 2021 to update and/or confirm the survey carried out in July 2020. The Site and the adjacent habitats were classified according to A guide to Habitats in Ireland (Fossitt, 2000). Notes were made for each habitat of dominant, typical and notable plant species, and any relevant ecological characteristics (particularly where relevant to habitat condition), which reflect

conditions at the time of survey. Habitats were also visually assessed to determine their potential value to nesting birds, invertebrates and other taxa.

The survey area encompassed all safely accessible parts of the Site and adjacent habitat to a distance of 200 m, where access permission existed or where this land was visible from within the Site, public rights of way, or other publicly accessible areas. Habitat types were mapped using Collector for ArcGIS on tablets. Nomenclature for plant species in this Chapter follows that of Stace (2019).

### **Bat roost suitability assessment**

The bat roost suitability of all trees and buildings (with the exception of occupied houses) within the boundary of the Site plus a 50 m buffer was assessed following guidance published by the Bat Conservation Trust (BCT) (Collins, 2016). The assessment was conducted on 01 and 02 July 2020, and inspection of the Site in 2021 concluded no change in this respect.

Potential Roost Features (PRF) were identified from the ground, using binoculars where necessary, and trees and buildings were classified as having 'Negligible', 'Low', 'Moderate' or 'High' bat roost suitability, according to the definitions provided in Collins (2016). PRFs searched for included suitable holes, cracks or splits in trees and any possible ingress points to buildings or structures. Where such features existed, evidence of bat use searched for included droppings, staining, foraging remains, auditory evidence and sightings of live or dead bats.

### **Bat emergence/re-entry survey**

Dusk emergence and dawn re-entry surveys were conducted on two trees which were identified from the bat roost suitability assessment (described above) as having Moderate suitability for roosting bats. The surveys largely followed the methodology described in Collins (2016) (but see limitations in section 9.1.4.7), and were carried out initially in July/August 2020, and subsequently repeated in August/September 2021. During the emergence / re-entry surveys the trees were watched carefully. If any bats emerged / entered a roost, the surveyors pinpointed the roost location where possible, identified the species (using bat detection equipment, see below) and counted the number of bats emerging or re-entering (where light conditions allowed). General bat activity was also noted during the survey to provide further information on use of the Site by bats.

Dusk emergence surveys commenced fifteen minutes prior to sunset and ended at least 1.5 hours after sunset. Dawn re-entry surveys commenced 1.5 hours prior to sunrise and ended 15-30 minutes after sunrise. Detailed survey dates, times and weather conditions are given in Table 9.3.

Additionally, the one small derelict building by Barberstown Lane North assessed as having Low bat roost suitability (see Section 9.2.3.1) was subject to one survey in line with BCT guidance (Collins, 2016; note that under this guidance, structures with Low bat roost suitability require one survey, but trees with Low bat roost suitability do not require any further survey). This survey was carried out in the evening of 14 June 2022 under suitable weather conditions, under the same method set for trees in the previous paragraphs.

The surveyors used Elekon Batlogger M ('Batlogger') detectors to detect, identify and record bats and their calls. Batlogger detectors record continuously throughout the survey, in real-time (i.e. including calls and gaps, allowing rhythm to be determined) and in full spectrum (i.e. all frequencies are recorded). This results in detailed sonograms allowing detailed analysis. Analysis of recorded bat calls was carried out using Kaleidoscope Pro and BatSound software, with quality assurance checks made by an experienced AECOM bat call analyst.



**Table 9.3 Details of dusk emergence / dawn re-entry bat roost surveys**

Date	Start time	End time	Time of sunset / sunrise	Weather conditions
21/07/20	21:22	23:07	21:37	Cloudy skies, light rain at start of survey and dry for the majority of the night, Force 3 wind at start of survey and Force 2 wind at end, temperature dropping to approximately 18°C.
11/08/20	04:29	06:14	05:59	Heavy fog at start of survey and becomes clearer during the middle and end of survey, light periodic drizzle at middle of survey, no wind, temperature 15 to 16°C.
31/08/21	05:03	06:48	06:33	Mostly dry during survey with some mist at start of survey, overcast, light air to light breeze, temperature 14 to 15°C.
29/09/21	18:51	20:36	19:06	Dry during survey, overcast, light air, temperature 15 to 16°C.
14/06/22	21:39	23:24	21:54	Dry, no wind, cloud cover 30-50%, temperature 14 to 13°C.

### Bat activity survey – walked transect

A walked bat activity transect route was devised to cover typical examples of habitat suitable for bat foraging and commuting within the Site and 50 m buffer, within safe access restrictions. In particular, the transect targeted habitat or linear features which may be both important to local bat populations and potentially impacted upon by the Proposed Development. A total of three listening point locations were also incorporated into the transect route in areas of habitat with high suitability for bats. Surveyors stopped at each listening point for between three and five minutes. The transect route and listening point locations are shown on Figure 9.1.

The walked bat activity surveys largely followed the guidelines in Collins (2016) (but see limitations in section 9.1.4.7) and comprised walking a transect route on 17 August 2020 to supplement bat activity data collected in 2017 by Keeley and Wilkowska (2017). Repeat walked bat activity surveys were carried out on 30 August and 21 September 2021. The transect route was amended from the pre-determined route due to the presence of cattle in many fields. The transect survey started at sunset and ended at least two hours after sunset. Details of the transect survey can be found in Table 9.4, below.

The surveyors used Batlogger detectors to detect, identify and record bats and their calls. Analysis of recorded bat calls was carried out using Kaleidoscope Pro and BatSound software, with quality assurance checks made by an experienced AECOM bat call analyst.

**Table 9.4 Details of walked transect bat activity surveys**

Survey date	Start time	End time	Time of sunset / sunrise	Weather conditions
17/08/20	20:48	22:48	20:48	Recent rain before the start of survey and periodic light drizzle throughout survey, light air, temperature 16 to 17°C.
30/08/21	20:19	22:19	20:19	Dry during the survey, light air, temperature 13 to 14°C.
21/09/21	19:26	21:26	19:26	Dry during the survey, light breeze, overcast, 15 to 16°C.

### Bat activity survey – static detector monitoring

Wildlife Acoustics Song Meter SM4BAT FS static bat detectors were placed in three locations to record general bat activity over an extended period of time. The detectors were timed to start recording 30 minutes before sunset and finish recording 30 minutes after sunrise for each day they were deployed. The static detector locations were chosen as being in representative habitat within the zone of influence of the Proposed Development which may be important to local bat populations for foraging and commuting. The locations of the static detectors are shown on Figure 9.1, with details as follows:

- Location A – located on wooden fence along hedge (ITM coordinates 703161, 738452);
- Location B – located in a rowan tree near the industrial building complex at the centre of the Site (ITM coordinates 703351, 738453); and,

- Location C – located on a horse-chestnut *Aesculus hippocastanum* tree within the Site at Barberstown Lane North (ITM coordinates 703333, 738563).

Detectors were initially deployed for 26 continuous days between 22 July and 17 August 2020, inclusive, and subsequently also for 31 days from 30 August 2021 to 30 September 2021, as shown in Table 9.5.

**Table 9.5 Details of static bat detector monitoring**

Location	Start date	End date	Number of nights deployed	Number of nights recorded
A	21/07/20	17/08/20	21	11
B	21/07/20	17/08/20	21	14
C	30/08/21	30/09/21	31	31

### Otter survey

Survey for otter was carried out on 01 and 02 July 2020 along suitable water features (i.e. Barnhill Stream, Royal Canal, and associated wet ditches) within 200 m of the Site, as far as access permitted. A recheck was carried out within the Site on 30 September 2021. The survey followed guidance in published literature (Chanin, 2003; Liles, 2003) where appropriate to a site survey. Evidence of otter searched for included refuges (holts and lie-ups), spraints (droppings), footprints, trails and foraging signs. Spraints were recorded as fresh, recent or old according to their apparent age.

### Badger survey

Survey for badger was carried out in suitable habitat within the Site plus a 200 m buffer (as far as access permitted, and not including private residences or the railway line except by peripheral observation) on 01 and 02 July 2020. An ecological walkover survey was also carried out on 30 September 2021 to check the status of badgers. The survey followed guidance in published literature (Harris *et al*, 1989). Evidence searched for included setts, spoil heaps and bedding, guard hairs, latrines, footprints, trails and scratch marks and foraging activity.

#### 9.1.4.5 Appraisal Methodology

The method employed for assessment of impacts on ecological features is that recommended by the Chartered Institute of Ecology and Environmental Management (CIEEM) in *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2019). CIEEM is the leading professional body for ecologists in the UK and Ireland, providing advice to government, upholding standards in professional conduct and promoting best practice. Guidance in CIEEM (2019) broadly agrees with guidance in EPA (2017) and guidance issued by National Roads Authority (NRA, 2009) (now Transport Infrastructure Ireland (TII)). The latter is commonly used in Ireland and provides detail on the use of a geographical scale of importance, which broadly concurs with CIEEM guidance.

### Importance of Ecological Features

An ecological feature is a site, habitat, or species with nature conservation importance. Only those ecological features that are ‘important’ and could be significantly affected by the project require detailed assessment – “*it is not necessary to carry out detailed assessment of ecological features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable*” (CIEEM, 2019). This is consistent with the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) which requires investigation of likely significant effects, as accordingly also emphasised by EPA (2017). NRA (2009) prescribes a similar approach, stating that ecological features of less importance than Local (Higher) should not be subject to detailed assessment.

Existing data and criteria are considered when determining the importance of ecological features. Where these are lacking, it is necessary to apply professional judgement. Factors considered include:

- rarity, endemism, mobility and geographic range (particularly if this changing);
- size/extent, rate of decline and vulnerability;
- typicalness, species-richness, habitat structure and connectivity/fragmentation;
- function/value to other features (e.g. habitats of notable species or buffers against impacts); and,
- restoration potential.

Compliance with legislation is relevant but, along with priority listing, does not necessarily translate to importance. For example, a transitory roost of a single bat would not be afforded the same importance as a regularly-occurring maternity roost, although legal obligations must still be met, and areas of priority habitat could be unfavourably small or in poor condition and not practically restorable.

The importance of ecological features is described using a geographic scale. Examples of the types of ecological features which may fall into each category are given in Table 9.6, which is adapted from CIEEM (2019) and NRA (2009) (EPA (2017) does not include geographical scale of importance). For the purposes of this assessment 'Local' is the area within 5 km of the site.

**Table 9.6 Importance of Ecological Features**

<b>Importance<sup>1</sup></b>	<b>Examples</b>
International (Very high)	Internationally designated nature conservation site (or candidate/proposed international site), or area satisfying criteria for such designation, or feature essential to maintaining such sites. Sustainable area (or part of a larger sustainable area) of best examples of Annex I habitat <sup>2</sup> . A regularly-occurring internationally-significant population (e.g. 1% of the national population, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of internationally important species listed on Annex I of the Birds Directive or Annex II of the Habitats Directive.
National (High)	Nationally designated nature conservation site (or proposed such site), or site satisfying criteria for such designation. Sustainable area of good quality Annex I habitat not deemed to be of international importance, or of national priority habitat, which is a significant proportion of the resource. Regularly-occurring nationally significant population (e.g. 1% of the national population, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of species listed or protected under the Wildlife Acts or Red Data lists, or site supporting one.
County (Medium)	County designated nature conservation site (or proposed such site). Sustainable area of Annex I habitat or national priority habitat not deemed to be of higher importance (e.g. lower quality, highly fragmented, small and/or low restoration potential), or priority habitat under a Local Biodiversity Action Plan if this exists and applies at county level. Regularly-occurring county significant population (e.g. 1% of county resource, or potentially less for critical parts of wider populations or those at a critical life-cycle stage) of species listed or protected under the Habitats/Birds Directives, Wildlife Acts, Red Data lists or Local Biodiversity Action Plan (if this exists and applies at county level), or site supporting one.
Local (Local higher)	Priority habitat of insufficient size or quality for higher importance, or degraded with low restoration potential. Habitat providing significant biodiversity or ecological corridors in a local context. Small sustainable population of notable species not qualifying for higher importance or uncommon locally.
Site (Local lower)	Common, heavily-managed or modified habitat, and common and widespread species.
<sup>1</sup> Terms in brackets are those used by NRA (2009). <sup>2</sup> Habitat listed on Annex I of the Habitats Directive.	

## Potential Impacts and Effects

Impacts may occur during the construction, operation and (if applicable) decommissioning phases of a development. They may be direct or indirect (also termed 'secondary'). Direct impacts are attributable to an action associated with a development. Indirect impacts are often produced away from a development or as a result of other initial impacts. In this case, the Proposed Development is expected to remain indefinitely, therefore decommissioning is not considered relevant.

Under CIEEM (2019) guidance there is a distinction between impact and effect. An impact is an action on an ecological feature (e.g. hedgerow removal; loss of a bat roost). An effect is the outcome of that impact on an ecological feature (e.g. effect of hedgerow loss on breeding birds; effect of bat roost loss on the conservation status of the bat species).

Likely impacts/effects are characterised using those parameters below that are necessary to understand them:

- direction/quality – whether the impact will have a beneficial, neutral or adverse effect;
- magnitude – the 'size', 'amount' or 'intensity' of an impact, described in quantitative terms as far possible;
- extent – the spatial or geographical area or distance over which the impact or effect occurs;

- duration – the time over which an impact/effect is expected to last prior to recovery or replacement (if possible) of the feature. Where appropriate, ecological aspects such as lifecycles are considered. The duration of an effect may be longer than the duration of an activity or impact;
- timing and frequency – timing is important since an effect might not occur if critical seasons or life stages are avoided. Frequency considers repetition of an activity, which may result in a greater effect; and
- reversibility – whether the effect is temporary or permanent. A temporary impact/effect is one from which recovery is possible or for which effective mitigation is possible and enforceable. A permanent effect is one from which recovery is either not possible, or cannot be achieved within a reasonable timescale (in the context of the feature being assessed).

Consideration is given to conservation objectives, whether processes within sites will be altered, effects on habitats and species population size/viability, and whether these will have an effect on conservation status. Conservation status is determined by the abundance and distribution of species, and the extent, structure and function, and typical supported species of habitats.

Consideration is also given to cumulative effects, since impacts acting in combination may have a cumulative effect exceeding that of the separate impacts. Cumulative effects may arise from a combination of impacts from the Proposed Development itself (e.g. impacts at the construction and operation stages), or the combined impacts from different developments.

Under EPA (2017), effects are also categorised as likely or not likely, and note must be made of any transboundary effects (effects extending into other countries).

### **Significance**

An effect (positive or negative) is significant at a specified geographical level if it affects the ecological integrity of a site or ecosystem or the conservation status of a species or habitat. If not significant at the level it was considered important, an effect could be significant at a lower geographic level (for example, an effect on a nationally-important population may not be significant to the national population). These assessments are based on quantitative evidence where possible, and as necessary through professional judgement.

Initially, the effect significance does not consider mitigation or compensation unless it is part of the embedded approach. The residual effect significance takes such measures into account, with the aim that, wherever possible, residual effects are not significant or are significant at a lower geographic level. In accordance with EPA (2017), significance of effect in this assessment has been stated using the terms Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. The last five of these terms are employed as equivalents of significance on the CIEEM-based geographical scale (Local (Lower), Local (Higher), County, National and International), in line with other parts of this EIAR.

CIEEM (2019) advise that where there is reasonable doubt and a conclusion of no significant effect cannot be robustly reached, this uncertainty should be acknowledged and a significant effect assumed, in line with the precautionary principle.

#### **9.1.4.6 Approach to mitigation and enhancement**

Where impacts on relevant ecological features are predicted, the approach to mitigation engages the following hierarchy:

- 1. Avoid features where possible.
- 2. Minimise impact by design, working method or other means (e.g. enhance existing feature).
- 3. Compensate for significant residual impacts (e.g. provide suitable habitat elsewhere).

This hierarchy requires the highest level to be applied where possible. Only where this cannot reasonably be adopted are lower levels considered, giving rationale including sufficient detail to show that the measures are feasible and would be provided.

NPF supports the protection and promotion of natural assets and biodiversity via green infrastructure. The Fingal Development Plan includes several nature conservation policies relevant to the Proposed Development, and the Barnhill LAP also contains several ecological objectives (see Section 9.1.3). Therefore the potential to secure biodiversity benefits, and compliance with these policies and objectives, has been considered in this assessment.

#### **9.1.4.7 Limitations**

The aim of a desk study is to help characterise the baseline context of a proposed development and provide valuable background information that may not be captured by field survey alone. Information

obtained during the course of a desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for particular habitats or species does not necessarily mean that they do not occur in the study area. Likewise, the presence of records for particular habitats or species does not automatically mean that these still occur within the area of interest or are relevant to the development.

Direct access was not possible to two fields outside the Site, and these were observed from adjacent roads and paths. Additionally, no access was possible to private residences, and the large area north of the railway line (outside the Site) was subject at the time to construction activity and was not accessed. However, the latter was of negligible ecological importance owing to the clearance and construction activity.

Owing to the timing of the commission, the original bat surveys were carried out in July and August 2020, in the middle and later part of the bat survey season (which is typically taken as May to September, inclusive), thus missing the early part of the season. However, July and August cover the key breeding period, and this data is supplemented by additional surveys carried out in September 2021 and (for one building assessed as having Low bat roost suitability survey and therefore requiring one survey (Collins, 2016)) in June 2022, and previous surveys carried out by Keeley and Wilkowska (2017) in May 2017. Consequently, and given that limited potential for bat roosts and no confirmed roosts were found during the surveys (see below), this limitation is not considered significant.

Part of Barnhill Stream was overgrown with vegetation and not directly accessible during the field survey. However, large parts were accessible for survey, and along those parts that were not, an inspection was made as far as possible through adjacent scrub etc. and along edges for possible signs of otter holts or activity (such as trails). Baseline data from previous surveys reported in Keeley and Wilkowska (2017) have also been included in the assessment. In view also of the small size of this stream, this limitation is considered minor.

#### 9.1.4.8 Sources of Information

Sources of desk study information are provided in the desk study methodology in Section 9.1.4.3.

#### 9.1.5 Study Area

The Study Area varies according to the ecological feature under consideration, as described in the desk study and field survey methodologies in Sections 9.1.4.3 and 9.1.4.4.

#### 9.1.6 Difficulties Encountered in Compiling Information

There were no significant difficulties in compiling the information used to inform this assessment.

## 9.2 Description of Existing Environment

The general site context is described in EIAR Chapter 1 – Introduction.

### 9.2.1 Nature conservation designations

#### 9.2.1.1 Statutory designations

There are four international nature conservation designations (all European sites, i.e. SPAs and SACs) and two statutory nationally designated sites within the search distances specified in Section 9.1.4.3. A fifth European site is also included because it lies within Dublin Bay close to several of the other international sites and with similar connectivity. These are set out in Table 9.7, below. Sites are listed in ascending order of distance from the Proposed Development, with those closest described first. The locations of the statutory designated sites relative to the Proposed Development are shown on Figure 9.2.



Table 9.7 Statutory designated nature conservation sites

Site name [site code]	Reason(s) for designation	Distance/direction from the Study Area
Royal Canal pNHA [002103]	The ecological value of this site includes the diversity of species along linear habitats and its function as a refuge for rare and protected species. These include the legally protected opposite-leaved pondweed <i>Groenlandia densa</i> , a red-listed stonewort <i>Tolypella intricata</i> , and otter. This pNHA includes peripheral habitat between the canal itself and adjacent agricultural land, which on the west side (towards the Proposed Development) comprises a strip of GS2 dry meadow grassland, with a hedgerow on the border of the pNHA.	0 m (immediately adjacent)
Liffey Valley pNHA [000128]	The ecological value of this site includes the diversity of habitats and several rare and threatened plant species. The site comprises the River Liffey (a salmonid river), low hills, mixed deciduous woodland, wet marsh, and grassland. The red-listed species green figwort <i>Scrophularia umbrosa</i> and yellow archangel <i>Lamiastrum galeobdolon</i> have been recorded at this site. Hairy St. John's wort <i>Hypericum hirsutum</i> , which is listed on the Flora Protection Order, has also been recorded at the woodlands of this site. The site is part of the Liffey Valley Special Amenity Areas Order 1990.	1.5 km south-east
Rye Water Valley / Carton SAC [001398]	Petrifying springs with tufa formation (Cratoneurion) [7220] Narrow-mouthed whorl snail <i>Vertigo angustior</i> [1014] Desmoulin's whorl snail <i>Vertigo moulinsiana</i> [1016]	3.5 km east-south-east
Glenasmole Valley SAC [001209]	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (important orchid sites) [6210] * Molinia <i>Molinion caeruleae</i> meadows on calcareous, peaty or clayey-silt-laden soils [6410] Petrifying springs with tufa formation (Cratoneurion) [7220]	15 km south-south-east
South Dublin Bay and River Tolka Estuary SPA [004024]	<u>Non-breeding birds:</u> Light-bellied brent goose <i>Branta bernicla hrota</i> [A046] Oystercatcher <i>Haematopus ostralegus</i> [A130] Ringed plover <i>Charadrius hiaticula</i> [A137] Grey plover <i>Pluvialis squatarola</i> [A141] Knot <i>Calidris canutus</i> [A143] Sanderling <i>Calidris alba</i> [A144] Dunlin <i>Calidris alpina</i> [A149] Bar-tailed godwit <i>Limosa lapponica</i> [A157] Redshank <i>Tringa totanus</i> [A162] Black-headed gull <i>Chroicocephalus ridibundus</i> [A179] Roseate tern <i>Sterna dougallii</i> [A192] Common tern <i>Sterna hirundo</i> [A193] Arctic tern <i>Sterna paradisaea</i> [A194] Wetland and waterbirds [A999] assemblage <u>Breeding birds</u> Common tern <i>Sterna hirundo</i> [A193] Arctic tern <i>Sterna paradisaea</i> [A194] Wetland and waterbirds [A999] assemblage	15 km east
South Dublin Bay SAC [000210]	Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Embryonic shifting dunes [2110]	15 km east
North Bull Island SPA	<u>Non-breeding birds:</u> Light-bellied brent goose [A046] Shelduck <i>Tadorna tadorna</i> [A048] Teal <i>Anas crecca</i> [A052]	17 km east

	Pintail <i>Anas acuta</i> [A054] Shoveler <i>Anas clypeata</i> [A056] Oystercatcher [A140] Golden plover <i>Pluvialis apricaria</i> [A140] Grey plover [A141] Knot [A143] Sanderling [A144] Dunlin [A149] Black-tailed godwit [A156] Bar-tailed godwit [A157] Curlew [A160] Redshank [A162] Turnstone [A169] Black-headed gull [A179] Wetland and waterbirds [A999]	
* Indicates that this Annex I habitat is a priority Annex I habitat under the Habitats Directive.		

### 9.2.1.2 Non-statutory designations

There are no non-statutory designations for nature conservation within 2 km of the Development.

## 9.2.2 Habitats

A description of the habitats within 200 m of the Proposed Development is provided below, using the Fossitt classification. A map showing the Fossitt habitat types is provided as Figure 9.3. Appendix 9.2 contains a list of plant species recorded during survey.

### 9.2.2.1 GA1 Improved agricultural grassland

The dominant habitat within the Study Area is improved agricultural grassland. The majority of these fields are heavily grazed by cattle and horses and are species-poor with short swards. In the eastern section of the Study Area a temporary small, shallow pool of water was recorded at the centre of the field with limited vegetation. Outside the Site boundary (within 200 m of the Site), the fields to the east and west of the Site mainly consist of further improved agricultural grassland similar to the fields within the Site.

The improved agricultural grasslands are typically dominated by perennial ryegrass *Lolium perenne* with frequent accompanying grasses including Yorkshire-fog *Holcus lanatus*, rough meadow-grass *Poa trivialis*, annual meadow-grass *Poa annua* and occasionally cock's-foot *Dactylis glomerata*. Less common grass species include meadow foxtail *Alopecurus pratensis*, false oat-grass *Arrhenatherum elatius*, sweet vernal-grass *Anthoxanthum odoratum* and creeping bent *Agrostis stolonifera*.

Occasional herb species include tufted vetch *Vicia cracca*, white clover *Trifolium repens*, red clover *Trifolium pratense*, common nettle *Urtica dioica*, creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, ribwort plantain *Plantago lanceolata*, dandelion *Taraxacum officinalis* agg., silverweed *Potentilla anserina*, common chickweed *Stellaria media*, broad-leaved dock *Rumex obtusifolius*, lesser burdock *Arctium minus*, common ragwort *Jacobaea vulgaris* and common field-speedwell *Veronica persica*.

### 9.2.2.2 GA2 Amenity grassland (improved)

There is a small area of heavily managed mown amenity grassland within the Study Area to the west of the private residences at the centre of the Site. This area also includes an ornamental garden and chicken coops.

### 9.2.2.3 GS1 Dry calcareous and neutral grassland

Note that GS1 excludes swards that are rarely grazed, which are assigned to GS2 (see below).

Two fields to the south of the Barnhill Stream had taller swards at the time of survey and may be grazed and/or cut less frequently. These two fields had moderately higher species diversity at the field edges

along the Barnhill Stream and the hedgerow running north to south between the fields. Species here, for example, included lady's bedstraw *Galium verum*, common restharrow *Ononis repens* and yarrow *Achillea millefolium*. However, the bulk of these fields is only marginally richer than typical improved grassland.

There is also a U-shaped area of assumed moderately grazed neutral grassland just outside the west edge of the Study Area, within the private curtilage of a large house. It was not accessed and is surrounded by hedges. It has been interpreted from inspection of aerial photography only, which suggests that this grassland is a pasture but is rougher and most likely moderately more diverse than the typical improved grassland fields dominating the survey area.

#### 9.2.2.4 GS2 Dry meadows and grassy verges

There is a moderately species-rich meadow along the north-west side of the canal. It is dominated by the grass species Yorkshire-fog, cock's-foot, perennial ryegrass and common couch *Elymus repens*. It contains numerous herbaceous species such as daisy *Bellis perennis*, oxeye daisy *Leucanthemum vulgare*, lady's bedstraw, black medick *Medicago lupulina*, common knapweed *Centaurea nigra*, common bird's-foot-trefoil *Lotus corniculatus*, yarrow, hawkweeds *Hieracium* sp., common ragwort, wild onion *Allium vineale*, wild marjoram *Origanum vulgare*, hemp-agrimony *Eupatorium cannabinum*, restharrow, and common valerian *Valeriana officinalis*.

There are less diverse grassy verges along the western side of the canal to the south of the canal bridge. This grassland area is dominated by perennial ryegrass, cock's-foot, with several herbaceous species such as white clover, common ragwort, creeping thistle, and creeping buttercup *Ranunculus repens*. Winter heliotrope *Petasites pyrenaicus*, a low-impact non-native species, is also widespread in this area along the canal.

There is also an abandoned field to the east of the canal with rough grasses and a tall sward height at the time of survey.

Beyond the Study Area to the farther north-west there are two abandoned fields dominated by grasses with occasional herbaceous weed species such as creeping thistle and common nettle. There was no access to this area and it was viewed from a distance only.

#### 9.2.2.5 WD1 (Mixed) broadleaved woodland

An area of mixed broadleaved woodland with a dense scrubby shrub layer is located 30 m north-west of the Study Area and on the opposite side of the railway. This comprises a mix of ash *Fraxinus excelsior*, elder *Sambucus nigra*, hawthorn *Crataegus monogyna*, wild privet *Ligustrum vulgare*, bramble *Rubus fruticosus* agg., rose *Rosa* sp. and sycamore *Acer pseudoplatanus*. Immature broadleaved woodland is classified under WS2 (see below).

#### 9.2.2.6 WD3 (Mixed) conifer woodland

There is a small stand of planted Scots pine *Pinus sylvestris* 30 m west of the Study Area to the south of a private residence.

#### 9.2.2.7 WS1 Scrub

There is a small area of scrub to the east of the industrial yard at the centre of the Study Area, containing a mix of bramble, common nettle, sycamore, rowan *Sorbus aucuparia*, elder, and ash. There is also low unmanaged scrub dominated by bramble and nettle with occasional sycamore trees at the industrial yard.

There are also two very small areas of scrub surrounded by fencing in the western section of the Study Area. These are dominated by bramble, elder, nettle, and hawthorn with occasional ash, hogweed *Heracleum sphondylium*, spear thistle, bittersweet *Solanum dulcamara*, and rosebay willowherb *Chamaenerion angustifolium*.

Along the railway line (not accessed) immediately to the north of the Study Area there is scrub with ruderal vegetation, which is dominated by bramble, creeping thistle, false oat-grass, and common nettle. Species beside the railway line also include field horsetail *Equisetum arvense*, common ragwort, cowslip *Primula veris*, gorse *Ulex europaeus*, and kidney vetch *Anthyllis vulneraria*.

Ground on the eastern side of the canal is composed of scrub habitat dominated by ash, elder, bramble, and hawthorn. Japanese knotweed *Reynoutria japonica*, a scheduled invasive species, is located within this scrub along the canal (ITM 703801 738237). This Japanese knotweed is located outside of the Study Area and not within or adjacent to any road transport route.

#### 9.2.2.8 WS2 Immature woodland

There are remnants of an old building to the west of the private residences near the centre of the Study Area, that is overgrown with immature trees and scrub. The woodland is dominated by ash and sycamore, with occasional English elm *Ulmus* sp., and a rather poor ground flora of rose, herb-robert *Geranium robertianum*, cleavers, elder, Atlantic ivy *Hedera hibernica* and bramble.

#### 9.2.2.9 WL1 Hedgerows

There are several mature, unmanaged hedgerows within and around the Study Area that are often associated with adjacent dry or wet ditches and contain scattered mature trees. The hedgerows are typically 4 to 5 m high and up to 4 m wide. They are dominated by hawthorn, elder, and bramble, with other woody species including ash, holly *Ilex aquifolium*, English elm, Atlantic ivy, dog-rose, sycamore and very locally Leyland cypress *Cupressus × leylandii*, with the ruderal herbs common nettle, cleavers and creeping thistle, and occasionally meadowsweet *Fillipendula ulmaria*.

#### 9.2.2.10 WL2 Treelines

There are several mature, unmanaged treelines within and around the Study Area that are typically dominated by ash with English elm, hawthorn and occasionally wild privet in the understorey. These are essentially hedgerows where tall trees dominate. Trees species also include beech *Fagus sylvatica*, pedunculate oak *Quercus robur*, horse-chestnut, and rowan. These trees are typically very mature and overgrown with ivy. The treelines are often associated with adjacent small dry or wet ditches.

There is also a tall (10 to 12 m high), unmanaged sycamore and Leyland cypress treeline along Barnhill Stream south of the Study Area.

#### 9.2.2.11 FW2 Depositing lowland rivers

There is a depositing lowland river known as the Barnhill Stream (EPA name: Rusk, EPA segment code: 09\_1660) that runs west to east in the southern section of the Study Area. The Barnhill Stream flows underneath the Royal Canal and then flows into the River Liffey approximately 3 km downstream.

The stream is small and flows eastwards, with a low water level and a muddy stream bottom. There is an open section of the stream in the western part of the Study Area that was disturbed at the time of survey by vegetation clearance and cattle activity. This section is dominated by ruderal species and the water is locally almost stagnant. There is limited instream vegetation within the Barnhill Stream, and vegetation at the edges is often overgrown and dominated by creeping thistle, bramble, Yorkshire-fog, common nettle, false oat-grass, hedge bindweed *Calystegia sepium*, and cock's-foot. There is dense scrub overhanging both sides of the stream at several sections, typically composed of bramble, elder, hawthorn, ash and rose species.

#### 9.2.2.12 FW3 Canals

The Royal Canal itself (rather than the wider Royal Canal pNHA, regarding which see above) is located within the Study Area but no part of the Proposed Development directly affects it. It has relatively stagnant, low water with a reinforced bank. Aquatic species within the canal include yellow water-lily *Nuphar lutea*, broad-leaved pondweed *Potamogeton natans*, yellow iris *Iris pseudacorus*, and submerged vegetation such as waterweed *Elodea* sp. The latter is an invasive non-native species.

#### 9.2.2.13 FW4 Drainage ditches

There are several small wet drainage ditches within the Study Area with shallow and occasionally deeper sections. These are all adjacent to and shaded by hedgerows/treelines and include species such as duckweed *Lemna* spp., watercress *Rorippa nasturtium-aquaticum*, common water-starwort *Callitriche stagnalis*, brooklime *Veronica beccabunga*, hard rush *Juncus inflexus* and meadowsweet (the last two are characteristic of damp but not waterlogged conditions).

#### 9.2.2.14 BC1 Arable crops

There were no arable fields in the Study Area at the time of survey, but there were two to the south containing rye *Secale cereale* and bread wheat *Triticum aestivum* at the time of survey.

#### 9.2.2.15 BL3 Buildings and artificial surfaces

Buildings and artificial surfaces include the industrial yard in the centre of the Study Area, the Hansfield train station to the north of the Study Area, and the Irish Rail yard to the east of the Study Area. There are also several private residences. These areas are of negligible ecological significance, comprising

built-up areas with occasional small areas of exotic shrub, amenity grassland, and bare ground. Much of the land north of the railway was an active construction area at the site of survey.

### 9.2.3 Protected and notable species

The baseline conditions with respect of protected and notable flora and fauna species are provided under the following sub-headings. Where relevant, records of these species identified by the desk study are referred to under the species sub-headings. However, a summary of all relevant records returned by the NBDC and NPWS database search (excluding records more than 50 years old) within 2 km of the Study Area is provided in Appendix 9.1.

#### 9.2.3.1 Bats

A review of the NPWS and NBDC databases returned records of several bat species within 2 km of the Study Area, including brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's bat *Myotis daubentonii*, soprano pipistrelle *Pipistrellus pygmaeus*, and whiskered bat *Myotis mystacinus*. These records do not state whether any are roosts, and they are presumed to be observations of flying bats.

A request for bat data within 1 km of the Study Area from Bat Conservation Ireland returned five bat records, which did not specify if any were roosts. The following bat species were recorded approximately 300 m south-east of the Study Area in 2007: *Myotis* sp., common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat, and Leisler's bat (also known as lesser noctule) *Nyctalus leisleri*. Leisler's bat was also recorded approximately 170 m south-east of the Site in 2016. These records were adjacent to the Barberstown Cottages near Lutterellstown Road (R121). Note that an absence of roost or bat records from any other desk study source does not in itself imply the absence of roosts or bats at the Study Area, hence surveys were carried out (see below).

In May 2017 Keeley and Wilkowska (2017) noted relatively high bat activity at the buildings within the centre of the Study Area and along the Royal Canal, recording three bat species: Leisler's bat, common pipistrelle and soprano pipistrelle.

Suitable habitat exists within the Study Area for commuting and foraging bats, in particular the Barnhill Stream and several mature and overgrown hedgerows/treelines running along the edges of pasture fields that are well-connected to the wider landscape including the Royal Canal. However, the heavily-grazed pasture dominating the Study Area constitutes relatively poor foraging habitat for bats.

#### **Bat roost suitability assessment**

No evidence of roosting bats was found during the ground-based assessment of bat roost suitability.

Two trees (T1 and T2) within the Study Area were categorised as having Moderate bat roost suitability following the initial ground-based bat roost suitability assessment. There were also several mature trees categorised as having Low bat roost suitability, primarily due to the ivy cover, which could potentially support a few individual bats.

The buildings within the central industrial complex were all assessed as having Negligible bat roost suitability with the exception of one small slate-roofed building immediately beside Barberstown Road North. The buildings with Negligible roost suitability are of modern construction with thin metal, concrete or stone walls, thin single-layer metal or asbestos roofs, and no apparent loft spaces. The small slate-roofed building is derelict with a collapsing roof with large holes, and would therefore be very draughty and not likely to be suitable for important roosts such as maternity roosts, however there were numerous remaining slates with several suitable gaps beneath which could offer space for minor bat roosts, hence this building was assessed as having Low bat roost suitability.

Table 9.8 provides a summary of the two trees with Moderate bat roost suitability. The locations of these trees, and those with Low bat roost suitability (for which no further survey is required under BCT guidance (Collins, 2016)) are shown on Figure 9.4.



**Table 9.8 Trees / structure with bat roost suitability requiring further survey**

Tree / structure reference	ITM Coordinates	Tree Species / Structure	Description from ground-based bat roost suitability assessment	Initial bat roost suitability	Emergence / re-entry survey required?
T1	703333 738563	Horse-chestnut	Crack in bark west-facing at 3 m height, south-facing rot at 5 m height that is potentially hollow within.	Moderate	Yes
T2	703589 738383	Ash	Two north-facing knotholes at 3 m height.	Moderate	Yes
B1	703344 738542	Derelict building	Small derelict slate-roofed building beside Barberstown Lane North. Windows broken. Roof collapsing, large holes, no loft. Suitably accessible gaps under some slates and through roof holes/windows.	Low	Yes

### Dusk emergence/dawn re-entry survey

No bats were seen to emerge from the dusk re-entry survey carried out on the one building in the central industrial complex identified as having Low bat roost suitability (note that under BCT guidelines (Collins, 2016), trees with Low bat roost suitability do not require further survey, but structures with Low bat suitability do require one survey).

No bats emerged from or re-entered the two trees with Moderate bat roost suitability during surveys in both 2020 and 2021. A description of the general bat activity during the surveys is given below:

- Tree 1 (horse-chestnut) dusk emergence surveys:
  - 21 July 2020: bat activity in the general area was relatively high with 26 recordings of Leisler's bat between 21:45 and 22:52 and seven recordings of common pipistrelle between 22:14 and 23:05. One Myotis species was recorded at 22:19.
  - 29 September 2021: bat activity was relatively high during the dusk emergence survey. Leisler's bat was recorded once at 19:40. Common pipistrelle was recorded 134 times throughout the night from 18:57 to 20:36 and soprano pipistrelle was recorded 54 times from 19:15 to 20:11.
- Tree 1 (horse-chestnut) dawn re-entry survey:
  - 11 August 2020: bat activity in the general area was low with only three Leisler's recordings at 04:36, 05:19, and 05:23. On 31 August 2021, bat activity was low during the dawn re-entry survey. Leisler's bat was recorded six times from 05:27 to 06:23. Common pipistrelle was recorded once at 05:30 and soprano pipistrelle was recorded four times from 05:09 to 05:42.
- Tree 2 (ash tree) dusk emergence survey:
  - 21 July 2020: bat activity in the general area was relatively high with 53 Leisler's passes recorded between 21:42 and 23:07 along with twelve common pipistrelle passes between 22:05 and 23:06. Soprano pipistrelle was also recorded passing four times during this survey between 22:20 and 23:01. One Myotis species was recorded at 22:19.
  - 29 September 2021: bat activity was relatively high during the dusk emergence survey. Leisler's bat was recorded seven times from 19:36 to 20:20. Common pipistrelle was recorded 194 times from 19:35 to 20:20 and soprano pipistrelle was recorded 77 times from 19:30 to 20:06. A social call was recorded at 19:36. Whiskered bat was recorded once at 20:32 and Nathusius' pipistrelle *Pipistrellus nathusii* was recorded once at 19:42.
- Tree 2 (ash tree) dawn re-entry survey:
  - 11 August 2020: bat activity in the general area was low with one Leisler's bat recorded 05:23, one Myotis species at 05:01 and two soprano pipistrelle passes at 04:52 and 04:57. On 31 August 2021, bat activity was relatively high during the dawn re-entry survey. Leisler's bat was recorded 28 times from 05:07 to 06:23. Common pipistrelle was recorded 30 times from 05:03 to 05:42 and soprano pipistrelle was recorded 106 times from 05:03 to 05:44. Nathusius' pipistrelle was recorded once at 05:07.

### Walked bat activity survey

The results of the walked transect bat activity survey are summarised in Table 9.9 and displayed in Figure 9.5. Note that the numbers for each bat species in Table 9.9 are the number of recorded bat passes and not the total number of bats – a single bat can make several passes in one location, consecutively or temporally spaced. Three bat species were recorded during the walked bat activity survey, comprising common pipistrelle, soprano pipistrelle, and Leisler's bat. Bats were predominately recorded along or near hedgerows.

**Table 9.9 Summary of walked transect bat activity surveys**

Date	Dusk / dawn	Start time	End time	Common pipistrelle	Soprano pipistrelle	Leisler's bat	Total no. bat passes
17/08/20	Dusk	20:48	22:48	34	2	16	52
30/08/20	Dusk	20:19	22:19	132	7	15	154
21/09/21	Dusk	19:26	21:26	57	45	41	143
Total no. bat passes				223	54	72	349

### Static bat activity survey

The results of the static bat activity survey are summarised in Table 9.10 and the locations of the static detectors are shown in Figure 9.1. Eight bats were recorded to species level (some *Myotis* species calls could not be determined to species) during static bat activity survey, of which three formed the majority of bat activity (common pipistrelle, soprano pipistrelle and Leisler's bat), with common pipistrelle by far the most frequent. A further five species were recorded at much lower levels of activity: Nathusius' pipistrelle, Natterer's bat *Myotis nattereri*, Daubenton's bat, whiskered bat and brown long-eared bat, as well as undetermined *Myotis* species, of which the latter reached a maximum average of three passes per night, whiskered two passes night, and the others less than one pass per night. The calls in the recorded passes of *Myotis* species were often not identifiable to species with certainty in many cases, as is often the case for this group.

At Location A, there were fairly high levels of Leisler's bat activity with 222 passes on average per night, the majority from the July deployment. There were moderate levels of common pipistrelle activity (70 passes on average per night) and low levels of soprano pipistrelle activity (27 passes). Average passes per night for *Myotis* sp. was very low at less than one per night, from nine passes only suggesting small numbers of bats. The *Myotis* calls within recorded passes could not be reliably identified with certainty but were considered likely to comprise Daubenton's bat and whiskered bat calls.

At Location B, there were moderate levels of Leisler's bat and common pipistrelle activity with 57 passes and 37 passes on average per night respectively. The recorded passes included several social calls. Soprano pipistrelle and *Myotis* species showed low levels of activity with approximately 5 passes and 3 passes on average per night respectively, and with total numbers of passes suggestive of very low numbers of bats. The *Myotis* recordings could not be identified with certainty but were considered likely to have been whiskered bat calls judging from the start and end frequencies of recorded calls.

At Location C, there were moderate levels of common pipistrelle and soprano pipistrelle activity, with 61 and 22 passes on average per night respectively. Leisler's bat had relatively lower levels of activity with approximately eight passes on average per night. Nathusius' pipistrelle, Daubenton's bat, whiskered bat, natterer's bat, brown long-eared bat, and an unidentified *Myotis* species were all recorded infrequently at Location C, with average passes per night less than two and mostly less than one (much less than one for brown long-eared and Natterer's bats), and arising from small numbers of total passes that suggest small to very small numbers of bats (for Natterer's bat the recording is of one bat only, since only one pass was recorded).

**Table 9.10 Static detector bat activity results ('<1' = 0.1-0.9%; '<<1' = less than 0.1%).**

Location	Deployment	Bat species	July 2020	August 2020	September 2021	Total recorded passes	Average passes per night	% of total passes at location
A	11 nights	Leisler's bat	2085	359	n/a	2444	222	69
		Common pipistrelle	660	108	n/a	768	70	22
		Soprano pipistrelle	270	30	n/a	300	27	9
		<i>Myotis</i> species	9	0	n/a	9	<1	<1
B	14 nights	Leisler's bat	513	449	n/a	962	69	56
		Common pipistrelle	302	322	n/a	624	45	37
		Soprano pipistrelle	34	35	n/a	69	5	4
		<i>Myotis</i> species	24	22	n/a	46	3	3
C	31 nights	Common pipistrelle	n/a	n/a	1874	1885	61	65
		Soprano pipistrelle	n/a	n/a	668	679	22	23
		Leisler's bat	n/a	n/a	234	242	8	8
		Whiskered bat	n/a	n/a	45	45	1	2
		<i>Myotis</i> species	n/a	n/a	35	35	1	1
		Daubenton's bat	n/a	n/a	12	12	<1	<1
		Nathusius' pipistrelle	n/a	n/a	5	5	<1	<1
		Brown long-eared bat	n/a	n/a	2	2	<<1	<<1
Natterer's bat	n/a	n/a	1	1	<<1	<<1		

### 9.2.3.2 Otter

One very old record of otter within 2 km of the Site was returned from the NPWS database, at the Royal Canal near Beech Park House in 1980.

In March 2017, Keeley and Wilkowska (2017) recorded fresh prints and otter spraints in the section of Barnhill Stream that passes underneath the Royal Canal.

Moderately suitable habitat for otter was present within the Study Area during the 2020 and 2021 field surveys, comprising the watercourse through the south of the Site (Barnhill Stream) and to a much lesser extent the associated drainage ditches. The Barnhill Stream is small and not likely to support a major fish foraging resource for otter, and does not connect upstream to waterbodies of potential high value to otter, therefore otter probably occurs infrequently along the Barnhill Stream, which concurs with the lack of field observations in 2020 and 2021 (see next paragraph).

No signs of otter were recorded during survey in July 2020 and September 2021. As noted in the Limitations, some of the Barnhill Stream was covered by overgrown vegetation such that the stream was not visible, however access was possible to open sections and inspection was made through and along the densely-vegetated sections for otter evidence. No otter evidence such as spraints or holts were found along the stream. However, given the observation of otter spraint on the Barnhill Stream under the Royal Canal in 2017 (Keeley and Wilkowska, 2017), and continued moderate suitability of the stream, occasional otter presence along the stream is expected.

### 9.2.3.3 Badger

Four records of badger within 2 km of the Study Area were returned by the NPWS and NBDC databases. The badgers identified were roadkill located 300 m north-west, 300 m south-east, 750 m south-east, and 1.2 km east of the Study Area. The databases did not include any records of setts.

Keeley and Wilkowska (2017) found evidence that badgers commute to and feed within the north-eastern corner of the Study Area. They also reported that badgers use lands at the hospital in Clonsilla, and that an artificial badger sett was created in a field neighbouring the hospital in Clonsilla.

An active outlier badger sett was identified in a hedgerow in the Study Area in July 2020 (see Photograph 9.1, and the Figure 9.6). It comprised a single entrance hole 40 cm high and 30 cm wide

with an eastward tunnel direction. The hole entrance showed recent excavation activity with badger hairs and a latrine at the entrance. Badger prints and a path were also recorded by a hedgerow near the southern edge of the Study Area. This badger sett was also active during the ecological walkover survey carried out in September 2021, and still comprised a single hole.

**Picture 9.1 Badger sett entrance**



**NOTE: THE BADGER SETT LOCATION FIGURE HAS BEEN REDACTED IN LINE WITH BEST PRACTICE INTENDED TO AVOID PERSECUTION OF BADGERS**

#### 9.2.3.4 Other small mammals

The NBDC and NPWS database searches returned records of pygmy shrew, Irish stoat and hedgehog within 2 km of the Study Area which are all protected under the Wildlife Acts.

Hedgehog activity in nearby fields was noted in 2016 and pygmy shrew was stated to have been heard at the eastern side of the northern field of the Study Area by Keeley and Wilkowska (2017).

The heavily-grazed pastures dominating the Study Area could be used for foraging by hedgehog, and along with and pygmy shrew and Irish stoat would likely utilise the hedgerows for foraging and refuge purposes. Short-grazed pasture is not favourable habitat for pygmy shrew therefore numbers in the Study Area would be likely to be small.

#### 9.2.3.5 Birds

##### **Desk study bird records**

A total of 59 protected and notable bird species were returned by the NPWS and NBDC database search within 2 km of the Study Area (Appendix A). The majority of these bird records are at 10 km resolution only, within the grid square O03 of which the Study Area is only a small part. The records mostly do not state whether nests or territorial behaviour were observed, but sightings outside the breeding season would clearly not be of breeding birds.

Seven of the bird species returned by the NPWS and NBDC database search are listed under Annex I of the Birds Directive. These are given below with rationale explaining why they would not occur or be dependent on the Study Area:



- breeding and (wintering) kingfisher *Alcedo althis* (confirmed breeding record in the 10 km square) – this species requires stable unvegetated vertical riverbanks to breed in, and will therefore not breed within the Study Area, nor is it likely to regularly use the Barnhill Stream for foraging because of its very small size and partial covering by overgrown vegetation;
- breeding corncrake *Crex crex* (probable breeding record in the 10 km square), and merlin *Falco columbarius* and peregrine falcon *Falco peregrinus* (both with possible breeding records in the 10 km square) – none of these are likely to breed in the Study Area owing to a lack of suitable habitat, and none were observed during the breeding bird survey (corncrake typically nests in substantial areas of tall and often ruderal vegetation, peregrine mostly on cliffs and occasionally tall buildings or other structures, and merlin mostly in thick heather *Calluna vulgaris*); and
- wintering European golden plover, little egret *Egretta garzetta*, and whooper swan *Cygnus cygnus* – little egret typically occurs in marshy areas, which are absent from the Study Area, and whilst golden plover and whooper swan may rest or forage in agricultural fields including pasture, and little egret might occasionally visit the more open section of the Barnhill Stream (the extensive scrubby sections would be unsuitable), there is no reason to expect a particular dependence on the fields or stream in the Study Area. Such fields are widespread in the adjacent region and often within zones marked for preservation as such in the Local Development Plan, and there are far more suitable watercourses and wetlands for little egret in the surrounding area.

There are four records of barn owl *Tyto alba* in the 10 km square. This species can nest in barns or similar buildings or occasionally in large tree cavities (or in barn owl boxes). The Study Area is sub-optimal for foraging by this species owing to the dominance of heavily-grazed pasture which would lack or support very few small mammal prey, and there was not considered to be any likelihood of this species breeding in the existing buildings in the industrial yard south of Barberstown Lane North, which were in active use at the time of survey. No barn owls were seen during the bat surveys.

There were also probable breeding and wintering records of the waders curlew *Numenius arquata* and common snipe *Gallinago gallinago* within the 10 km grid square. The habitat of common snipe (wet marshy ground, often with rushes *Juncus* spp.) is absent from the Study Area thus snipe can be taken as likely absent. Curlew does not breed in heavily grazed pasture, therefore would not breed in the Study Area, and although it could use the fields in the Study Area at times for foraging in winter, such fields are extensive in the region. Both species are also widespread in the region.

A third wader, oystercatcher, was also recorded in winter in the 10 km grid square, but is widespread in the region and again has no likely dependence on the particular fields in the Study Area amongst the many in the region. Woodcock *Scolopax rusticola*, also recorded in winter, is also a wader but is associated with woodland which is absent in any significant extent from the Study Area therefore this species is highly unlikely to occur within it.

Mute swan *Cygnus olor* was recorded breeding and wintering in the 10 km square. Mute swan is associated with substantial standing or running waterbodies and will therefore not occur within the Study Area.

The following gulls, that are of conservation concern for declining or limited breeding populations, were recorded wintering in the 10 km square: great black-backed gull *Larus marinus*, lesser black-backed gull *Larus fuscus*, common gull *Larus canus*, black-headed gull, and herring gull *Larus argentatus*. Black-headed gull (a red-listed breeding bird) and herring gull were also recorded breeding in the 10 km square. However, there is no likelihood that the particular fields in the Study Area would be of special significance for wintering gulls given the abundance of such fields in the region, and there is no possibility of these species breeding within the Study Area since none of the habitats within it constitute breeding habitat for gulls (which comprise habitats such as cliffs, large buildings, moorland and, in the case of black-head gull, substantial marshy wetland or waterbodies). All these gull species are also widespread in the surrounding area.

### Breeding bird survey

Breeding bird surveys were carried out within 50 metres of the Study Area in May and June 2017 by Keeley and Wilkowska (2017). Habitats with higher bird activity included dense hedgerows and mature trees. The following BoCC red- or amber-listed species were recorded in the Study Area, giving estimated numbers of pairs/territories based on the mapping, text and tabulated data given in Keely and Wilkowska (2017):

- Red-listed:
  - yellowhammer *Emberiza citrinella* – probable breeding activity comprising two males and likely two territories in hedges in southern part of the Study Area and at shrubs along the Barnhill Stream; thought to use southern part of Study Area because of the proximity of cereal fields for foraging just outside the Study Area to the south;
- Amber-listed:



- goldcrest *Regulus regulus* – probable breeding, estimate 2 pairs;
- greenfinch *Chloris chloris* – probable breeding, estimate 3 pairs,
- swallow *Hirundo rustica* – confirmed breeding, estimate 2-4 pairs at barns, but also at retained houses surrounded by but not within the Study Area,
- mistle thrush *Turdus viscivorus* – possible breeding, maximum 2 pairs based on locations.

The red-listed species meadow pipit *Anthus pratensis* was also recorded possibly breeding, but outside the Study Area to the north in what was a construction site in 2020. There is no suitable habitat for meadow pipit within the Study Area, the typical breeding habitat being rough grassland or moorland.

The amber list species house sparrow *Passer domesticus* was confirmed to be breeding but was associated with unaffected retained houses and adjacent hedges surrounded by but not part of the Study Area. Stonechat *Saxicola rubicola*, also amber-listed, was also recorded potentially breeding, but outside the Study Area along the railway line. Finally, the amber list species swift *Apus apus* and house martin *Delichon urbica* (observed gathering mud) were recorded but there was no evidence of breeding in the Study Area.

During the protected mammal survey and preliminary bat roost assessment carried out in July 2020, yellowhammer were again recorded singing in the hedgerows in the south of the Study Area, similarly to the above bird survey. No other red list species were incidentally recorded in 2020 or 2021.

#### 9.2.3.6 Amphibians and reptiles

Records of common frog *Rana temporaria* and smooth newt within 2 km of the Study Area were held by the NPWS and NBDC databases. There were no rare or protected reptiles recorded within 2 km of the Site.

Keeley and Wilkowska (2017) noted frog spawn in a culvert near the railway line at the northern boundary of the Site. They also noted that small ditches along hedgerows in the Study Area could be used by amphibians but also noted drying out in dry periods, which reduces their value to amphibians. In the wider area, Keely and Wilkowska (2018b) reported a maximum of six smooth newts at a drain in the Hansfield area on the opposite (north) side of the railway from the Study Area; however, newts were found to be absent there during a subsequent survey (the Applicant, pers. comm.).

The 2020 field surveys noted that potential for breeding amphibians within the Study Area is limited, comprising a small part of the Barnhill Stream and above-mentioned drainage ditches. There are no ponds in the Study Area or within 250 m. The Royal Canal, which is beyond but near the south-east corner of the Proposed Development, is subject to amenity fishing and contains several species of large coarse fish including pike *Esox lucius*, perch *Perca fluviatilis*, rudd *Scardinius erythrophthalmus*, tench *Tinca tinca* and bream *Abramis brama*, all of which are omnivorous or predatory and will prey upon amphibians (<https://royalcanal.ie/royal-canal-greenway/fishing/>), rendering the canal an unfavourable habitat for amphibians. Favourable terrestrial habitat in which young newts can find refuge and develop to maturity, and where adults can hibernate, comprises structurally taller/complex habitats such as long grass and woodland, whereas the overwhelming dominant habitat in the Study Area is highly unfavourable heavily-grazed pasture. Although a small section of relatively stagnant water was noted on the Barnhill Stream (ITM 703015 738295), and two adult common frogs were recorded along it, running water is unfavourable for amphibians and no newts were seen. A likely presence of stickleback further reduces the likelihood of a significant amphibian population (sticklebacks predate amphibians and exhibit a wide habitat tolerance including small muddy and polluted streams/ditches, and are recorded shortly downstream in the NBDC database).

#### 9.2.3.7 Fish

The Barnhill Stream is very small and would not support a significant fish population. Disturbance of parts of the stream by livestock and overshadowing of other parts by shrubs further reduces the current value of the stream to fish. As mentioned above in respect of amphibians, stickleback is likely to be present in the stream since it is recorded downstream, and has a wide habitat tolerance.

As noted in the previous section with regard to amphibians, the canal (which is outside but near the south-east corner of the Proposed Development) is known to contain a number of large coarse fish including pike, perch, rudd, tench and bream.

#### 9.2.3.8 Invertebrates

Seven red-listed invertebrate species records within 2 km of the Study Area were held by the NPWS and NBDC databases.

Five of the red-listed invertebrates were butterflies. This included marsh fritillary *Euphydryas aurinia*, which is listed under Annex II of the Habitats Directive. However, marsh fritillary is extremely unlikely to occur in the Study Area owing to lack of suitable wetland habitats with devils bit scabious *Succisa pratensis*, the main larval food plant. Similarly, the Study Area habitats (principally agriculturally-improved pastures with hedgerows) are not suitable breeding habitat for the other four notable butterfly species (listed in Appendix 9.1).

The NBDC database search results also included the red-listed large red-tailed bumblebee *Bombus lapidarius* (classified as Near Threatened) and lake orb mussel *Musculium lacustre* (classified as Vulnerable). The large red-tailed bumblebee uses a wide range of habitats and the closest record was 800 m north in a small grassland field within a residential complex. Therefore, large red-tailed bumblebee could occur within the Study Area; however, the heavy grazing and agriculturally-improved pasture dominating the Study Area severely limits the availability of flowers upon which such bumblebees forage, therefore the Study Area is likely to be of limited importance for this species.

Lake orb mussel was recorded in 2003 at the Royal Canal adjacent to the Study Area. It prefers small, ephemeral or species-poor freshwater habitats and can tolerate nutrient-rich and deoxygenated conditions (information obtained from <http://www.habitas.org.uk/>). It could occur within the Study Area in the Barnhill Stream, especially in view of the observed areas of apparently stagnant water in parts of this stream.

#### 9.2.3.9 Plants

The NBDC and NPWS database search returned three rare plant species within 2 km of the Study Area. One of these was upright brome *Bromopsis erecta* (classified as Near Threatened). However, this species is highly unlikely to be present within in or near the Study Area owing to the absence of calcareous grassland, which is its preferred habitat.

Green figwort *Scrophularia umbrosa* (classified as Near Threatened) was recorded in the NPWS dataset approximately 1.8 km southeast of the Study Area in St. Edmondsbury, Liffey Valley. The preferred habitat of green figwort is fertile soils by streams and rivers and within damp woodland, whereas the Study Area is agriculturally-improved and heavily-grazed. It is more or less confined to the River Liffey according to the Botanical Society of Britain and Ireland (BSBI). Therefore, green figwort is highly unlikely to occur in the Study Area, and none was found during field survey.

There are records (latest in 1992) of Hairy St. John's-wort *Hypericum hirsutum* (protected under the Flora Protection Order and classified as Vulnerable) in the NPWS dataset, located immediately north-west of the Site at Barnhill Bridge at the railway line (ITM 703171 738855). Hairy St. John's-wort prefers well-drained, neutral to basic soils in open or moderately-shaded habitats including ungrazed grassland, woodland edges and clearings, river banks, and road and railway verges. The Site is dominated by agricultural grasslands that are heavily grazed by livestock, and the Barnhill Stream is disturbed by cattle in several sections and over-shaded by vegetation in other sections. For these reasons it is not likely that Hairy St. John's-wort would be present within the Study Area, and it was not identified during the habitat survey in July 2020, nor in previous surveys (Keeley and Wilkowska, 2017). However, St. John's-wort may still be present outside the Study Area by the railway line to the north of the Site.

No protected or specially-notable plant species were recorded during the field survey. One species was noted which although not rare, is localised in Ireland – this was wild onion, which was recorded in grassland beside the canal beyond the Study Area. No notable plants were found within the Study Area, and it is highly unlikely that there would be any given the agricultural improvement and heavy grazing. Appendix 9.1 lists plants recorded within the Study Area and adjacent to it.

#### 9.2.3.10 Invasive non-native species

Three high-impact invasive animal species were recorded within 2 km of the Study Area in the NBDC and NPWS databases, comprising grey squirrel *Sciurus carolinensis*, brown rat *Rattus norvegicus*, and sika deer *Cervus nippon*. There were also several records of the medium-impact invasive species rabbit *Oryctolagus cuniculus*. Since grey squirrel and to some extent sika deer occur in woodland, which is absent from the Study Area to any significant extent, they are unlikely to occur within it. Rabbit and brown rat could occur in the Study Area – rabbit if present would be most likely to occur along the hedgerows, and brown rat along the Barnhill Stream or in the vicinity of existing houses/buildings.

Keeley and Wilkowska (2017) noted evidence (droppings and visual sighting) of the high-impact invasive animal species American mink *Mustela lutreola* within the Study Area in 2016. This species will likely mainly occur along the Barnhill Stream.

No scheduled invasive plant species were recorded within the Study Area, however Japanese knotweed (a scheduled invasive species) was recorded along the canal approximately 70 m to the east of the Site (ITM 703801 738237). This area of Japanese knotweed was located outside of the Study Area and was not located within or adjacent to any transport route.

One high-impact invasive plant species, cherry laurel *Prunus laurocerasus*, was recorded in a hedgerow but outside of the Study Area beside a private residence to the west of the Site.

## 9.2.4 Future baseline

### 9.2.4.1 Baseline at the time of construction

The Proposed Development is expected to progress construction within a relatively short time period not exceeding two years, therefore the baseline for most of the Study Area at the time of construction have been professionally reviewed and are considered to be extremely similar to that described in the baseline above, with two exceptions. The exceptions concern the proposed upgrading of two roads – Barberstown Lane South just beyond the south edge of the Proposed Development, and an upgraded R149 through the western part of the Study Area. These will have been completed under separate developments when the Proposed Development proceeds, and will be part of the baseline environment. The result in terms of habitats will be an increased area of road surface and road verges of sown grassland etc., at the south edge of the Study Area or enclosed within it with for the R149, replacing existing poorer quality pasture and some sections of hedgerow and trees (thus a number of trees with Low bat roost suitability will not be present along Barberstown Lane South at the time of construction). Note that the upgraded Barberstown Lane South will include a badger underpass (see Section 9.3.6.7), and both road schemes will be maintaining access for otter along the Barnhill Stream (see Section 9.3.6.6).

### 9.2.4.2 Baseline in the absence of the Proposed Development

The future baseline in the absence of the Proposed Development (the 'do nothing scenario'), taken for these purposes to be the situation in 20 years, would very likely include a development similar to the Proposed Development within the Study Area, with peripheral and intersecting road upgrades. This is because the Barnhill LAP requires fulfilment by Fingal County Council, whether or not this is achieved by the Proposed Development. Therefore in the absence of the Proposed Development it is very likely that an alternative similar development would be constructed, with accompanying road scheme improvements. In the unlikely event that the Barnhill LAP was entirely withdrawn with no replacement, then the existing habitat baseline would likely persist, with agriculturally-improved pastures for grazing livestock dominating the Study Area. It is not likely, in the absence of the Proposed Development, that there would be any significant improvement in ecological condition. Ecological condition would in some ways be lower than with the Proposed Development, owing to the inclusion within the design of the Proposed Development of a significant wetland feature, meadows and woodland near the Barnhill Stream, for which ecological enhancement through removal of covering scrub is also embedded into the design along with significant hedgerow retention.

## 9.3 Predicted impacts

The Proposed Development is considered to be a permanent development. There is therefore no expectation of a decommissioning phase, and decommissioning is not considered. Potential impacts are given for construction and operation phases, where not excluded from assessment in the following section.

### 9.3.1 Do Nothing Scenario

As discussed above, it is likely that an alternative similar development would be undertaken in the absence of the Proposed Development, since the Barnhill LAP requires to be fulfilled. In the hypothetical situation that the Barnhill LAP was abandoned and neither the Proposed Development nor a similar one was undertaken, the ecological baseline would likely remain much as reported above, and it is unlikely that there would be any significant improvement in ecological condition of the predominantly agricultural habitats. Ecological condition would in several ways be lower in a 'do nothing scenario', owing to the inclusion within the design of the Proposed Development of a significant wetland feature with adjacent meadows and woodland, and enhancement of the Barnhill Stream through removal of covering shrubs and provision of further adjacent meadow.

### 9.3.2 Features excluded from assessment

Relevant ecological features are those that are considered to be 'important' and have the potential to be affected by the Proposed Development (CIEEM, 2019). This is consistent with the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU) which requires investigation of *likely significant effects*, as also emphasised by EPA (2017).

Accordingly, and in view of the baseline data obtained through desk study and field survey, the following features have been excluded from further assessment, because either a) they are considered to be likely absent, b) they do not satisfy criteria for importance, c) there is considered to be no impact pathway, or d) there is considered to be no likelihood of a significant effect on them:

- habitats other than the Barnhill Stream and hedgerows/treelines – other habitats in the Study Area are not of sufficient ecological note to separately assess further. The grassland is mainly species-poor agriculturally-improved pasture, and localised areas of neutral grassland within or next to the Study Area that will or could be impacted by the Proposed Development are also relatively species-poor and not of ecological note. Woodland within the Study Area comprises a very small extent of immature disturbed scrubby woodland around a ruined building, and woodland outside the Study Area is situated on the opposite side of roads/railway such that indirect effects are improbable. Other habitats adjacent to the Study Area are either of no note (mostly agricultural fields), or are situated such that indirect effects are improbable (on the opposite side of roads/railway, agricultural fields or the Royal Canal); however the Royal Canal itself and adjacent grassland is included in the assessment under the Royal Canal pNHA;
- red squirrel and pine marten – no records of these species were returned from the desk study and the Study Area is highly sub-optimal for these species, being dominated by agricultural grassland with no significant woodland;
- wintering birds – as noted above, notable wintering birds for which there are desk study records either will not occur in the fields in the Study Area or will not have particular dependency upon them given that such fields are widespread in the adjacent region. With similar reasoning, the Natura Impact Statement (AECOM, 2021) also determined that the Study Area was not likely to be important to wintering birds from coastal European sites (including curlew and oystercatcher). Therefore no significant effect is likely on wintering birds;
- fish – significant parts of the Barnhill Stream are disturbed by livestock and overshadowed by shrubs, and it is very narrow and generally shallow, therefore it is unlikely to support significant fish populations, and no records of notable fish were returned from the desk study; moreover fish are unlikely to be significantly affected by the Proposed Development since it intends to retain the Barnhill Stream and enhance adjacent habitat;
- invertebrates other than lake orb mussel – the Study Area is of no or negligible value for the notable butterflies returned by the desk study owing to a lack of suitable breeding habitat, and of limited value to the red-listed bumblebee returned by the desk study owing to the heavy grazing and agricultural improvement of the grassland dominating the Study Area;
- protected or notable plants – there are no known protected or notable plant species within or adjacent to the Study Area;
- invasive non-native plants – the only known invasive non-native plants in or near the Study Area comprise Japanese knotweed on the opposite side of the canal, and cherry laurel in a hedge belonging to a retained private property, neither of which would be affected by the Proposed Development; and,
- invasive animal species – invasive animal species that are known to occur in the Study Area or for which there is a reasonable likelihood of their occurrence comprise American mink, rabbit and brown rat; however, there is no mechanism by which the Proposed Development could cause a significant increase in these species and more importantly no realistic means by which the Proposed Development could spread them elsewhere.

### 9.3.3 Importance of ecological features

Ecological features identified in the baseline conditions and not scoped out of detailed assessment (see above), i.e. those that are considered 'important' (following CIEEM (2019)), are set out in Table 9.11 below, together with the rationale. Ecological importance has been assessed on a geographic scale following CIEEM (2019).

For the purposes of defining geographical scale, 'County' is defined as Co. Dublin, 'Local (Local Higher)' as the area within 5 km of the Proposed Development, and 'Site (Local Lower)' as the Site and immediate surroundings.

**Table 9.11 Importance of ecological features**

<b>Ecological feature</b>	<b>Importance</b>	<b>Rationale</b>
Rye Water Valley / Carton SAC [001398]	International (Very High)	International nature conservation designation.
Glenasmole Valley SAC [001209]	International (Very High)	International nature conservation designation.
South Dublin Bay and River Tolka Estuary SPA [004024]	International (Very High)	International nature conservation designation.
South Dublin Bay SAC [000210]	International (Very High)	International nature conservation designation.
Royal Canal pNHA [002103]	National (High)	Proposed national nature conservation designation.
Liffey Valley pNHA [000128]	National (High)	Proposed national nature conservation designation.
Barnhill Stream	Local (Local Higher)	Barnhill Stream is very small and affected by livestock disturbance and covering vegetation, but constitutes one of the few habitats of moderate ecological note within the Study Area, and the only water feature (other than small ditches beside hedgerows), providing water connectivity beyond the Site. It is not of sufficient size or note to warrant County importance. The Barnhill LAP states that it should be protected to support biodiversity within the local area.
Terrestrial habitats	Local (Local Higher)	The mature hedgerows and treelines comprise native species, provide connectivity between the Study Area and adjacent areas, and are a resource for local wildlife (such as birds, bats and invertebrates) within the Study Area which is otherwise dominated by improved pastures of negligible ecological importance. The Barnhill LAP states that hedgerows and mature trees within the Study Area should be protected to support biodiversity within the local area.
Bats	County (Medium)	Bats are strictly protected under the Habitat Regulations. However, the bat surveys found no roosts at the two trees with Moderate bat roost suitability, and the trees with Low suitability are likely to support no or few bats with no likelihood of significant roosts (such as maternity roosts). Bat activity, which was generally moderate to low, was dominated by common and widespread species (common pipistrelle, soprano pipistrelle and Leisler's bat), with low levels of activity by Myotis species and extremely low Nathusius' pipistrelle and brown long-eared bat activity. Although the latter could have been under-recorded (since it echolocates very quietly), it is also common. The wide range of bats using the Study Area suggests more than local importance, however given the low levels of activity other than for common species, and lack of roosts, national importance is not considered applicable and County importance has been assigned.
Otter	Local (Local Higher)	Otter is strictly protected in Ireland under the Habitat Regulations. Although no sign of otter was found during recent surveys, earlier surveys had found evidence near the canal. Given the large range of otters (in the order of 15 km of watercourse for females and



		often much more for males), and the size of the Barnhill Stream which constitutes a very minor resource for otters, with no known otter refuges and no connectivity to significant upstream otter habitat, it is likely that otter presence in the Study Area is occasional and involves one or two otters only, and it the Barnhill Stream is not likely to be important to otters. Therefore otter is considered of Local importance only.
Badger	Local (Local Higher)	Badger is legally protected in Ireland under the Wildlife Acts. However, badger is common and widespread in Ireland, and only one small outlier sett was found in the Study Area, therefore the badger population using the Study Area is likely to be of Local (Local Higher) importance only.
Other protected mammals: hedgehog, Irish stoat, Irish hare, pygmy shrew	Local (Local Higher)	These species are protected under the Wildlife Acts. Their numbers are likely to be limited given the dominance of heavily-grazed agricultural fields. These species are also common and widespread, therefore populations within the Site would not exceed Local (Local Higher) importance.
Amphibians: common frog and smooth newt	Local (Local Higher)	Common frog and smooth newt, which are widespread in Ireland, are protected under the Wildlife Acts. Two frogs were observed along the Barnhill Stream, and there are small ditches by several hedges, but as noted above there is a likelihood of significant stretches of small ditches drying out in dry weather and adjacent habitat is poor (heavily-grazed pasture is unfavourable offering no cover), with no ponds within 250 m and a likely presence of predatory stickleback, or other fish, in the Barnhill Stream and Royal Canal. The amphibian population in the Study Area would therefore likely be very small.
Reptiles: Common lizard	Local (Local Higher)	Common lizard is protected under the Wildlife Acts. It was not recorded during field survey or desk study, and although it could occur in small numbers along the edges of the Barnhill Stream, hedgerows and road verges, the dominant heavily-grazed pasture is not favourable habitat, and any population within the Study Area is therefore likely to be very small. Therefore the population would at most be of Local (Local Higher) importance.
Breeding birds	Local (Local Higher)	All of the Annex I and other notable breeding birds for which desk study records were returned in the relevant 10 km square are highly unlikely to breed, or certainly will not breed, within or close to the Study Area itself owing to a lack of suitable breeding habitat (see above). One red list breeding species, yellowhammer, was found during the bird survey with likely two territories overlapping the southern part of the Study Area, but this species is not rare in Ireland, and two territories do not warrant County level importance. The amber-listed species are of less note and are also common and widespread. Consequently, a Local (Local Higher) level of importance for breeding birds is considered appropriate, largely based on breeding yellowhammer.
Invertebrates: lake orb mussel	Local (Local Higher)	Lake orb mussel is classed as 'Vulnerable', and although somewhat localised in Ireland it is also widespread and almost certainly under-recorded. Any possible presence in the very small Barnhill Stream is likely to be very minor compared with the likely population in the much larger canal, which contains abundant viable habitat (mud) and where multiple records exist at presumed sampling points. Therefore, lake orb mussel in the Study Area is considered of Local (Local Higher) importance only.

### 9.3.4 Embedded mitigation

Several aspects of the Proposed Development constitute embedded ecological mitigation that is part of the design and has been taken into account during the initial impact assessment. These are listed in Table 9.12, which also notes compliance with key biodiversity objectives in local policy (either the Barnhill LAP, the current Fingal Development Plan (FDP) or the Draft Fingal Development Plan 2023-2029 (Draft FDP)).

**Table 9.12 Embedded ecological mitigation and local biodiversity policy compliance**

Embedded ecological mitigation	Local biodiversity policy
Retention of significant lengths of existing hedgerows/tree lines, including the majority of the north-south hedgerows with numerous mature trees and significant sections of hedgerow and trees along Barberstown Lane North; the total retained hedge length is 2.1 km (see Landscape Design Report, Sections 1 and 4, provided by Gannon Associates and accompanying the planning application – retained hedges are green).	GI06 of the Barnhill LAP NH27 of the FDP GINHP21/22 of Draft FDP
Provision of 5 m width or more of buffering grassland beside much of the length of the retained north-south hedges/tree lines, sown with suitable meadow mix incorporating locally-native species advised by an ecologist (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).	GI16 of the Barnhill LAP NH02 of the FDP GINHP5 of Draft FDP
Retention of a 10 m riparian strip along both sides of the Barnhill Stream (discounting small footpaths and footbridges), widened to incorporate substantial parts of the flood zone within the proposed park area, sown with suitable meadow mix incorporating locally-native species advised by an ecologist (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).	GI12 of the Barnhill LAP NH02 of the FDP GINHP5 of Draft FDP
Provision of a substantial wetland feature in the main risk flood zone in the proposed park area, functioning both as a Sustainable Drainage System (SuDS) feature and significant biodiversity feature including open water and wetland vegetation of high ecological value, planted with suitable locally-native species advised by an ecologist (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).	GI14 of the Barnhill LAP NH02 of the FDP GINHP7 of Draft FDP
Design of the lighting scheme so that there is negligible light spill on the wetland in the park area, along the Barnhill Stream and along the retained north-south hedgerow through the proposed park. This will maximise benefit to nocturnal protected species such as otter and bats. See Landscape Design Report, Section 4, provided by Gannon Associates and accompanying the planning application – in the lighting figure, the purple line indicates a light level of 1 lux, i.e. all land beyond this line receives less than 1 lux).	GI10 of the Barnhill LAP NH17 of the FDP GINHP18 of Draft FDP
Incorporation of herbs and shrubs providing foraging opportunity for pollinating invertebrates, which will include the provided meadow areas in the proposed park and various shrubs in general planting throughout the Proposed Development (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).	GI17 of the Barnhill LAP NH07 of the FDP GINHP11 of Draft FDP
Retention of the Barnhill Stream in its current alignment and improvement of its ecological function by removal of covering shrubs and sowing of adjacent meadow (as well as the incidental removal of adverse livestock impacts), and connection to the proposed wetland (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).	GI11 of the Barnhill LAP NH24 and WQ05 of the FDP GINHP7 of Draft FDP
Maintenance of passage for otter along the Barnhill Stream, through absence of culverts within the Proposed Development along the stream, and use of bridges (comprising foot bridges in the proposed park, and one road bridge at the west end of the park) that do not involve in-stream or immediate stream-bank works, and leave vegetated strips on both banks.	GI11 of the Barnhill LAP NH17 of the FDP GINHP18 of Draft FDP
Provision of native tree planting forming woodland blocks within the proposed park, near the proposed wetland (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).	GI11 of the Barnhill LAP NH02 of the FDP GINHP5 and 22 of Draft FDP
Design is in accordance with a) the flood risk assessment (McCloy Consulting, 2022), avoiding inappropriate construction in flood risk areas, and b) the SuDS Strategy Report (Clifton Scannel Emerson Associates, 2021), ensuring that there is no untreated run-off	GI14 of the Barnhill LAP NH02 of the FDP

<p>into watercourses in or beyond the Proposed Development. As stated in the Appropriate Assessment screening of the Barnhill LAP (Fingal County Council, 2019), discharge is to be limited to that of a greenfield site. Incorporated run-off control measures include the above hedge retention, retention of many of the small ditches beside hedges, the above provision of a wetland feature in the flood risk area in the proposed park, and urban controls including permeable paving, rainwater butts, underground stormwater system and infiltration trenches, and monitoring of the effectiveness of these measures. This contributes to ensuring the prevention of operational waterborne pollution.</p>	<p>GINHP7 of Draft FDP</p>
<p>Design of the foul water discharge to feed into the extra capacity of the upgraded Ringsend Waste Water Treatment Plant and upgraded sewer network, which are expected to be completed by 2023, contributing to ensuring prevention of operational waterborne pollution. Note that the Barnhill LAP requires adequate capacity for waste water treatment to be in place for new development at Barnhill (protecting downstream European sites).</p>	<p>Several policies of the FDP/Draft FDP in particular NH02, NH16 and NH24 of the FDP and GINHP7 and 17 of the Draft FDP.</p>
<p>Taking of clean water ultimately from Leixlip Water Treatment Plant, with no abstraction of the water from the Study Area or adjacent areas. This avoids hydrological effects by abstraction on habitats in or near the Study Area.</p>	<p>Several Barnhill LAP and FDP/Draft FDP policies in particular G11 of Barnhill LAP, NH24 of FDP and GINHP7 of Draft FDP.</p>

The planting of the proposed wetland feature will comprise appropriate locally-native species around the created pond, as advised by an ecologist, including sedge, reed and tall flowering herbs that thrive in marsh or swamp conditions and are beneficial to pollinating invertebrates. Similarly, areas of proposed sown meadow (including where practicable 5 m buffer strips beside retained hedgerows) will utilise suitable neutral meadow seed mixes comprising locally-native species, and native tree planting in proposed areas of woodland will use locally-native tree species, as advised by an ecologist. The meadow seed mixes will include a high diversity and proportion of flowering herbs beneficial to pollinating invertebrates. The layout and planting scheme of the proposed wetland features, meadows and tree planting are shown in the Landscape Design Report, Section 5 (provided by Gannon Associates and accompanying the planning application).

### 9.3.5 Construction Phase

#### 9.3.5.1 European sites

The NIS for the Proposed Development (AECOM, 2021) determined that there were no Likely Significant Effects on European sites for all construction impacts. This included construction disturbance of the qualifying features of European sites, construction waterborne and airborne pollution, and construction hydrological effects, and was primarily due to separation distances. The overall conclusion of the NIS was that there would be no adverse effect on the integrity of European sites as a result of the Proposed Development, either alone or in-combination with other plans/projects. This matched the conclusion of the Barnhill LAP Appropriate Assessment Screening (Fingal County Council, 2019). Although such a conclusion still allows for very minor effects that do not affect the integrity of European sites, such effects (such as downstream transfer of construction pollution, which would in the worst case be minor given the nature of the Proposed Development, and given also the general absence of development close to the Barnhill Stream, and major river and sea dilution) would be imperceptible.

Although developments can sometimes have beneficial effects on European sites, there is no mechanism by which this could occur in this case.

It is therefore concluded that construction effects of the Proposed Development on European sites are unlikely and **Imperceptible**.

#### 9.3.5.2 Royal Canal pNHA

This pNHA is within the Study Area but not directly impacted by the Proposed Development (however, see Section 9.3.7 Cumulative assessment). Given the nature of the Proposed Development and the pNHA, and that there is no direct impact from the Proposed Development, the only realistic connectivity to the pNHA is via water movement or air emissions, thus waterborne or airborne pollution are potential impacts.

### Construction – waterborne pollution

Waterborne pollution during construction has the potential to enter the Barnhill Stream, however this passes under the canal and therefore cannot enter the canal. It would, however, be possible for unmitigated waterborne pollution from construction to pass across adjacent land to the canal at the south-east corner of the Site, which is within 10 m of the canal. Pollution of the canal by construction pollutants could have adverse effects on aquatic plants, invertebrates (including lake orb mussel) or fish in the canal, which could in turn affect species higher in the trophic ladder such as otter (which are known to occur in the canal vicinity). Pollutants such as oil, fuel, concrete or chemicals would be of most concern, and silt less so (since the canal substrate is already muddy/silty). Any such worst-case degradation would likely affect a very short stretch of the pNHA (which is 100 km long and mostly upstream, with slow flowing water). Therefore, without construction pollution controls, there is predicted to be a temporary adverse effect on the Royal Canal pNHA through waterborne construction pollution, which would be unlikely and of **Moderate** significance.

### Construction – airborne pollution

Airborne construction pollution concerns gaseous vehicle emissions and dust emissions created by construction activity or vehicles. Gaseous vehicle emissions (in particular oxides of nitrogen (NO<sub>x</sub>)) are insignificant beyond 200 m and not generally assessed beyond this distance (IAQM, 2020), whilst dust assessment is recommended to extend to 50 m from a) the construction site and b) roads used by construction vehicles up to 500 m the construction site (IAQM, 2020).

Only a small section of the south-east corner of the Proposed Development is within 200 m of the pNHA, and the extent of pNHA within 200 m is extremely small (this pNHA is 100 km long and mostly upstream) and screened by peripheral hedgerows and trees. Construction emissions would also be temporary during construction only, which within 200 m of the canal would be intermittent and over a period of months, whereas significant effects from nitrogen deposition<sup>2</sup> on vegetation arise from on-going long-term exposure (Air Pollution Information System (APIS) <http://www.apis.ac.uk/>). Additionally, the agricultural fields adjacent to the canal are likely to result in nitrogenous run-off into vegetation adjacent to the canal (as well as the canal itself) which would likely far outweigh minor inputs from construction nitrogen deposition. Thus effects from construction vehicle emissions on the Royal Canal pNHA are likely to be Imperceptible.

Given that the pNHA is at closest less than 15 m from the eastern end of the Proposed Development, unmitigated dust emissions could theoretically have an adverse effect on vegetation in the pNHA. As for gaseous emissions, the extent of potentially affected pNHA is very small (it is 100 km long and mostly upstream). The amount of dust generated by construction activity within 50 m of the pNHA is not likely to be great, since the Proposed Development does not involve excessive excavations, and would be temporary during construction only and would only occur during dry weather. Any worst-case unmitigated dust generation would likely be moderate and more likely to affect neutral grassland (some of which is species-rich) in the pNHA rather than aquatic habitat (noting that canal substrate into which dust would settle is already muddy/silty). Hedgerows along the canal would however provide some screening of pNHA habitat from dust arising in the nearby part of the Proposed Development, and any dust that did fall on pNHA grassland would likely be washed away by rain over a short period of time. For these reasons, there is predicted to be at most a temporary adverse effect on an extremely small part of the pNHA from unmitigated construction dust, which would be unlikely and of **Moderate** significance.

#### 9.3.5.3 Liffey Valley pNHA

Liffey Valley pNHA is 1.5 km from the Site at closest, thus there is no possibility of direct impacts. Given the nature of the Proposed Development and the pNHA, the only realistic connectivity to the pNHA is via water, thus waterborne pollution during either construction or operation are potential impacts. Effects of airborne pollution from vehicles or dust generation on vegetation operate over short distances from the source not typically exceeding 200 m (see previous section), therefore no effect on this pNHA by these means is likely.

### Construction – waterborne pollution

Waterborne pollution during construction has the potential to enter the Barnhill Stream, which directly connects to the River Liffey pNHA. Pollution of the River Liffey could have adverse effects on populations of Atlantic salmon *Salmo salar* that are known to use this river (for example, by degrading

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<sup>2</sup> Direct toxicity of NO<sub>x</sub> to vegetation arises at particularly high concentrations which would not arise from construction emissions.

spawning areas) or cause general degradation, both of which could in turn affect otters, and degradation could also affect plant and invertebrate communities. Any such worst-case degradation would however likely affect only a short stretch of the river, and would likely be temporary during construction with unmitigated pollutants likely to be diluted and removed through river flow over time. Therefore without construction pollution controls, there is predicted to be a temporary adverse effect at the Local (Local Higher) level on the River Liffey pNHA through waterborne construction pollution, which would be unlikely but of **Moderate** significance.

#### 9.3.5.4 Barnhill Stream

The Barnhill Stream is being retained within the Proposed Development, with buffer habitat on either side, and the proposed footbridges and one road bridge will leave the stream banks and channel intact beneath them, therefore no direct impact will occur. Given the nature of the Proposed Development, the only realistic construction impacts are waterborne or airborne pollution. Operational air pollution (from vehicle emissions) is unlikely to be significant on the stream given that it will largely be contained within a proposed park, and that gaseous air pollution effects are considered to affect terrestrial vegetation rather than aquatic features. Hydrological effects on the stream are unlikely because clean water for the Proposed Development there will not be by abstraction of water from within or near the Site (see embedded mitigation in Section 9.3.4).

##### **Construction – waterborne pollution**

Waterborne pollution during construction has the potential to enter the Barnhill Stream, since it runs through the Study Area. Pollution of the stream could have adverse effects on locally-important aquatic communities, and if severe could deter use by otter or degrade the foraging resources of otter (which however are likely to be very limited in the stream, given its very small size; potential effects on the downstream River Liffey are discussed under the River Liffey pNHA above). Therefore without specific mitigation, construction waterborne pollution could have a temporary adverse effect at the Local level on the Barnhill Stream, which would be likely and of **Slight** significance.

##### **Construction – airborne pollution**

Airborne construction pollution would concern gaseous emissions or dust created by construction plant. Gaseous construction emissions would be short-term and intermittent, and not likely to be significant given the nature of the Proposed Development and the inclusion of most of the stream within an area of undeveloped parkland. Dust effects are not generally significant beyond 50 m (IAQM, 2020), and could only be produced within this distance of the stream very locally given that much of it will be within an undeveloped park area, and only intermittently in dry weather. However, the stream is also likely to self-clean fairly quickly. Therefore construction emissions and dust, without mitigation, are considered capable of causing at most a temporary short-term adverse effect at the Local level on the Barnhill Stream, which would be likely and of **Slight** significance.

#### 9.3.5.5 Terrestrial habitats

##### **Construction – changes to baseline terrestrial habitats**

No habitats in the Study Area constitute Annex I habitats listed under Annex I of the Habitats Directive as interpreted in NPWS (2019) and European Commission (2013). The loss of the dominant heavily-grazed pastures is not significant given its species-poor nature and its abundance to the south, west and to, a lesser extent, the east of the Study Area, imparting negligible ecological value. There will also be loss of a small area of pasture in the south of the Proposed Development that was generally species-poor but included localised meadow species. The main adverse impact on terrestrial habitats of ecological consequence is the local loss of some existing lengths of hedgerow. In accordance with the Barnhill LAP, however, significant stretches of hedgerow will be retained along with component trees. The lengths retained and lost are shown in the Landscape Design Report, Section 1.10 (provided by Gannon Associates and accompanying the planning application). The total length of retained hedgerow is 2.1 km, with further provision of 1,700 planted trees many of which are native (Landscape Design Report, Sections 4 and 5).

The retained hedges include long higher quality stretches (incorporating mature trees) running approximately north-south through the centre and west of the Proposed Development (including through the proposed park area), as well as part of a north-south hedge in the east of the Proposed Development and significant stretches along Barberstown Lane North. The retained hedges will also generally retain associated small parallel ditches (where present), and the retained north-south hedgerows will be provided with a minimum 5 m buffer of peripheral grassland on at least one side (see Landscape Design Report, Section 5).



However, the Proposed Development provides beneficial effects on habitats through the provision of a substantial wetland feature incorporating a pond with surrounding wetland vegetation, as well as sown meadows either side of the retained Barnhill Stream, removal of covering shrubs from the Barnhill Stream, and planting of native trees in woodland patches in the surrounding park area. The positive biodiversity impact of these proposals, in particular the wetland feature, is significant given that the baseline Study Area is predominantly species-poor heavily-grazed pasture. They provide a range of habitats that are wholly lacking in the baseline Study Area, including significant standing water, wetland habitat such as swamp and areas of species-rich lowland meadow, and significantly increase local biodiversity. The species to be planted and sown are locally native. The layout of these features is shown in the Landscape Design Report, Section 5.

In view of a) the retention of significant lengths of native hedgerow with trees (and, in most cases where present, small parallel ditches), b) the enhancement of several of retained hedgerows with peripheral meadow strips, c) the provision of a substantial wetland feature, d) the enhancement of the Barnhill Stream by removing covering shrubs, and e) the provision of meadow and woodland areas in the wetland/stream vicinity, the beneficial habitat effects of the Proposed Development are considered to outweigh losses to sections of baseline hedgerow. The overall biodiversity benefit of these proposals is significant and there is predicted to be a permanent **beneficial** effect on habitats at the Local (Local Higher) level, which is likely and (since the benefit would not be of consequence at the County scale, but is consequential to the wider local area) of **Moderate** significance.

#### 9.3.5.6 Bats

##### **Construction – loss of potential bat roost sites**

The Proposed Development intends to retain a significant proportion of the baseline trees and hedgerow features within the Site, in accordance with the Barnhill LAP. Structures that will be lost to the Proposed Development comprise mainly modern buildings under current industrial use with Negligible bat roost suitability, and one small derelict building with Low bat roost suitability and no currently-known roosts. However, there will be some tree loss, which would include 16 Low bat roost suitability trees, out of 46 trees with bat roost suitability in the baseline environment (note that a number of trees along Barberstown Lane South will not be part of the baseline environment at the time of construction owing to previous provision of the upgrade to this road). The only two trees (T1 and T2) with Moderate suitability are in good condition (Abor-Care, 2022) and will be retained (see Figure 9.4 and tree protection plan Abor-Care, 2022). Any bats that did roost in trees in the Study Area would likely comprise common pipistrelle, soprano pipistrelle or Leisler's bat, which are common and widespread, since these were by far the dominant bat species recorded during the bat surveys. It is less likely although possible, given the low to very low levels of activity of other bat species, that other bat species could roost in the Site. However, the trees with Moderate suitability, and the one building with Low suitability, did not contain roosts during the surveys, and these Low suitability trees/structures are unlikely to support more than a few individual bats. Thus it is highly unlikely that important roosts such as maternity roosts or large hibernation roosts will be impacted, and potential loss of roost sites is likely to be limited, if it occurs at all, to minor roosts of low importance only. This would not be consequential to the local conservation status of bats, particularly given the presence of many other trees along field lines in the surrounding area. Consequently, bat roost loss, if this occurs, is predicted to cause a permanent adverse effect at the Local (Local Lower) level only, which is unlikely and of **Slight** significance.

##### **Construction – loss of foraging/commuting habitat**

Of the recorded bats within the Study Area, Leisler's bat has the greatest preference for larger open areas for foraging, therefore loss of the large open fields as a result of the Proposed Development could have the most effect on this species. However, fields of improved pasture are not the most productive habitat in terms of aerial invertebrates upon which bats prey, and it is probably not coincidental that there is some suggestion of Leisler's bat foraging/commuting along the hedgerows/treelines. It must also be noted that the Proposed Development includes a substantial new wetland, blocks of new native woodland planting, sown meadows, and a long retained hedge with mature trees (the central north-south hedgerow, with peripheral strips of tall grassland/meadow at least 5 m wide), the majority of which will be unlit (Landscape Design Report, Section 4, provided by Gannon Associates and accompanying the planning application – area beyond the purple lines in the lighting diagram will receive less than 1 lux of artificial light). These embedded proposals provide excellent sources of aerial invertebrates (in particular the wetland) that would be available and suitable for all bat species including light-averse species. Additionally, the Proposed Development includes retention of significant lengths of the other hedgerows with mature trees in the western and eastern parts of the Proposed Development; and although these would be partly lit they would still be at least of use to foraging and commuting pipistrelles which are known to tolerate lighting whilst foraging/commuting. Many trees would also be retained along

Barberstown Lane North, and other patches of tree planting including native trees are also proposed adjacent to this road and elsewhere (see Landscape Design Report, Sections 1, 4 and 5, provided by Gannon Associates and accompanying the planning application) . The retained hedgerows also preserve connectivity to lands to the south.

For these reasons, the losses to foraging/commuting habitat of bats is predicted to be neutral (i.e. this is no predicted net effect) and **Not Significant**. This effect is interconnected with artificial lighting during the operational stage, which is addressed in the Operational Effects section below.

#### **Construction – disturbance of foraging/commuting bats**

Disturbance of foraging or commuting bats by construction activity could occur if works were carried out at night using artificial lighting (there are no known roosts and no likelihood of significant roosts (see preceding section) therefore roost disturbance is not likely to be significant). However, such construction lighting disturbance would be infrequent given that works will take place largely in daylight when bats are not active. Moreover, the bat activity overwhelmingly involves pipistrelles and Leisler's bat which are known to be light-tolerant (Rowse *et al*, 2018). Construction-related disturbance of foraging/commuting bats would therefore be very limited and is predicted to be likely but **Not Significant**.

#### 9.3.5.7 Otter

##### **Construction – changes to foraging/commuting habitat**

Otter is known to be present in the general area, but the Barnhill Stream constitutes sub-optimal habitat for this species. No otter refuges or resting sites were identified within the Study Area, and the Barnhill Stream is very small with no connectivity to significant upstream resources and would not itself support a significant foraging resource for otter, whose home ranges are large (in the order of 40 km of watercourse for males and 15-20 km for females (Harris and Yalden, 2008)). Moreover, the Barnhill Stream will be retained, and provision of the proposed wetland feature including a substantial pond (which will be largely unlit – see Landscape Design Report, Section 4, provided by Gannon Associates and accompanying the planning application – in the lighting diagram, areas beyond the purple lines receive less than 1 lux of artificial light) would likely slightly increase foraging opportunities for otter, at least in spring months once amphibians have colonised. There is therefore predicted to be a permanent beneficial effect at the Local (Local lower) scale on otter through habitat changes, which is likely and of **Slight** significance.

##### **Construction – pollution of commuting/foraging habitat**

Construction-related pollution of aquatic habitats within the Study Area could temporarily reduce the availability of prey for otter. However, as described above, the section of Barnhill Stream within the Study Area encompasses a very small portion of the home range of an individual otter, and the stream would not support a significant foraging resource. Degradation of commuting/foraging habitat as a consequence of unmitigated construction pollution would therefore result in a temporary adverse effect of less than Local consequence that is unlikely and **Not Significant**.

##### **Construction – otter mortality**

Injury by impact with construction traffic is improbable given the slow speed of vehicles on construction sites, and that construction activity will be mainly in daylight, but otters could be injured or killed if entrapped in open excavations or pipes. However, otters within the Study Area are only likely to occur along the Barnhill Stream, which will be retained (small ditches by some hedgerows are too small to be of value to otter), and there are no known otter refuges within the Study Area. Therefore the probability of otter harm during construction is very low. However, death of a single otter as a result of the Proposed Development could, especially if the otter were female and at least in the short- to medium-term, impact population level and thereby conservation status, and given the large range of otters (see above) this would be at the County scale. Therefore without mitigation, disturbance or injury of otter during construction could result in a temporary adverse effect at the County (Medium) that is unlikely but **Significant**.

#### 9.3.5.8 Badger

##### **Construction – disturbance**

Badgers and their setts are protected under the Wildlife Acts, making it an offence to intentionally kill or injure a badger or to wilfully interfere with or destroy a breeding or resting site (i.e. a sett). Potential exists for disturbance of one active single-hole sett recorded within the Study Area. Field survey

evidence suggests that this is a sporadically-used outlier sett. Such infrequently-used outlier setts are not particularly important and are not likely to be used for breeding – the main sett (where most breeding activity takes place and the most important type of sett) of the relevant badger social group was not found and is presumed to be outside the Study Area (there is little possibility of a main sett being located in the private residential enclaves within the Study Area that are not part of the Proposed Development, since main setts are typically large and not located so near people).

The sett is unlikely to be directly damaged because it lies within a hedgerow that will be retained (see Landscape Design Report, Section 1, provided by Gannon Associates and accompanying the planning application). However, construction works are liable to take place within 50 m of the sett, therefore there is potential for badger disturbance to occur if the sett is active at the time (disturbance could also occur up to 150 m from the sett if severe construction activities such as piling take place within that distance – badgers are particularly susceptible to disturbance impacts associated with heavy machinery (NRA, 2006)).

However, given the low importance of an infrequently-used outlier sett, any disturbance of the sett (if occupied) is very unlikely to be consequential to the badger social group, because there will be a main sett and most likely (since it is usual) other usable subsidiary setts belonging to the social group in the region beyond the Study Area, and these would be unaffected. Foraging activity is unlikely to be disturbed because construction will be largely in daylight (loss of foraging habitat is addressed separately below). Badgers, although protected, are also widespread. Consequently, there is predicted to be a temporary adverse effect (during works) on badgers through construction disturbance at the Local (Local Higher) level only, which is likely but **Not Significant**.

#### **Construction – loss of foraging habitat**

Badgers are likely to use the fields in Study Area and surrounding region for foraging, since pasture is an optimal foraging habitat for badger and badger evidence exists. The evidence suggests that badgers cross Barberstown Road South, and since the main sett was not found during the field surveys it may lie to the south of the Proposed Development, or possibly along the edge of the railway to the north (although no sign of badger was found in the north of the Study Area which abuts the railway). The majority of badger foraging habitat in the Study Area will be lost, although a substantial amount will remain in the form of amenity grassland, sown meadow and planted woodland areas in the park around the proposed wetland feature and Barnhill Stream (large parts of which will be unlit – see Landscape Design Report, Section 4, provided by Gannon Associates and accompanying the planning application), which is in the southern part of the Proposed Development offering connectivity to the south and also west along the banks of the Barnhill Stream. Other fields extending to the Royal Canal east of the Proposed Development and into extensive rural areas to the west and south also offer suitable foraging habitat. However, the home range of the social group would be reduced and this may force some expansion in other directions in possible conflict with other badger social groups, and thereby potentially reducing the numbers of badgers in the immediate area. Overall, however, given the availability of suitable rural habitat beyond the Proposed Development, badger would still remain common at the Local (Local Higher) level.

Note that the separately-provided upgraded Barberstown Lane South, which will be completed before the Proposed Development commences, will include a badger underpass in as suitable a position as possible, which will help maintain connectivity for badgers to/from the fields to the south.

In view of the above points, the reduction in badger foraging habitat a result of construction is considered a permanent adverse effect at the Local (Local Lower) level only, which is likely and of **Slight** significance.

#### **Construction – badger mortality**

Injury by impact with construction traffic is improbable given the slow speed of vehicles on construction sites, and that construction activity will be mainly in daylight, but badgers could be injured or killed if entrapped in open excavations or pipes. Notwithstanding legal obligations, death of a badger as a result of the Proposed Development would not be significant given that the local social group would (according to the nature of typical social groups, e.g. Harris and Yalden (2008)) probably involve about six individuals, the numbers expanding significantly each breeding season with likely replacement of a lost individual within one year. Multiple deaths would be more significant but are not likely, since badgers are relatively intelligent and unlikely in the first instance to enter excavations and pipes that are obviously disturbed by people. Badgers are also common and widespread. It is therefore predicted that, without mitigation, there would be a temporary adverse effect (during construction) at the Local (Local lower) scale through badger mortality, which would be unlikely and of **Slight** significance.

#### 9.3.5.9 Other protected mammals

##### **Construction – loss of habitat**

Desk and field survey information indicates that at least hedgehog, pygmy shrew, and Irish stoat are likely to occur in the Study Area, and probably Irish hare. These species are protected under the Wildlife Acts but are relatively common and widespread in Ireland. There will be a loss of pasture (of value to foraging hedgehog and potentially Irish hare), and some loss of hedgerow of likely value to hedgehog, pygmy shrew and Irish stoat. However, a large proportion of existing hedgerows will be retained, including significant lengths of several north-south hedges with mature trees and hedgerow/trees along Barberstown Lane North. There will also be provision of significant areas of meadow and woodland in the park area and by the Barnhill Stream and around the wetland features, and buffer strips beside the hedgerows in this area. Such habitat would be viable to pygmy shrew, Irish stoat and hedgehog, providing likely better foraging and increased shelter opportunities than is afforded by the currently-dominant heavily-grazed pasture. For these three species, the overall effect is therefore likely to be neutral. There would be a likely reduction in the immediate area of Irish hare, however the abundant nearby rural fields beyond the Study Area indicate that such a reduction would be relatively small. There is therefore predicted, at worst, to be a permanent adverse effect at the Local (Local Lower) level only, through loss of habitat of other protected mammals, that would be likely and of **Slight** significance.

##### **Construction – mortality of other protected mammals**

There is potential, without mitigation, for Irish hare, hedgehog, pygmy shrew, and Irish stoat to be injured or killed during construction by entrapment in excavations or pipes. Potentially collision with construction traffic could also occur, although this is unlikely for hedgehog since it is nocturnal and construction will be largely in daylight, and unlikely for Irish hare and Irish stoat because they are extremely mobile. However, given the life history of these small mammals (which have several offspring and, in some cases, several large litters per year), population recruitment is fairly to very rapid and loss of a small number of individuals would be very unlikely to have a major effect on local populations. There are also not likely to be very large populations of these species within the Study Area owing to the dominance of heavily-grazed pasture, which offers no shelter to such species (shelter would be largely confined to the hedgerows). Therefore without mitigation there is predicted to be at worst a temporary adverse effect at the Local (Local Lower) level only, which would be unlikely and **Not Significant**.

#### 9.3.5.10 Amphibians

##### **Construction – change in habitat extent**

Although the Barnhill Stream is likely to be of limited value to amphibians owing to likely presence of stickleback and limited more stagnant stretches of water, and with amphibians not favouring flowing water, the Barnhill Stream will be retained. Small ditches, although also of limited value, will also largely be retained where present along retained hedges. Amphibian populations are likely to be insignificant owing to such factors (see Section 9.2.3.6). Therefore loss of habitat would be significant at most at the Local (Local Higher) level only. However, the Proposed Development includes provision of a significant wetland feature including a substantial pond (which will be the only pond in the local area) with surrounding wetland habitat, as well as adjacent meadows and woodland blocks, and retention of the nearby hedgerow with buffer strip (see Landscape Design Report, Sections 1 and 5, provided by Gannon Associates and accompanying the planning application). This will constitute excellent habitat for amphibians, providing not only good breeding habitat in the pond itself, but also viable terrestrial habitat (the meadows and woodland) for use by maturing young amphibians and for hibernation. Consequently, there will be an overall improvement in amphibian habitat, which (given the shortage of ponds in the area) would be beneficial at the Local (Local Higher) level. There is therefore predicted to be a permanent **beneficial** effect on amphibian habitat, which is likely and of **Moderate** significance.

##### **Construction – pollution of habitat**

Given the low significance of any amphibian populations in the Study Area (see above), unmitigated construction pollution of existing lower value amphibian habitat would be significant at most at the Local (Local Higher) level. At worst, this minor adverse effect would be temporary (during construction), likely and of **Slight** significance.

##### **Construction – injury of killing of amphibians**

There is potential for construction activities to injure or kill amphibians, however given the predicted insignificant population and the widespread occurrence of amphibians in Ireland, such losses without mitigation would not in the worst case exceed Local (Local Higher) significance. Consequently, this

minor adverse effect would be temporary, likely and of **Slight** significance. The provision of the above-described excellent amphibian habitat within the Proposed Development would result in replacement of any losses and a highly likely increase in amphibian abundance.

#### 9.3.5.11 Reptiles

##### **Construction – change in habitat extent**

The common lizard population in the Study Area will be small owing to the dominance of unsuitable heavily-grazed pasture, and if present at all this species will be largely confined to the hedgerows, narrow road verges and potentially edges of the Barnhill Stream. Significant amounts of hedgerow will be retained, as well as the Barnhill Stream, therefore suitable habitat loss would be partial and of relatively small extent. However, the proposed provision of areas of meadows beside the Barnhill Stream and proposed wetland feature, as well as buffer meadow along the nearby retained hedgerow and to an extent the edges of the wetland features itself, all constitute habitat for common lizard, providing good opportunities for shelter, foraging and basking (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application). Consequently, there will be an overall significant net increase in reptile habitat constituting a permanent **beneficial** effect at the Local (Local Higher) level, which is likely and of **Slight** significance.

##### **Construction – injury or killing of reptiles**

There is potential for construction activities to injure or kill common lizard, although the small population in the Study Area, if present at all, and the widespread occurrence of common lizard in Ireland indicates that in the worst case this would not exceed Local (Local Higher) significance. Consequently, even without mitigation this minor adverse effect would be temporary, likely and of **Slight** significance. The provision of the above-described good reptile habitat within the Proposed Development would result in quick replacement of any losses and a likely increase in reptile abundance.

#### 9.3.5.12 Breeding birds

##### **Construction – changes in breeding habitats and associated populations**

Habitats in the Study Area that were found to support breeding birds comprise the hedgerows, localised barns and existing houses/gardens. The latter are not part of the Proposed Development and will be retained. The only (probable) breeding BoCCI red-list species was yellowhammer in the south of the Study Area with two likely territories thought likely to include cereal fields beyond the Study Area. The main north-south hedgerow in this area will be retained and enhanced within the proposed park area, with a buffer strip of meadow and other nearby meadow areas. The cereal fields to the south of the Study Area will not be affected. Therefore there is a reasonable likelihood that at least one yellowhammer territory will remain. Possible loss of one yellowhammer territory, since this species is still widespread in Ireland, is considered significant at the Local (Local Lower) level only. There will be no loss, or no significant loss, of territories/nest sites of BoCCI amber-listed species – this is because most habitat used by goldcrest, greenfinch and mistle thrush (hedgerows and houses/gardens) will be retained, and whilst there would be loss of buildings at the industrial yard used by swallow, swallow nest sites at retained houses would be kept.

As discussed in Section 9.2.3.5, there was no likely possibility of specially-protected or Birds Directive Annex I species occurring in the Study Area with the possible exception of kingfisher. However, kingfisher requires stable vertical soft-substrate unvegetated river banks to breed in, which do not exist in the Study Area, and the Barnhill Stream is too small to be a significant foraging resource for this species. The Barnhill Stream will also be retained. Therefore although kingfisher might rarely occur in the Study Area along the Barnhill Stream, there will not be any appreciable effect on it.

As also discussed in Section 9.2.3.5, there was not considered to be a likelihood of barn owl nesting at the active industrial yard just south of Barberstown Lane North, and no barn owls were seen during the bat surveys; there is also a lack of optimal barn owl foraging habitat in the Study Area (rough grass etc. with small mammal prey). With the proposed provision of significant meadow areas around the retained Barnhill Stream and proposed wetland, large parts of which would be unlit, suitable foraging habitat for barn owl would increase locally and may, when well-developed, be used by barn owl at night (see Landscape Design Report, Sections 4 and 5, provided by Gannon Associates and accompanying the planning application).

The proposed substantial wetland feature in the park area, which will include a large pond and surrounding wetland vegetation including swamp vegetation, is highly likely to attract new bird breeding species not currently known in the Study Area, with a significant net biodiversity gain in this respect (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the



planning application). Likely new breeding species would include reed bunting *Emberiza schoeniclus* and sedge warbler *Acrocephalus schoenobaenus*, which will breed in various stands of taller swamp vegetation (which do not need to be very large to be viable), and there is also a lower possibility of the amber-list species mute swan and mallard *Anas platyrhynchos* breeding when the wetland feature is well-established. The proposed native woodland blocks in the park area will also increase habitat for certain existing species such as the amber-listed mistle thrush and greenfinch, as well as common species that utilise broadleaved woodland.

Given the above beneficial aspects of the Proposed Development, and the very limited loss for breeding habitat and associated birds (stemming from dominance of heavily-grazed pasture in the baseline environment), there is predicted to be a permanent **beneficial** effect at the Local (Local higher) scale on the extent of breeding bird habitat and breeding bird diversity and abundance, which is likely and of **Moderate** significance.

#### **Construction – potential for barn owl mortality**

Before the Proposed Development commences, there will be a period of time during which the industrial yard will be inactive prior to its demolition. During this period, there would be a possibility of barn owl establishing a nest site in the disused buildings, if the period of disuse includes the breeding season (March to August, inclusive) and if barn owl was able to access the buildings. The possibility of this occurring appears relatively low – research reported by the Barn Owl Trust suggests that barn owls require about 0.3 to 0.5 km<sup>2</sup> of foraging habitat within 2 km of a nest site, which does not appear to exist to this degree within that distance of the industrial yard (<https://www.barnowltrust.org.uk/how-to-manage-land-for-barn-owls/barn-owl-habitat-requirements/>). However, the possibility of barn owl nesting in the yard buildings, once disused and if accessible, or of roosting in them, cannot be completely eliminated given known presence of barn owl in the 10 km square. There is therefore a small possibility of barn owl injury or mortality if occupying the yard buildings at the time of their demolition. Therefore without mitigation there is a possibility of a temporary adverse effect by disturbance or injury of nesting barn owl, which (given the small numbers of barn owl likely to occur in the surrounding area) would be relevant at the Local (Local Higher) level, and would be unlikely but of **Moderate** significance if it occurred, and would also be in breach of the protection under the Wildlife Acts, which is slightly stricter for barn owl through inclusion on the Fourth Schedule.

#### **Construction – direct impacts on general breeding bird populations**

As noted in Section 9.2.3.5 there is no potential for Birds Directive Annex I birds to nest in the Study Area, and none are known to do so, through lack of suitable nesting habitat. The potential for barn owl mortality is discussed separately above.

For breeding birds in general, there is a high likelihood (without mitigation) of accidental destruction of active nests during the construction phase through clearance of habitat, should this take place during the breeding season. This would not include the dominant heavily-grazed pasture, which does not support nesting birds, but would include the removal of other localised habitats such as sections of hedgerow and scattered shrubs/trees. Regardless of ecological significance, wild birds are protected under the Wildlife Acts from (in summary) wilful injury, wilful taking/destruction of eggs/nests and wilful disturbance of a wild bird on/near an active nest (with some exceptions in the Third Schedule; the hunting exceptions are not relevant to development). The breeding season is generally taken as March to August, inclusive.

The majority of passerine species do or can lay multiple clutches of eggs each year, thus the loss of one brood would likely be of relatively limited significance, and it can be expected that the local population of general breeding birds would easily recover, probably within the same year. The destruction of active nests would not, therefore, adversely affect the local conservation status of any of the species thought to breed in the Study Area. Therefore, notwithstanding legal obligations, there is predicted to be (if clearance took place in the breeding season and without mitigation) a temporary adverse effect at the Local (Local Lower) level through damage or destruction of active nests of general breeding birds, which would be likely and **Not Significant**.

#### **9.3.5.13 Lake orb mussel**

##### **Construction – changes in habitat extent**

As noted above, lake orb mussel is almost certainly under-recorded and is also widespread, and there are likely to be large quantities in the Royal Canal where there are records and large amounts of suitable muddy substrate. Therefore any occurrence in the Barnhill Stream, if any, is highly unlikely to be significant, given the small size of this stream. Moreover, the Barnhill Stream will be retained in its

current planform, with no works to the stream itself planned (adjacent works for footbridges would be very minor, and a proposed road bridge will cross the stream retaining the banks and channel intact) (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application). For these reasons there is expected to be **No Effect** on the extent of lake orb mussel habitat.

### **Construction – pollution of habitat**

As noted for above, without specific mitigation there is predicted to be a temporary adverse effect on the Barnhill Stream through waterborne or possibly airborne construction pollution. Given, as discussed in the previous paragraph, that the lake orb mussel population in the stream (if any) is highly likely to be insignificant compared to the resource in the Royal Canal, and the Barnhill Stream does not connect to the Royal Canal (it passes under it), the effect of any unmitigated construction pollution on lake orb mussel is predicted to be temporary adverse at the Local (Local Lower) level only, and likely but **Not Significant**.

## 9.3.6 Operational Phase

### 9.3.6.1 European sites

The NIS for the Proposed Development (AECOM, 2021) determined that there were no Likely Significant Effects on European sites for most possible impacts. It investigated in further detail the possible effects of waterborne pollution during the operational phase and recreational pressure during the operational phase on European site habitats or their qualifying species. It concluded there would be no adverse effects on the integrity of European sites from operational waterborne pollution owing to embedded design mitigation comprising a) no inappropriate development in flood risk areas, b) suitable SuDS treatment of surface waters and monitoring of its effectiveness, c) clean water supply from Leixlip Water Treatment Plant, and d) discharge of foul water to an upgraded Ringsend Waste Water Treatment plan and upgraded sewer system expected to be completed by 2023<sup>3</sup>. It also concluded there would be no adverse effects on the integrity of European sites or their qualifying species through recreational pressure owing to a) lack of parking and inconvenient access to Rye Water Valley/Cartron SAC, b) relative inaccessibility of habitat and location at the limit of possible recreational effects for Glenasmole Valley SAC, and c) location of South Dublin Bay and River Tolka Estuary SPA beyond the likely limit of possible recreational effects, with existing visitor management measures and limited qualifying bird presence in the nearest part. The overall conclusion of the NIS was that there would be no adverse effect on the integrity of European sites as a result of the Proposed Development, either alone or in-combination with other plans/projects. This matched the conclusion of the Barnhill LAP Appropriate Assessment Screening (Fingal County Council, 2019).

Although developments can sometimes have beneficial effects on European sites, there is no mechanism by which this could occur in this case.

It is therefore concluded that operational effects of the Proposed Development on European sites are unlikely and **Imperceptible**.

### 9.3.6.2 Royal Canal pNHA

For the same reasons given above for construction effects, the only possible connectivity between this pNHA and the Proposed Development is via waterborne and airborne pollution.

### **Operation – waterborne pollution**

Operational waterborne pollution from the Proposed Development will be adequately controlled by the embedded surface water mitigation described in Section 9.3.4, which includes multiple SuDS measures, absence of inappropriate construction in the flood risk area, creation of a wetland in the flood risk area, and discharge of foul water to an upgraded treatment and sewer system. Therefore no significant waterborne pollution is likely during operation. Consequently, there is predicted to be an unlikely and **Imperceptible** effect on the Royal Canal pNHA through operational waterborne pollution.

### **Operation – airborne pollution**

Airborne pollution during the operational phase concerns gaseous vehicle emissions (principally NO<sub>x</sub>) from vehicles used by or serving residents and facilities of the Proposed Development. Such vehicular

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<sup>3</sup> With further regard to the Ringsend WWTP, a judicial review of the Barnhill LAP (2019/208 O’Cairbre v. Fingal County Council) decided in August 2020 that the Barnhill LAP was lawful in this respect because the LAP requires adequate waste water disposal to be available for development at Barnhill.

emissions are typically not significant more than 200 m from the source and usually considerably less (IAQM, 2020). This pNHA encompasses the whole Royal Canal and peripheral habitat and is therefore extremely long (over 100 km), with the majority upstream. Given the limit of 200 m for significant vehicle emissions, only an extremely small proportion of the pNHA could be affected, and this is afforded screening by peripheral hedgerows and trees which would likely reduce the effect. The agricultural fields that will remain adjacent to the canal in the nearby area are also likely to result in nitrogenous run-off into the pNHA outweighing minor inputs from operational nitrogen deposition. For these reasons, there is predicted to be a likely but **Imperceptible** effect on the Royal Canal pNHA from operational airborne pollution.

#### 9.3.6.3 Liffey Valley pNHA

For the same reasons given above for construction effects, the only possible connectivity between this pNHA and the Proposed Development is via waterborne pollution.

##### **Operation – waterborne pollution**

Operational waterborne pollution from the Proposed Development will be adequately controlled by the embedded surface water mitigation (see Section 9.3.4), which includes multiple SuDS measures, absence of inappropriate construction in the flood risk area, creation of a wetland in the flood risk area, and discharge of foul water to an upgraded treatment and sewer system. There will therefore not be any significant operational waterborne pollution entering the Barnhill Stream and thence the River Liffey. Consequently, there is predicted to be an unlikely and **Imperceptible** effect on Liffey Valley pNHA through operational waterborne pollution.

#### 9.3.6.4 Barnhill Stream

Given the nature of the Proposed Development, the only theoretical operational impact on the Barnhill Stream habitat is considered to be waterborne pollution. Operational air pollution (from vehicle emissions) is unlikely to be significant on the stream given that it will largely be contained within a proposed park. Hydrological effects on the stream are highly unlikely because a) there will be no construction within 10 m of the stream (apart from a localised road crossing and footbridges), and b) clean water for the Proposed Development will not be obtained by abstraction from within or near the Proposed Development (see embedded mitigation in Section 9.3.4).

##### **Operation – waterborne pollution**

Operational waterborne pollution from the Proposed Development will be adequately controlled by the embedded surface water mitigation described in Section 9.3.4, which includes multiple SuDS measures, absence of inappropriate construction in the flood risk area, creation of a wetland in the flood risk area, and discharge of foul water to an upgraded treatment and sewer system. Therefore no significant waterborne pollution is likely during operation. Consequently, there is predicted to be an unlikely and **Imperceptible** effect on Liffey Valley pNHA through operational waterborne pollution on the Barnhill Stream.

#### 9.3.6.5 Bats

##### **Operation – disturbance of foraging and commuting bats**

There will be permanent lighting fixtures associated with operation of the Proposed Development. The effect of this on foraging/commuting pipistrelles is not likely to be significant because they are known to be light-tolerant when foraging/commuting (Rowse *et al*, 2018), and these species are likely to continue to forage/commute along retained hedgerows/treelines. This is likely to be the case also for Leisler's bat (light-tolerant species are stated to include *Nyctalus* species in Rowse *et al* (2018)). Leisler's bat also tends to fly at height and would likely continue to do so where there are retained mature trees (as there are along much of the retained hedgerow), the height of which will generally exceed that of lighting columns. Whilst permanent lighting could have a significant effect on the other recorded bat species, because they are light-averse (Rowse *et al*, 2018), their recorded activity is so low (at most averaging three passes per night during static detector monitoring, and often one or less passes per night; see Section 9.3.2.1) that the level of occurrence of other bat species is considered insignificant. However, light-averse species would be able to forage at the majority of the wetland feature, adjacent retained hedgerow, and Barnhill Stream, and significant parts of the and proposed meadow/woodland, where light levels will be below of 1 lux (see Landscape Design Report, Section 4, provided by Gannon Associates and accompanying the planning application) and viable for such species, and this is a considerable benefit which might increase their local abundance (potentially including Daubenton's bat, which specialises in foraging over calm water). The central retained hedgerow with mature trees

maintains connectivity to and from the wetland/stream/meadow area, and along with other hedgerows/trees maintains connectivity beyond the Proposed Development. Commuting routes for light-averse species to significant roosts are unlikely to be affected given the very low level of activity of light-averse species, however there are no known bat roosts in the Study Area, there is no significant baseline roosting potential north of the Study Area (which is under development), and other areas adjacent to the Study Area are served for commuting purposes by other unlit features in particular the Royal Canal (a particularly important foraging and commuting feature for bats). Consequently, there is predicted to be an overall neutral effect on foraging and commuting bats by operational disturbance, which is likely and **Not Significant**.

#### 9.3.6.6 Otter

Operational pollution of otter habitat is adequately dealt with by the embedded SuDS measures as discussed elsewhere above.

##### **Operation – road mortality**

The Barnhill Stream will be retained and likely used occasionally by otter. Otters can be injured by vehicular collision if forced to leave watercourses to cross roads. However, the Proposed Development includes embedded design that will avoid this occurrence. The one road bridge that is part of the Proposed Development spans the stream whilst leaving the channel and immediate banks intact, providing passage for otter beneath the bridge at all times. Proposed small footbridges across the stream do not cause any risk of harm to otter because they are in an open park environment and do not involve vehicles. Keely and Wilkowska (2017) recorded a terrestrial otter crossing point between the Barnhill Stream and the Royal Canal, however this is located where the stream passes under the canal, well outside the Study Area to the south-east and unaffected. The baseline environment at the time of construction and therefore also present during operation will include the upgraded Barberstown Lane South along the south edge of the Study Area and the upgraded R149 through the western part of the Study Area, provided by separate developments; however, the design of these upgraded roads, where they bridge the Barnhill Stream, also maintains passage for otter along the stream with no barriers such as grills. The likelihood of otters crossing roads in the Study Area, rather than continuing to commute along the Barnhill Stream, is therefore very low. There is therefore predicted to be **No Effect** on otter through injury during operation.

#### 9.3.6.7 Badger

##### **Operation – road mortality**

Badger-vehicle collisions can kill badgers, particularly in areas with dense human populations and busy roads. As Ireland is principally a rural country, road casualties are a relatively insignificant source of badger mortality (Sleeman *et al*, 2012). However, the Proposed Development will urbanise an area currently dominated by pasture and increase vehicular activity around it. Roads within the Proposed Development itself will be low speed and potential foraging habitat for badger within it will be restricted mainly to the park in the south of the Proposed Development. Note that the upgraded Barberstown South Lane, provided through a separate development, will be present and part of the baseline environment at the time of construction, and will therefore also be present during the operational phase; however, this will incorporate a badger underpass in the vicinity of the likely area that badgers currently cross this road. The provided upgraded road will also be relatively low speed at this point owing to the presence of a roundabout. Therefore badger-vehicle collisions are likely to be rare, and there is predicted to be a permanent adverse effect at the Local (Local Lower) level only, which is unlikely and **Not Significant**.

#### 9.3.6.8 Other protected mammals

There are not considered to be any adverse impacts on Irish hare, hedgehog, pygmy shrew or Irish stoat during the operational phase, with the possible exception of predation of pygmy shrew by pets of residents of the Proposed Development, in particular cats.

#### 9.3.6.9 Amphibians

There are not considered to be any adverse impacts on amphibians during the operational phase, in particular owing to the extensive embedded SuDS measures which will avoid operational pollution (see embedded mitigation, Section 9.3.4).

#### 9.3.6.10 Reptiles

There are not considered to be any adverse impacts on reptiles during the operational phase, in particular owing to the extensive embedded SuDS measures which will avoid operational pollution (see embedded mitigation, Section 9.3.4).

#### 9.3.6.11 Breeding and wintering birds

There is only considered to be one possible operational adverse effect on birds, which would be potential predation by pets owned by residents of the Proposed Development, particularly cats.

Predation studies suggest that more than 55 million birds are killed annually by domestic cats in the UK (Thomas *et al*, 2012). However, it must be noted that the existing baseline breeding bird population is not of special note, with an importance of Local (Local Higher) only, largely as a result of the dominance of heavily-grazed pasture within the Study Area. The diversity of breeding birds would almost certainly increase as a result of the Proposed Development, as discussed above (section 9.3.5.12) and in particular due to the wetland and woodland creation (the breeding bird population would still be likely however to remain at Local (Local Higher) importance). Likely breeding birds in the created wetland, such as reed bunting and sedge warbler, would be unlikely to be predated by cats since cats do not favour wet environments. Birds that nest in woodland could be predated, particularly where ground-nesting, however there are not likely to be many ground-nesting birds in the woodland (owing to factors such as dog walking), and those that nest above the ground (including potential amber-listed greenfinch and mistle thrush) would be predated to a lower degree. It is therefore concluded that bird predation by pets would constitute a permanent adverse effect on birds at the Local (Local lower) scale only, which would be likely but of **Slight** significance, and would not prevent the likely increase in bird diversity from the wetland and woodland creation.

#### 9.3.6.12 Lake orb mussel

There are not considered to be any adverse impacts on lake orb mussel during the operational phase, in particular owing to the extensive embedded SuDS measures which will avoid operational pollution (see embedded mitigation, Section 9.3.4).

### 9.3.7 Cumulative assessment

There are a number of permitted developments within the Hansfield Supplementary Development Zone (SDZ), which lies to the north of the Proposed Development on the opposite side of the railway.

Several of these developments already exist and are considered part of the baseline environment – these comprise FW15A/0161, FW16A/0117 and FW16A/0123. In the case of FW15A/0032, the development largely also exists and is part of the baseline environment, with the exception of a small area just north of the railway – there was no general ecological information available on the Fingal County Council Planning Portal for this development but a Natura Impact Statement concluded no likely significant effects on European sites.

For FW14A/002, FW17A/0135 and FW17A/0134, no ecological information was available on the planning portal.

For FW19A/0187 and FW18A/0197, no available general ecological information was available but an Appropriate Assessment Screening Report concluded no Likely Significant Effects on European sites.

For FW16A/0123 and FW18A/0021, an impact assessment concluded no long-term impacts on the conservation status of habitats or protected species, although a reduction in foraging/commuting habitat for bats/badgers was noted (no setts were affected).

For FW18A/0110, an Appropriate Assessment Screening concluded no Likely Significant Effects on European sites. The same document also concluded no measurable impact on Annex II species. Minor loss of scrub was compensated by planting. Loss of foraging/commuting habitat for bats/badgers (no loss of setts/roosts) partially mitigated by planting along southern boundary to provide connectivity to west and east including Royal Canal. Six smooth newts were found in a drain, but were not refound during subsequent surveys (the Applicant, pers. comm.), therefore no mitigation was required.

In view of the above, the main impacts of forthcoming developments in the Hansfield SDZ are reductions in foraging and commuting habitat for bats and badger. The Proposed Development is considered to have an overall neutral effect on bat commuting/foraging habitat for the reasons stated in the above impact assessment, including provision of new, good foraging habitat (the proposed wetland and adjacent meadows and native tree planting, with significant unlit areas, and retention of significant lengths of hedgerows with mature trees). Therefore there will be no cumulative adverse effect with

regard to bat foraging/commuting habitat. For badger foraging habitat, the cumulative loss will be larger with the Proposed Development and nearby Hansfield SDZ areas considered together. However, it must be noted that there are extensive fields suitable for badger foraging to the south, west and to a lesser extent east of the Proposed Development. These areas are marked in the Fingal Development Plan for retention as either 'Open Space' (a field between the Proposed Development and the Royal Canal), 'High amenity' (extensive lands east and south of the Royal Canal regarded as of high scenic value) and 'Green belt' (extensive lands south and west of the Proposed Development). There is therefore a high probability that suitable habitat for badger will remain indefinitely in the local area within County Dublin. Additionally to this, nearby areas of County Meath and County Kildare are also highly rural and likely to remain so. Therefore the cumulative effect on badger is considered to remain of **Slight** significance.

Additionally, there is a proposed short footpath at the south-east edge of the Proposed Development linking towards the footpath along the Royal Canal. The footpath within the Proposed Development terminates at the hedgerow on the border of the Royal Canal pNHA. However, the footpath is likely in due course to be extended by other parties, to pass through the narrow strip of peripheral GS2 dry meadow grassland to the canal footpath. The grassland strip is part of the pNHA. Therefore there would be a cumulative impact involving minor loss to this grassland within the pNHA, estimated at most to be 50 m<sup>2</sup>. For comparison, the amount of such grassland along the canal and in the pNHA within the survey area alone is 6,474 m<sup>2</sup>, and the pNHA is 100 km long with extensive peripheral grassland of likely similar nature. It should also be noted that pNHAs are not subject to the degree of protection afforded to fully designated NHAs. Consequently, the cumulative impact of this path construction by loss of pNHA grassland is considered a permanent adverse effect at the Local (Local lower) level only, which is likely and of **Slight** significance.

## 9.4 Mitigation Measures

Specific mitigation measures (further to those that are embedded – see Section 9.3.4) will be implemented to minimise adverse effects on ecological features identified above. Mitigation is not necessarily required where there is no predicted effect or it is Imperceptible or Not Significant, however in some cases readily-achievable measures will be implemented to ameliorate such effects and/or provide ecological enhancement. This will contribute to or ensure compliance with the Barnhill LAP and the FDP.

The implementation of mitigation does not replace or negate the requirement for legislative compliance, and in some cases the below measures are required for this reason.

### 9.4.1 Construction Phase Mitigation

The following construction phase mitigation measures are proposed, for the reasons given.

#### 9.4.1.1 Appointment of Ecological Clerk of Works

An Ecological Clerk of Works (ECoW) will be appointed for the duration of each phase of construction. The ECoW will advise on and monitor implementation of ecological mitigation measures and compliance with legislative requirements concerning ecological features. The ECoW will also carry out pre-commencement checks for protected and/or notable species and provide other ecological advice as necessary. Note that the ECoW should ideally be qualified and licensed to handle bats, in case bats are found during supervised removal of any trees (and the one building) with Low bat roost suitability.

#### 9.4.1.2 Pre-commencement survey

The earliest enabling works will not take place until late 2024 at the earliest. The ECoW will therefore carry out a survey for protected or notable species to check for any changes to the baseline conditions described in this Chapter, in particular any changes to the locations of resting sites used by protected species. The ECoW will be provided with details of the works, so that distances can be determined from the known badger sett and any other protected species resting sites that the ECoW might find. The pre-commencement survey will be completed two to six months prior to the commencement of enabling works (such as site clearance), giving time for derogation licensing if found necessary. The results will be reported and communicated to the appointed principal contractor, and where necessary proportionate avoidance/mitigation measures will be implemented.

Given the different phases of the Development, the ECoW may need to carry out pre-commencement surveys in consecutive years or to carry them out in areas relevant to particular phase(s). This shall be arranged by due communication between the principal contractor(s) and the ECoW.



#### 9.4.1.3 Barn owl check

The above pre-commencement survey will include inspection of the buildings in the industrial yard just south of Barberstown Lane North to check for signs of nesting or roosting barn owl, since the industrial yard (it is assumed) would be vacant for a period before demolition and could therefore become used by barn owl(s) if accessible to them. Barn owl is protected under the Wildlife Acts, with slightly stricter protection afforded by inclusion on the Fourth Schedule.

In the event that barn owl is found to have occupied the vacant buildings, which is considered possible but unlikely, the ECoW will communicate this to relevant stakeholders and carry out any necessary actions to ensure barn owls are not harmed and relevant legislation is complied with, including obtaining any derogation licensing that may be necessary. If a barn owl nest site or roost site will subsequently be lost as a result of the works, a replacement barn owl box will be installed in an appropriate location on a retained hedgerow under the guidance of the ECoW.

#### 9.4.1.4 Licensing

Works will be carried out near an existing small single-hole badger sett (described above). The sett will be retained in central retained hedgerow in the proposed park area, but could be subject to disturbance by works. Prior to carrying out any works which could cause disturbance of the sett, the ECoW or other suitably qualified ecologist shall apply for a licence from NPWS. This would be likely to be received if NPWS is satisfied with the proposed mitigation (such as an exclusion zone of appropriate size/shape from which plant, machinery and materials will be excluded, to avoid damaging the sett).

As noted above, in the unlikely event that barn owl colonises one or more of the (then) vacant buildings in the industrial area, the ECoW would need to obtain a derogation licence to permit disturbance of the nest/roost site, with appropriate mitigation.

No other licensing is currently considered necessary. However, if the ECoW should subsequently find new resting places of protected species (such as bat roosts) during pre-commencement surveys, that will be destroyed or disturbed by works, then derogation licence(s) may be required for those works to proceed. The ECoW shall advise accordingly if this situation arises.

#### 9.4.1.5 Precautionary method for removal of trees and building with Low bat roost suitability

The two trees with Moderate bat roost suitability will be retained (see Figure 9.4 and Arbor-Care, 2022). Those identified with Low bat roost suitability do not require survey under BCT guidelines (Collins, 2016). However, where Low bat roost suitability trees require to be removed, sectional soft-felling will be used as necessary for the affected tree parts (those with dense ivy) under the supervision of the ECoW or other ecologist qualified and licensed to handle bats. In the unlikely event that the supervising ecologist find bats during removal of such trees, they shall be placed in a pre-existing bat box on a retained tree in a suitable location nearby.

For the small derelict slate-roofed building with Low bat roost suitability on the immediate south edge of Barberstown Lane North, the following shall be carried out. The pre-commencement surveys shall include dusk or dawn survey of this building, and the ECoW or other ecologist qualified and licensed to handle bats shall inspect the building externally and, if safe to do so, internally. In the unlikely event that bats or bat evidence are found, the supervising ecologist shall advise accordingly and obtain a derogation licence, and in this case mitigation (in addition to supply of compensatory roost box(es)) would likely require careful demolition in a piece-meal fashion rather than bulldozing (with slates, as far as possible, removed individually under supervision of the supervising ecologist, and other parts also carefully removed to the extent considered necessary by the supervising ecologist). If, as is more likely, no bats are found during the inspections/survey, the manner of demolition of the building shall be at the discretion of the ECoW.

#### 9.4.1.6 Precautionary methods for protection of amphibians and reptiles

As discussed above, there is considered to be limited opportunity in the baseline Study Area for amphibians and reptiles. Heavily-grazed pasture is unfavourable habitat for both as it provides no shelter. However, if at the time of commencing vegetation clearance the grass has grown and no longer comprises tightly-grazed short swards, then the ECoW shall inspect any grassland prior to its clearance, if necessary prescribing and supervising cutting of the grass to a low height with an intermediate cut if considered appropriate, to discourage amphibian and reptile presence. Similarly, lengths of hedgerow with adjacent small ditches that require to be removed shall be inspected by the ECoW to check for amphibian or reptile presence before their removal.

If any amphibians or reptiles are found by the ECoW, they shall be returned to sections of retained small ditch beside retained hedgerows (such as the central north-south hedgerow through the proposed park area). If the proposed wetland feature with pond and surrounding habitat in the park has been constructed and is established, with reasonably developed aquatic vegetation, any found amphibians shall be transferred there, at the discretion of the ECoW.

#### 9.4.1.7 Compliance with nesting bird legislation

As far as possible, works directly impacting vegetation that could be used by nesting birds (including all hedgerows, shrubs and trees) will be undertaken outside the breeding season (taken to be March to August, inclusive). Should vegetation clearance be required during the breeding season, a pre-works check for active nests will be carried out by the ECoW or other suitably experienced ornithologist no more than 72 hours in advance of the clearance works taking place (since nests can be quickly established). Where any active nests are identified, suitable species-specific exclusion zones will be implemented and maintained until the breeding attempt has concluded.

#### 9.4.1.8 Other wildlife protection measures

The following measures will be included to minimise risk of disturbance or harm to protected species:

- any excavations will be left with a method of escape (such as a battered slope or plank of wood) for any animals that may enter overnight, and will be checked at the start of each working day to ensure no animals are trapped;
- any exposed pipes will be capped or otherwise blocked at the end of each working day or if left for extended periods of time, to ensure no animals are trapped;
- as far as possible, works will be carried out in daylight to avoid adverse artificial lighting effects on protected species such as foraging/commuting bats and badger;
- any artificial lighting required for construction works will be strongly directional, directed only at the works area(s) and turned off when not required, to avoid adverse artificial light effects on nocturnal wildlife; and,
- sightings or evidence of protected species during construction will be recorded, and if found within 30 m of works then those works will stop immediately and the ECoW will be contacted for further advice.

#### 9.4.1.9 Construction and Environment Management Plan

An outline Construction and Environment Management Plan (CEMP) has been produced. The appointed principal contractor shall develop the final CEMP and update it as necessary. The final CEMP shall include the following general measures for the protection of biodiversity.

##### **Pollution prevention measures**

Pollution prevention is important in reducing the risk of damage to ecological features, particularly those that are aquatic. The CEMP shall include the following pollution prevention measures that are of particular importance for protection of biodiversity, that will be implemented throughout all construction of the Proposed Development:

- controls and contingency measures will be provided to manage run-off from construction areas and to manage sediment, including silt fencing if necessary, with monitoring of silt ponds etc.;
- all oils, lubricants or other chemicals will be stored in appropriate secure containers in suitable bunded storage areas, with spill kits provided at the storage locations;
- all refuelling and servicing of vehicles and plant will be carried out in a designated area; and,
- dust suppression measures including wheel-washing and if necessary water-based dust suppression.

##### **Tree and hedgerow protection**

Retained trees and hedgerows will be protected from damage during construction activity using suitable barriers and in accordance with BS 3398 2010.

### 9.4.2 Operational Phase Mitigation

#### 9.4.2.1 Provision of bat boxes

The Proposed Development will result in loss of 16 trees with Low bat roost suitability, and one building with Low bat roost suitability. There will therefore be a reduction in the number of potential roost features in the Site. This will be compensated by the provision of 20 bat boxes, ideally constructed from woodcrete so as to be long-lasting, positioned in appropriate mature trees along retained hedgerows.

The positioning of the bat boxes will be advised by the ECoW. Unlit sections of the hedgerow through the proposed park area near the wetland feature would be appropriate locations.

Note that the bat boxes will need to be provided shortly before any works (including clearance/demolition works) so that they are also available for use by the ECoW in the unlikely event that bats are found during sectional soft-felling of trees with Low bat roost suitability and demolition of the one building with Low bat roost suitability (see above).

### 9.4.3 Monitoring

#### 9.4.3.1 Monitoring of pollution controls

Construction pollution controls will be monitored by the ECoW or other person(s) stipulated in the CEMP. In the event of any issue with construction pollution control, the ECoW or other responsible person(s) will notify the principal contractor and any other relevant parties, and will verify when remedial action has been taken and record this.

Monitoring will be carried out of the effectiveness of the permanent SuDS measures to control operational pollution.

#### 9.4.3.2 Monitoring of habitat establishment

The embedded measures for habitat creation and enhancement (including provision of the proposed wetland feature, meadows and woodland, and removal of overshading shrubs from the Barnhill Stream) will be monitored as set out in the Landscape Design Report (provided by Gannon Associated and accompanying the planning application) and the period of time set out therein or as subsequently agreed with the planning authority. Monitoring of sown habitat shall ensure, where applicable, that management follows seed supplier guidance. Where necessary, remedial action will be taken should monitoring identify failures or problems with the establishment of planted or sown vegetation. This will ensure that the desired species and proposed habitats establish successfully.

#### 9.4.3.3 Monitoring for protected species

On-going monitoring for protected species will be carried out by the ECoW, as required, for the duration of the construction phases. If this identifies a need for additional avoidance or mitigation measures, these will be communicated to the principal contractor and will be implemented with ECoW guidance as necessary, to ensure legislative and planning policy compliance on protected species and biodiversity preservation.

## 9.5 Residual Impacts

In summary, the following impacts were determined to be **Imperceptible** or **Not Significant**, or there will be **No effect** prior to implementation of the mitigation in Section 9.4:

- all impacts on European sites;
- construction vehicle emission pollution of the Royal Canal pNHA;
- construction changes to bat foraging/commuting habitat (losses are balanced by provision of the proposed wetland feature, meadows and native woodland, large parts of which will be unlit);
- construction disturbance of foraging/commuting bats;
- construction pollution of otter commuting/foraging habitats;
- construction disturbance of badger;
- construction loss of habitat for other protected mammals;
- construction harm to active bird nests;
- construction changes in lake orb mussel habitat;
- construction pollution of lake orb mussel habitat;
- operational waterborne pollution of the Royal Canal pNHA;
- operational airborne pollution of the Royal Canal pNHA;
- operational waterborne pollution of the Liffey Valley pNHA;
- operational waterborne pollution of the Barnhill Stream;
- operational disturbance of foraging/commuting bats;
- operational mortality of otter; and,
- operational mortality of badger.

The following impacts were determined to be of **Slight adverse** significance, without (where applicable) the mitigation in Section 9.4:

- construction waterborne pollution of the Barnhill Stream;

- construction airborne pollution of the Barnhill Stream;
- construction loss of potential bat roost sites (several trees and one building with Low suitability);
- construction loss of badger foraging/commuting habitat;
- construction mortality of badger;
- construction pollution of amphibian habitat;
- construction mortality of amphibians;
- construction mortality of reptiles; and,
- operational predation of birds by pets particularly cats.

The following impacts were determined to be of **Moderate adverse** significance, without the mitigation in Section 9.4:

- construction waterborne pollution of the Royal Canal pNHA;
- construction dust emissions of the Royal Canal pNHA;
- construction pollution of the Liffey Valley pNHA; and,
- construction mortality of barn owl.

The following impacts were determined to be **Significant adverse** without the mitigation in Section 9.4:

- construction mortality of otter.

The following impacts were determined to be of **Slight beneficial** significance:

- changes to otter foraging/commuting habitat (embedded provision of the wetland features with pond); and,
- changes in reptile habitat (embedded provision of sown meadows).

The following impacts were determined to be of **Moderate beneficial** significance:

- changes in terrestrial habitats (as a result of embedded proposals for a large wetland feature, sown meadows, native woodland planting and removal of overshadowing shrubs along the Barnhill Stream);
- changes in amphibian habitat (through embedded provision of the proposed large wetland feature including pond); and,
- changes in bird breeding habitats (again, through embedded provision of the wetland, meadows and native woodland planting).

With the above mitigation in Section 9.4 implemented, **all but two effects of Slight adverse significance, and all those of Moderate adverse and Significant adverse significance, are mitigated and will be Not Significant**, either through construction pollution controls or implementation of measures to avoid significant harm to protected species populations. The residual adverse effects of the Proposed Development that will remain are loss of badger foraging/commuting habitat, and likely predation of birds by the pets of the residents of the Proposed Development. There will also be a cumulative Slight adverse effect arising through completion by other parties of the short footpath linking to the canal footpath, completion of which would pass through a very small amount of grassland in the Royal Canal pNHA. Loss of badger foraging/commuting habitat cannot be appreciably mitigated since the pasture dominating the baseline environment is suitable and known to be visited by badger, and neither can bird predation by pets be prevented. However, these remaining residual adverse effects are of Slight significance only, for the reasons set out in the impact assessment, and are not considered an impediment to the Proposed Development, which achieves several important and counteracting beneficial effects for biodiversity as summarised in the last bullet points above.

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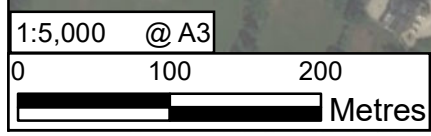
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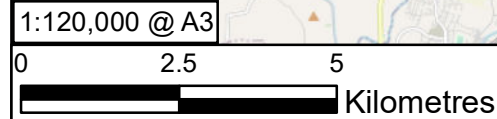
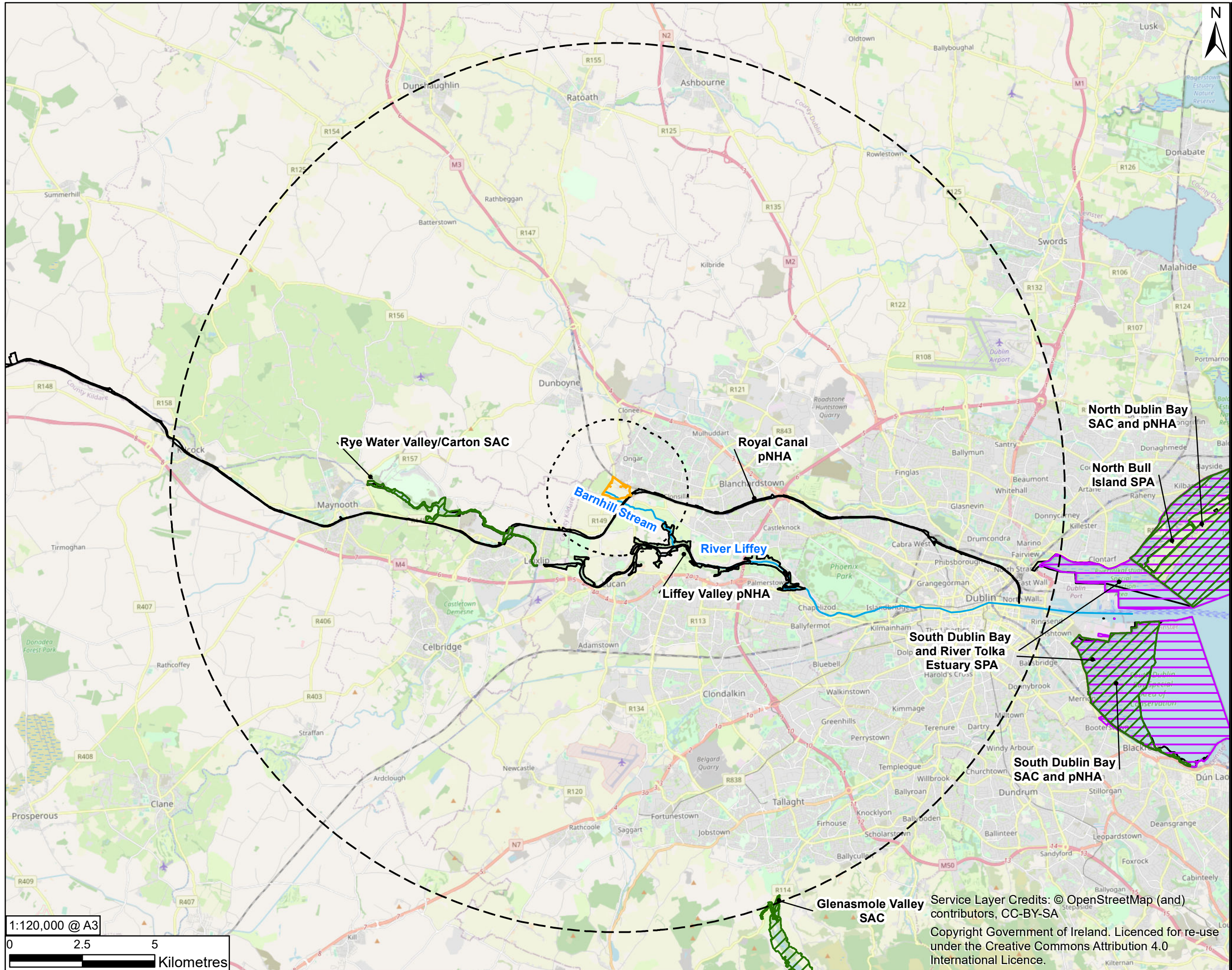


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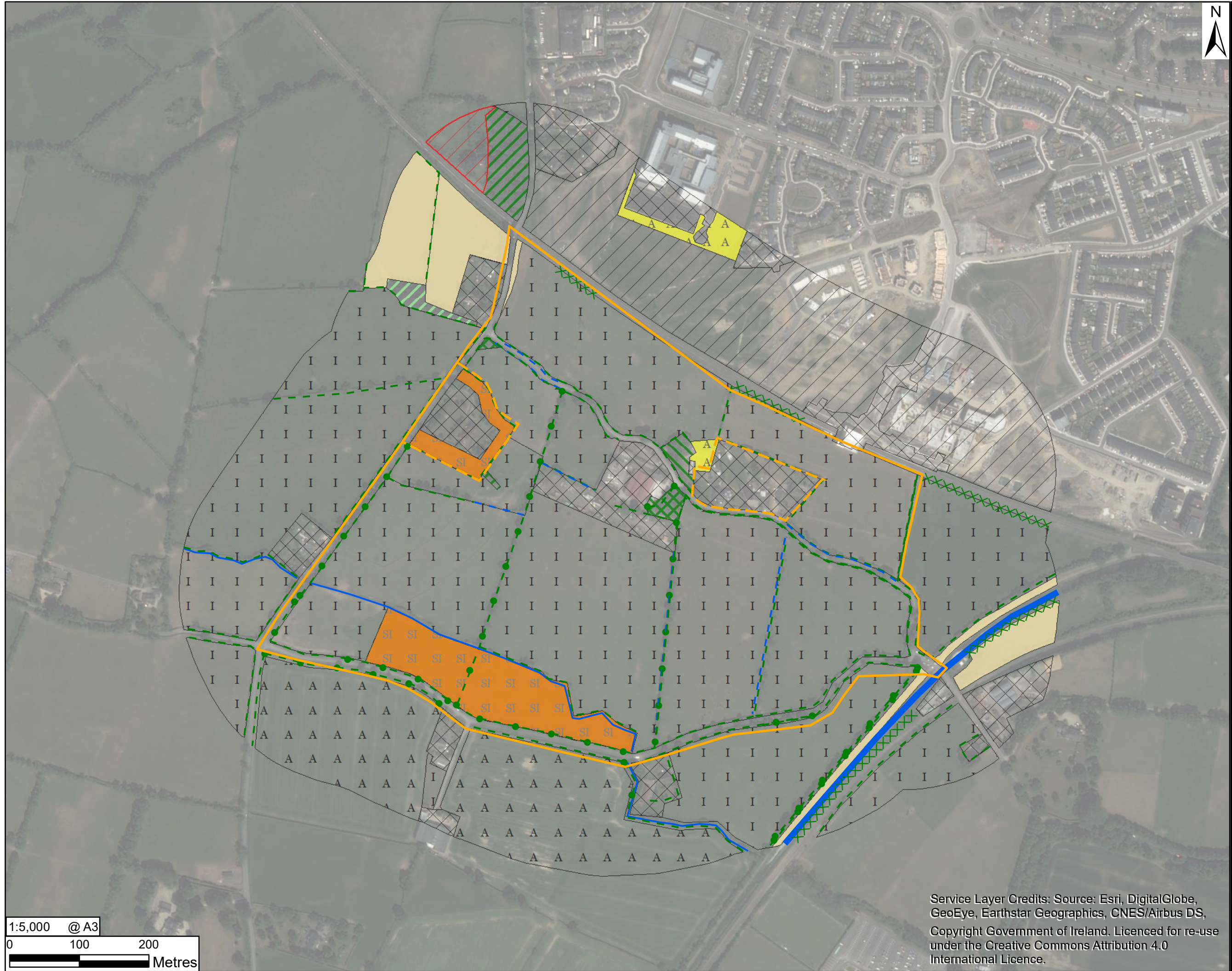
-  Study Area
-  2 km radius around Site
-  15 km radius around Site
-  Special Areas of Conservation (SAC)
-  Special Protection Areas (SPA)
-  Proposed Natural Heritage Areas (pNHA)
-  Watercourses downstream of the Site



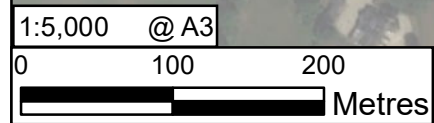
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- Study Area
- Habitat (Fossitt)**
- FW Watercourses
- FW3 Canals
- FW4 Drainage ditches
- WL1 Hedgerows
- WL2 Treelines
- WS1 Scrub
- WD1 (Mixed) broadleaved woodland
- WD4 Conifer plantation
- WS2 Immature woodland
- WS1 Scrub
- GS1 Dry calcareous and neutral grassland (smaller area around retained property outside Red Line and not accessible, assessed from aerial)
- GS2 Dry meadows and grassy verges (outside Red Line, NW area not accessible and assessed from distance/aerial)
- GA1 Improved agricultural grassland
- GA2 Amenity grassland (improved)
- BC1 Arable Crops
- BL3 Buildings and artificial surfaces (outside Red Line apart from central area, includes private houses/gardens)
- Construction area (outside Red Line, no access)
- Unknown (outside Red Line, no access and uncertain from aerial)







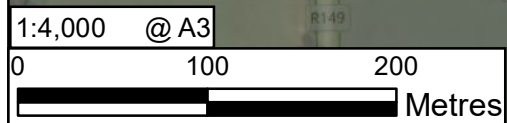
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-  Study Area
- Bat roost suitability**
-  Moderate suitability tree (T1 and T2)
-  Low suitability tree
-  Low suitability building (B1)

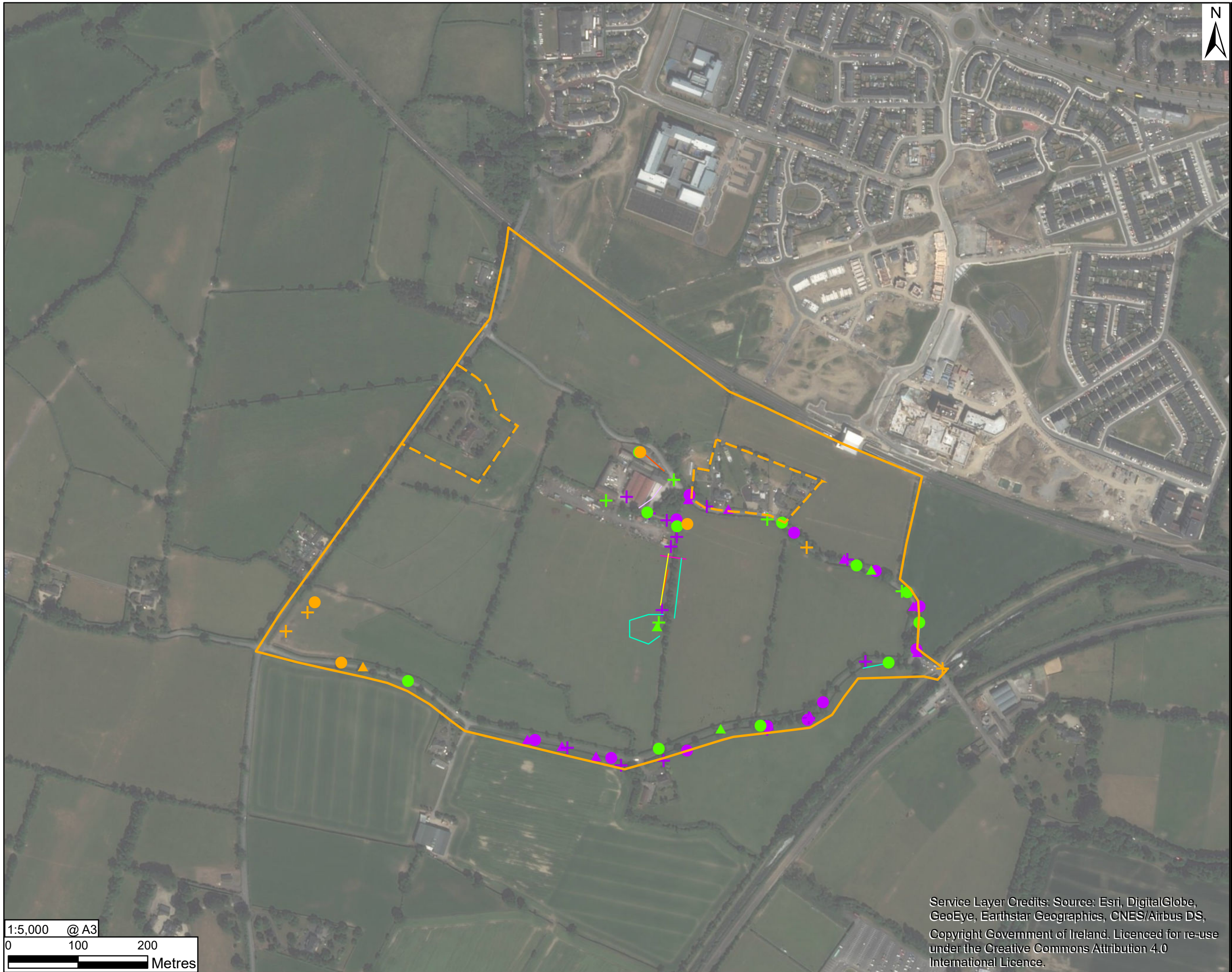


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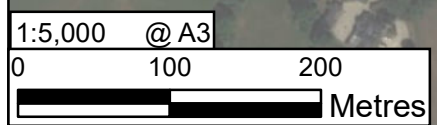
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- LEGEND**
- Study Area
  - Bat activity transect survey results**
  - 17 August 2020**
  - Common pipistrelle
  - + Leisler's
  - ▲ Soprano pipistrelle
  - 30 August 2021**
  - Common pipistrelle
  - + Leisler's
  - ▲ Soprano pipistrelle
  - Common pipistrelle
  - Leisler's
  - 21 September 2021**
  - Common pipistrelle
  - + Leisler's
  - ▲ Soprano pipistrelle
  - Common pipistrelle
  - Leisler's
  - Soprano pipistrelle



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# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 10

### Noise and Vibration

# Volume II

Environmental Impact Assessment Report



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## Chapter 10 Noise and Vibration

### Contents

10	Noise and Vibration .....	10-3
10.1	Introduction .....	10-3
10.1.1	Author Information and Competency .....	10-3
10.1.2	Reference to Guidelines Relevant to Discipline .....	10-3
10.1.3	Methodology .....	10-8
10.1.4	Difficulties Encountered in Compiling Information .....	10-12
10.2	Description of Existing Environment .....	10-12
10.2.1	Baseline Measurement Survey .....	10-12
10.2.2	Survey Equipment .....	10-13
10.2.3	Baseline Survey Results .....	10-13
10.2.4	Train Measurement Survey .....	10-15
10.2.5	Modelled Development Environment .....	10-15
10.2.6	Future Noise Environment at Existing Receptors .....	10-16
10.3	Predicted Impacts .....	10-18
10.3.1	Construction Phase – Noise .....	10-18
10.3.2	Construction Phase – Vibration .....	10-23
10.4	Mitigation Measures .....	10-29
10.5	Residual Impacts .....	10-30
10.5.1	Construction Phase Residual Impacts .....	10-30
10.5.2	Operational Phase Residual Impacts – External .....	10-30
10.5.3	Operational Phase Residual Impacts – Internal .....	10-31
10.6	References .....	10-32

### Tables

Table 10.1	Acts and Technical Standards referenced in this Chapter .....	10-4
Table 10.2	Construction Noise Residential Receptors – Example Threshold Values .....	10-5
Table 10.3	Construction Vibration Residential Receptors – Example Threshold Values .....	10-5
Table 10.4	Residential Development Suitable Internal Noise Levels, dB .....	10-6
Table 10.5	LA <sub>10,18hr</sub> conversion calculations .....	10-7
Table 10.6	Sensitivity Criteria for Acoustic Receptors .....	10-9
Table 10.7	Construction Noise – Impact Magnitude .....	10-9
Table 10.8	Construction Vibration – Magnitude of Change (Impact) .....	10-9
Table 10.9	Environmental Noise Upon Residential Receptors Daytime – Impact Magnitude .....	10-10
Table 10.10	Environmental Noise Upon Residential Receptors Night-Time (Internal) – Impact Magnitude .....	10-10
Table 10.11	Commercial Noise Upon Residential Receptors – Impact Magnitude .....	10-10
Table 10.12	Development Related Traffic – Short-Term Magnitude of Change (Impact) .....	10-11
Table 10.13	Development Related Traffic – Long-Term Magnitude of Change (Impact) .....	10-11
Table 10.14	Level of Effect Matrix .....	10-11
Table 10.15	LA <sub>10,18hr</sub> conversion calculations .....	10-13
Table 10.16	Monitoring Equipment .....	10-13
Table 10.17	Noise Survey Results .....	10-14
Table 10.18	SEL of Train Passes at Location 1 .....	10-15

Table 10.19 Comparison of Traffic Flows and the Adjustments Required to the Noise Model .....	10-16
Table 10.20 Do Minimum and Do Development 2030 Traffic Data .....	10-17
Table 10.21 Threshold Construction Noise Limits dB(A).....	10-18
Table 10.22 Phase 1: Site Clearance and Enabling Works - Plant List.....	10-19
Table 10.23 Phase 2: Road Construction Works - Plant List.....	10-19
Table 10.24 Phase 3: Groundworks – Plant List .....	10-20
Table 10.25 Phase 4: Substructure – Plant List.....	10-20
Table 10.26 Phase 5: Superstructure Works – Plant List.....	10-21
Table 10.27 Predicted Noise Levels and Assessment, LAeq dB(A).....	10-22
Table 10.28 Predicted Construction Vibration Levels .....	10-24
Table 10.29 Calculated BNL And Short-Term Impact .....	10-28

## Figures

Figure 10.1 Survey Locations .....	10-12
Figure 10.2 External Daytime LAeq,T Noise Levels .....	10-26
Figure 10.3 Mitigated External Daytime LAeq,T Noise Levels .....	10-31



## 10 Noise and Vibration

### 10.1 Introduction

#### 10.1.1 Author Information and Competency

The assessment has been completed by Michelle Dawson BSc (Hons), MSc, IOA Dip. Michelle is a member of SLR's Acoustics Team and is a Corporate Member of the Institute of Acoustics (MIOA).

#### 10.1.2 Reference to Guidelines Relevant to Discipline

This Section is split into:

Planning Policy and Development Control  
Technical Standards

##### 10.1.2.1 Planning Policy and Development Control

The following Planning/Development Control Policies are of relevance to The Barnhill SHD:

Fingal Development Plan 2017 – 2023  
Barnhill Local Area Plan

#### **Fingal Development Plan 2017 – 2023 Local Plan**

The Zoning Objective for the Barnhill SHD area is to “*Provide for new residential communities’ subject to the provision of the necessary social and physical infrastructure*”. The Specific Objective of the Area is “*Subject to Local Area Plan 13.A*”.

#### **Barnhill Local Area Plan**

Barnhill Local Area Plan will be in effect for a period of 6 years (2019-2025), as provided for under the Planning and Development Act 2010. It is the policy of Fingal County Council to adopt a strategic approach to managing environmental noise within its functional area, which will aim to prevent members of the population in new residential and other noise sensitive developments being exposed to undesirable noise levels.

Section 7.4 of the Barnhill LAP states: ‘N1. Require developers to ensure that appropriate noise assessments are carried out and the principles of good acoustic design are applied in line with “*ProPG: Planning & Noise New Residential Development*” and in keeping with World Health Organization recommendations and guidance, where appropriate’.

#### **The National Planning Framework 2040**

In addition to Local Policy, reference is also required to *The National Planning Framework 2040*. *The National Planning Framework 2040* is the Government’s high-level strategic plan for shaping the future growth of Ireland up to the year 2040. Of particular relevance to this Chapter is *National Policy Objective 65*.

*National Policy Objective 65* aims to: ‘*Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and supports the aims of the Environmental Noise Regulations through national planning and Noise Action Plans*’.

The Environmental Noise Regulations recognize a number of British Standards and also recommend the UK national computation method ‘*Calculation of Road Traffic Noise (CRTN)*’ for road traffic noise prediction. **In the absence of any specific Irish guidance, this Chapter has where necessary referenced a number of British standards.**

### 10.1.2.2 Technical Standards

The Acts and Technical Standards referenced in this Chapter are indicated in Table 10.1

**Table 10.1 Acts and Technical Standards referenced in this Chapter**

Demolition and Construction Phase	Operational Phase
Environmental Protection Agency Act 1992	BS8233:2014 Guidance on sound insulation and noise reduction for buildings.
BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.	ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, New Residential Development, produced by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).
	Environmental Noise Guidelines for the European Region document (WHO, 2018) and Night Noise Guidelines for Europe (WHO, 2009).
	Calculation of Road Traffic Noise (1988)
	BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

Impacts and Effects effect will be determined with reference to the *Guidelines for Environmental Noise Impact Assessment*, produced by the Institute of Environmental Management and Assessment (IEAM), and published in October 2014. Relevant sections of the Technical Standards referenced are provided in this Section.

#### **BS5228-1:2009+A1:2014**

The chief noise guidance document used in Ireland in the construction phase of noise assessments is the Environmental Protection Agency Act 1992. This defines environmental pollution as including noise that is a nuisance, or that would endanger human health or cause damage to properties or the environment. *'Part 4: Integrated Pollution Control'* states: *'In considering an application for a license or the review of a license or revised license under this Part, the Agency shall have regard to – any relevant noise regulations under section 106'*.

In order to set appropriate construction noise limits for the development site, reference has been made to BS 5228 2009+A1 2014 Code of practice for noise and vibration control on construction and open sites. Part 1 of this document Noise provides guidance on selecting appropriate noise criteria relating construction works.

Construction noise from the construction of the development will be assessed in accordance with BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. This standard sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities and contains tables of sound power levels generated by a wide variety of mobile and fixed plant equipment.

Compliance with BS5228-1:2009+A1:2014 is expected as a minimum standard when assessing the impact of construction noise upon the existing noise environment at nearby sensitive receptors.

BS5228-1:2009+A1:2014 gives several examples of acceptable noise limits for construction or demolition noise. For this assessment as baseline noise data will be available, it is proposed that the ABC method will be used to determine the threshold value at the receptor locations.

In accordance with this method the threshold noise levels for a potentially significant effect are as detailed in Table 10-2.

**Table 10.2 Construction Noise Residential Receptors – Example Threshold Values**

Assessment category and threshold value period (LAeq)	Threshold value, in decibels (dB)		
	Category A	Category	Category C
Night-time (23.00-07.00)	45	50	55
Evenings and weekends D)	55	60	65
Daytime (07.00-19.00) and Saturdays (07.00-13.00)	65	70	75
<p>NOTE1 A significant effect has been deemed to occur if the total LAeq noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.</p> <p>NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total LAeq noise level for the period increases by more than 3 dB due to construction activity.</p> <p>NOTE 3 Applied to residential receptors only.</p>			
<p>A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.</p> <p>B) Category B: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.</p> <p>C) Category C: threshold values to use when the ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.</p> <p>D) 19.01-23.00 weekdays, 13.01-23.00 Saturdays and 07.01-23.00 Sundays.</p>			

If the threshold value is exceeded, then the effect of construction noise upon nearby receptors may be significant. BS5228-1:2009+A1:2014 states that the significance of the effect will depend upon “other project-specific factors, such as the number of receptors affected and the duration and character of the impact” . Whereby professional judgement will be used to determine whether an effect is considered to be significant, and commentary explaining the reasons for this judgement will be provided.

**BS5228-2:2009+A1:2014**

Construction vibrations will be assessed in accordance with BS5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration. This standard gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration levels.

BS5228-2:2009+A1:2014 provides guidance on the effects of vibration as shown in Table 10.3.

**Table 10.3 Construction Vibration Residential Receptors – Example Threshold Values**

Vibration Level, $\text{mms}^{-1}$	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.30	Vibration might be just perceptible in residential environments.
1.00	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.
10.00	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

**BS8233:2014**

The impact of environmental noise upon the proposed residential receptors at the Site will be assessed with reference to BS8233:2014.

BS8233:2014 is the provision of recommendations for the control of noise in and around new buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use rather than to assess

the effect of changes in the external noise climate. The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 10.4.

**Table 10.4 Residential Development Suitable Internal Noise Levels, dB**

Activity	Location	07:00 to 23:00	23:00 to 07:00
		<i>L<sub>Aeq,16hr</sub></i>	<i>L<sub>Aeq,8hr</sub></i>
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

BS8233:2014 states that the recommended limits can be relaxed by up to 5dB “where development is considered necessary or desirable” (Paragraph 7.7.2).

Whilst it may be considered desirable to achieve the BS8233:2014 recommended internal noise levels with windows open, it is stated that where the limit cannot be met with an open window “there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level” (Paragraph 7.7.2).

It is, therefore, not essential that the recommended internal noise levels are achievable with open windows if suitable alternative means of ventilation can be provided.

With regards to external noise, Section 7.7.3.2 of BS8233:2014 states that:

*“For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited”.*

### **ProPG: Planning & Noise**

As BS8233:2014 does not specify internal limits for maximum noise levels within bedrooms during the night-time, reference has been made to the guidance document ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise, New Residential Development, produced by the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH).

This document states:

*“For a reasonable standard in noise-sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45dB LAFmax more than 10 times a night.”*

### **WHO Guidelines**

The WHO advice correlates with the guidance within BS8233:2014 and ProPG with regards to suitable indoor and outdoor noise levels.

The Environmental Noise Guidelines for the European Region document (WHO, 2018) and Night Noise Guidelines for Europe (WHO, 2009) recommend guideline noise levels regardless of the current noise environment. The WHO suggests suitable noise levels for both indoor and outdoor living areas during daytime and night-time periods, and these levels are set regardless of the noise type or noise source, i.e. ‘benchmark’ levels. It advises on the minimum levels of noise before critical health effects, including annoyance, occur.

In this regard, the WHO 2018 guidelines state:

*“The NNG defines effect thresholds or ‘lowest observed adverse health effect levels’ for both immediate physiological reactions during sleep and long-term adverse health*

effects. These guideline exposure levels defined a level below which no effects were expected to occur (corresponding to 30dB L<sub>night</sub>) and proceeded to define the level where adverse effects start to occur (corresponding to 40dB L<sub>night</sub>, with the aim of protecting the whole population, including – to some extent – vulnerable groups.”

the WHO 2009 guidelines state:

“Below the level of 30dB L<sub>night, outside</sub>, no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise. There is no sufficient evidence that the biological effects observed at the level below 40dB L<sub>night, outside</sub> are harmful to health. However, adverse health effects are observed at the level above 40dB L<sub>night, outside</sub>, such as self-reported sleep disturbance, environmental insomnia, and increased use of somnifacient drugs and sedatives”. And “Above 55dB the cardiovascular effects become the major public health concern, which are likely to be less dependent on the nature of the noise. Closer examination of the precise impact will be necessary in the range between 30dB and 55dB as much will depend on the detailed circumstances of each case.”

### Calculation of Road Traffic Noise

It is understood that the road network in the vicinity of the Site is to be reconfigured. Therefore, future road traffic noise levels at the Site will be undertaken with reference to CRTN.

CRTN sets out the UK standard methods and procedures to predict and measure road traffic noise. In the UK, road traffic noise is predicted and measured in terms of a statistical measure, equivalent to the 10th percentile. Termed the L<sub>A10</sub>, this measure of noise is equivalent to the noise level exceeded for 10% of the measurement period. CRTN will be used to determine the L<sub>A10, 18hr</sub> noise level from the new road network.

To allow the BS8233:2014 assessment to be undertaken, the L<sub>A10, 18hr</sub> noise levels require conversion to a L<sub>Aeq, T</sub>. For assessment purposes, the modelled L<sub>A10, 18hr</sub> noise levels will be converted to a L<sub>Aeq, T</sub>, the equivalent continuous sound level using the formulae presented in Table 10.5, as recommended in the ‘Method for Converting the UK Road Traffic Noise Index L<sub>A10, 18hr</sub> to the EU Noise Indices for Road Noise Mapping’ (2006).

Table 10.5 L<sub>A10, 18hr</sub> conversion calculations

Time	Non-motorway conversion	Motorway conversion
07:00 – 21:00	L <sub>day</sub> = 0.95 x L <sub>A10, 18hr</sub> + 1.44	L <sub>day</sub> = 0.98 x L <sub>A10, 18hr</sub> + 0.09
21:00 – 23:00	L <sub>evening</sub> = 0.97 x L <sub>A10, 18hr</sub> – 2.87	L <sub>evening</sub> = 0.89 x L <sub>A10, 18hr</sub> + 5.08
23:00 – 07:00	L <sub>night</sub> = 0.90 x L <sub>A10, 18hr</sub> – 3.77	L <sub>night</sub> = 0.87 x L <sub>A10, 18hr</sub> + 4.24
07:00 – 23:00	L <sub>Aeq, 16hr</sub> = 10log <sub>10</sub> ((12 x (10 <sup>L<sub>day</sub>/10</sup> )) + 4 x (10 <sup>L<sub>evening</sub>/10</sup> )/16)	

The Chapter also includes a simple assessment of the impact of traffic from the proposed residential development upon existing Noise Sensitive Receptors. Using the noise modelling software CadnaA, up to ten receptor locations adjacent to the new road network will be assessed. The modelled L<sub>A10, 18hr</sub> noise levels will be used to determine the impact of development related traffic upon existing receptors.

### BS4142:2014+A1:2019

The impact of commercial noise from the proposed development upon existing and future sensitive receptors will be assessed with reference to British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*. This standard is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby sensitive receptor locations within the context of the existing sound environment.

Where the specific sound contains tonality, impulsivity and/or other sound characteristics penalties should be applied depending on the perceptibility. For tonality a correction of either 0, 2, 4 or 6dB should be added; for impulsivity a correction of either 0, 3, 6 or 9dB should be added and if the sound contains specific sound features which are neither tonal nor impulsive a penalty of 3dB should be added.

In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.



The assessment of impacts contained in BS4142:2014+A1:2019 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the sensitive receptor location. Consideration is then given to the context of the existing sound environment at the sensitive receptor location to assess the potential impact.

- Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014+A1:2019 states that the following should be considered:
- typically, the greater the difference, the greater the magnitude of the impact;
- a difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
- 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. It is an indication that the specific sound source has a low impact

BS4142:2014+A1:2019 notes that:

*“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.”*

BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014+A1:2019 provides the following with respect to the application of penalties to account for “the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention”.

- Tonality – “For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;
- Impulsivity – A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- Intermittency – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and
- Other Sound Characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.”

Finally, BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

### 10.1.3 Methodology

#### 10.1.3.1 Sensitivity Criteria

The sensitivity of the receiving environment is shown in Table 10.6.

**Table 10.6 Sensitivity Criteria for Acoustic Receptors**

Sensitivity	Definition
Very High	Residential properties (night-time), Schools and healthcare building (daytime)
High	Residential properties (daytime), SAC, SPA, SSSI (or similar areas of special interest)
Medium	Offices and other non-noise producing employment areas
Low	Industrial areas

### 10.1.3.2 Impact Magnitude

The Guidelines for Environmental Noise Impact Assessment list the following generic noise impacts:

- Negligible Impact: *“Noise impacts can be heard, but do not cause any change in behaviour or attitude, e.g. turning up volume on television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is perceived change in the quality of life”;*
- Minor Impact: *“Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life”;*
- Moderate Impact: *“Causes a material change in behaviour and/or attitude, e.g. voiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area”;* and
- High Impact *“Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory”.*

### Demolition/Construction Noise Impact

The impact of construction noise upon existing residential receptors will be determined with reference to the ABC method presented in BS5228-1:2009+A1:2014. The impact of construction noise upon existing residential receptors is as detailed in Table 10.7.

**Table 10.7 Construction Noise – Impact Magnitude**

Impact Magnitude	Increase in the $L_{Aeq,T}$ Noise Level
High	Threshold value exceeded by more than 5dB
Moderate	Threshold value exceeded between 3.0 and 4.9dB
Minor	Threshold value exceeded between 0.1 and 2.9dB
Negligible	Threshold value not exceeded

### Demolition/Construction Vibration Impact

The impact of construction vibration upon existing residential receptors will be determined with reference to BS5228-2:2009+A1:2014. The impact of construction vibration upon residential receptors is as detailed in Table 10.8.

**Table 10.8 Construction Vibration – Magnitude of Change (Impact)**

Magnitude	$mms^{-1}$ Vibration Level
High	10.0 $mms^{-1}$ or more
Moderate	Between 1.0 to 9.9 $mms^{-1}$
Minor	Between 0.3 to 0.9 $mms^{-1}$
Negligible	Up to 0.3 $mms^{-1}$ not exceeded

## Operational Impact – Environmental Noise

The impact of environmental noise upon proposed residential receptors will be determined with reference to BS8233:2014.

Based on the guidance presented in BS8233:2014 the impact of environmental noise upon proposed residential receptors during the daytime is detailed in Table 10.9. The impact at night is detailed in Table 10.10.

**Table 10.9 Environmental Noise Upon Residential Receptors Daytime – Impact Magnitude**

Magnitude	$L_{Aeq,T}$ Daytime Noise Level dB External	$L_{Aeq,T}$ Daytime Noise Level dB Internal
High	More than 60	More than 45.0
Moderate	55.1 – 60.0	40.1 – 45.0
Minor	50.0 – 55.0	35.1 – 40.0
Negligible	Less than 50.0	Less than 35.0

**Table 10.10 Environmental Noise Upon Residential Receptors Night-Time (Internal) – Impact Magnitude**

Magnitude	$L_{Aeq,T}$ Night-Time Noise Level dB Internal
High	More than 35.0
Moderate	33.0 – 34.9
Minor	30.0 – 32.9
Negligible	Less than 30.0

## Operational Impact – Commercial Noise

The impact of commercial noise upon existing and proposed residential receptors will be determined with reference to BS4142:2014+A1:2019.

Based on the guidance presented in BS4142:2014+A1:2019 the impact of commercial noise upon existing and proposed residential receptors is detailed in Table 10.11.

**Table 10.11 Commercial Noise Upon Residential Receptors – Impact Magnitude**

Magnitude	Description
High	Rating level is 10dB(A) or more above the background
Moderate	Rating level is between 6 and 9dB(A) above the background
Minor	Rating level is between 1 and 5dB(A) above the background
Negligible	Rating level is below the background

## Operational Impact of Development Related Traffic Noise

The impact of development related traffic noise upon existing receptors will be calculated in accordance with CRTN.

The impact of development related traffic noise upon existing receptors in the short-term is detailed in Table 10.12.

**Table 10.12 Development Related Traffic – Short-Term Magnitude of Change (Impact)**

Magnitude	Noise Change $L_{A10,18hr}$ dB
High	5.0+
Moderate	3.0 – 4.9
Minor	1.0 – 2.9
Negligible	0.1 – 0.9

The impact of development related traffic noise upon existing receptors in the long-term is detailed in Table 10.13.

**Table 10.13 Development Related Traffic – Long-Term Magnitude of Change (Impact)**

Magnitude	Noise Change $L_{A10,18hr}$ dB
High	10.0 +
Moderate	5.0 – 9.9
Minor	3.0 – 4.9
Negligible	0.1 – 2.9

### 10.1.3.3 Level of Effect

The sensitivity of the receiving environment together with the magnitude of impact defines the level of effect as shown in Table 10.14.

**Table 10.14 Level of Effect Matrix**

Impact Magnitude	Sensitivity			
	Very High / Effect	High / Effect	Medium / Effect	Low / Effect
High	Major	Major	Major	Moderate
Moderate	Major	Moderate	Moderate	Minor
Minor	Moderate	Minor	Minor	Minor
Negligible	Negligible	Negligible	Negligible	Negligible

Where an effect is classified as High, this is considered to represent a 'significant effect' in terms of the EIA Regulations. Where an effect is classified as Medium, this may be considered to represent a 'significant effect' but should always be subject to professional judgement and interpretation, particularly where the sensitivity or impact magnitude levels are not clear or are borderline between categories or the impact is temporary or intermittent.

The Level of Effect Matrix provided within Table 10.14 therefore provides a guide to decision making but is not a substitute for professional judgement.

Impacts and effects can be beneficial, neutral or adverse and these would be specified where applicable. Effects can also be temporary, intermittent or permanent in nature. It should be noted that significant effects need not be unacceptable or irreversible.

### 10.1.4 Difficulties Encountered in Compiling Information

## 10.2 Description of Existing Environment

### 10.2.1 Baseline Measurement Survey

A noise measurement survey was completed in 2022 at the four locations shown on Figure 10.1. The purpose of the baseline noise survey was to inform noise limits for construction and to establish noise levels from the railway line. As the future ambient noise levels across the Site will be affected by the changes to the road network, the development noise models will be based on the new road layout with traffic data (and subsequent noise levels) on each new link road informed by the Transport Chapter.

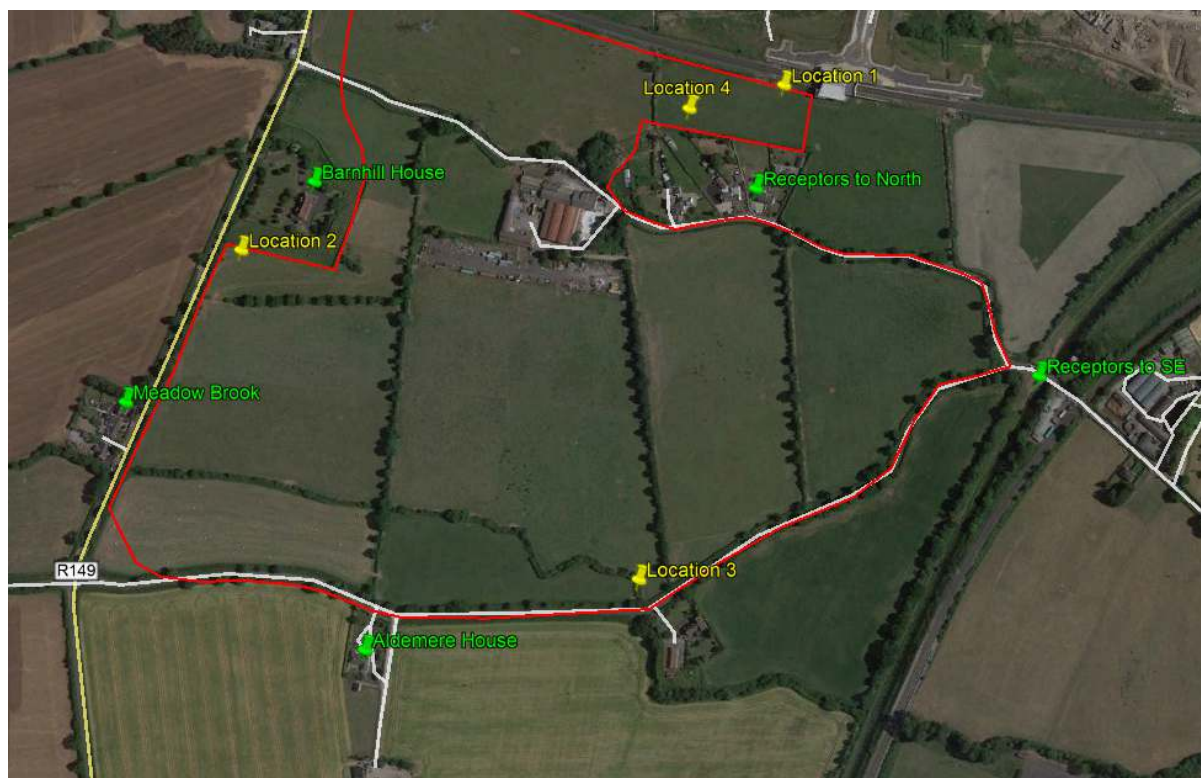


Figure 10.1 Survey Locations

At Locations 1- 4, the survey was completed in order to determine noise levels incident upon the Barnhill SHD from the adjacent existing road and rail network.

As the meters could not be left unattended (due to security concerns), the daytime survey consisted of a three-hour period between the hours of 10:00 and 17:00. In accordance with the following guidance documents, the data obtained may therefore be used to determine the  $L_{Aeq,16\text{-hour}}$ , and  $L_{Aeq,8\text{-hour}}$  noise levels across the Site.

- Using the shortened measurement procedure in the Calculation of Road Traffic 1988 the three hourly  $L_{A10,1hr}$  values at each Location can be converted to an  $L_{A10,18hr}$  noise level.
- To convert the  $L_{A10,18hr}$  noise level to a  $L_{Aeq,16hr}$  and an  $L_{Aeq,8hr}$  noise level the formulae presented in Table 10.15 as recommended in the *Method for Converting the UK Road Traffic Noise Index  $L_{A10,18hr}$  to the EU Noise Indices for Road Noise Mapping* (2006) has been used.



**Table 10.15**  $L_{A10,18hr}$  conversion calculations

Time	Non-motorway conversion	Motorway conversion
07:00 – 21:00	$L_{day} = 0.95 \times L_{A10,18hr} + 1.44$	$L_{day} = 0.98 \times L_{A10,18hr} + 0.09$
21:00 – 23:00	$L_{evening} = 0.97 \times L_{A10,18hr} - 2.87$	$L_{evening} = 0.89 \times L_{A10,18hr} + 5.08$
23:00 – 07:00	$L_{night} = 0.90 \times L_{A10,18hr} - 3.77$	$L_{night} = 0.87 \times L_{A10,18hr} + 4.24$
07:00 – 23:00	$L_{Aeq,16hr} = 10 \log_{10} ((12 \times (10^{L_{day}/10}) + 4 \times (10^{L_{evening}/10})/16)$	

In addition to the three-hour daytime measurement, at each Location a 30-minute measurement was completed between 06:00 and 07:00.

The data at Locations 2, 3 and 4 will also be used to determine the baseline noise environment at the following existing Receptor Locations:

- Location 2: Barnhill House and Meadow Brook.
- Location 3: Aldemere House and Receptors to the SE.
- Location 4: Receptors to North.

### 10.2.2 Survey Equipment

The equipment used during the survey is detailed in Table 10.16.

**Table 10.16** Monitoring Equipment

Location	Description	Serial No.
All	Model 831	2582
	Calibrator LD CAL200	1246

The sound level meter was calibrated before the measurements using an acoustic calibrator and the calibration was checked upon completion of the survey. No significant drift was observed. The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory.

### 10.2.3 Baseline Survey Results

The full survey results are shown in Table 10.17.

It can be seen from Table 10.17 that at Location 1 noise from road traffic is not dominant at the Site<sup>1</sup>. Consequently, the formula presented in Table 10.15 cannot be used to determine the  $L_{Aeq,16-hour}$  or  $L_{Aeq,8-hour}$  noise level at this Location. To present a robust construction noise assessment the lowest daytime ambient measurement of 53.5dB(A) will be used in the Construction Phase assessment. The highest daytime ambient level of 61.3dB(A), and the night-time ambient level of 59.5dB(A), will be used to determine noise from the railway line for the Operational Phase assessment.

<sup>1</sup> As evidenced by  $L_{A10}$  values that are generally lower than the  $L_{Aeq}$  noise levels.

Table 10.17 Noise Survey Results

Location	Date of Baseline Survey	Time Period	L <sub>Aeq,1-hour</sub>	L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Amax</sub>	L <sub>Aeq,16 hour</sub>	L <sub>Aeq,8hour</sub>
1	04/05/2022	09:59 – 10:59	61.3	52.9	42.7	95.3	53.5 / 61.3	59.5
		11:01 – 12:01	55.7	56.0	45.4	84.5		
		12:02 – 13:02	53.5	52.6	43.9	86.9		
	04/05/2022	06:18 – 06:48	59.5	55.8	45.3	86.1		
2	04/05/2022	13:18 – 14:18	67.2	72.3	44.5	81.8	69	60.9
		14:19 – 15:19	67.3	72.5	45.5	80.5		
		15:20 – 16:20	68.6	73.6	50.1	82.8		
	05/05/2022	05:54 – 06:24	69.7	74.5	54.0	90.0		
3	05/05/2022	13:14 – 14:14	52.9	54.7	42.8	83.7	52	44.8
		14:15 – 15:15	51.3	53.6	43.3	72.8		
		15:15 – 16:15	54.5	56.5	43.5	73.8		
	06/05/2022	06:31 – 07:01	53.6	55.8	48.2	70.4		
4	05/05/2022	09:56 – 10:56	50.9	53.2	40.3	72.2	49	41.9
		10:56 – 11:56	48.5	51.0	42.0	68.6		
		11:57 – 12:57	49.0	51.1	41.9	70.1		
	05/05/2022	06:32 – 07:02	53.6	57.3	45.9	73.1		

## 10.2.4 Train Measurement Survey

In addition to the Baseline Noise Survey completed for the Construction Phase assessment, a survey to determine the noise level of a single train pass by was completed at Location 1. To allow for the consideration of future intensification of trains on the Railway Line during the Operational Phase assessment. The measured noise levels of ten train pass-bys are shown in Table 10.18.

**Table 10.18 SEL of Train Passes at Location 1**

Location Measurement No.	Time	L <sub>Aeq</sub>	L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Amax</sub>
1	06:56-06:57	69.6	71.7	49.5	87.7
2	07:12-07:13	62.5	67.3	49.4	69.7
3	07:13-07:14	61.2	67.5	49.6	69.4
4	07:46-07:46	63.9	69.7	51.1	71.9
5	08:01-08:01	68.3	74.0	49.7	76.5
6	08:18-08:19	57.9	61.8	48.3	68.4
7	08:22-08:23	64.3	69.9	48.7	75.4
8	08:43-08:44	62.5	67.6	50.8	77.1
9	08:51-08:52	65.1	70.5	50.5	74.5
10	09:14-09:15	63.8	68.7	48.9	72.2
<b>Log average (L<sub>Aeq,T</sub>) / Highest (L<sub>Amax</sub>)</b>		65.1	-	-	87.7

For information the current frequency of trains adjacent to the Site are currently as follows:

- From Monday – Friday the tracks are used by 43 different train services from 07:14 – 00:00. Between 07:00 and 09:00 there are 9 services, one every 30-40 minutes. From 10:00 – 16:00 there is a service every hour. From 16:00 – 19:00 services run every 30 minutes. Between 19:00 and 00:00 there is a service every half an hour between the first two trains. Beyond that there is one train per hour.
- On Saturday's a total number of 33 services use the tracks from 08:18 – 00:00. Between these hours there is a train every one hour. This can vary between 19:00 – 00:00 however it is typically one per hour.
- On Sunday's 28 services use the tracks from 10:00 – 00:00. From 10:00 – 19:00 there is a train every hour. From 19:00 – 00:00 the services are typically once every 45 minutes – 1-hour.

From a comparison with the measured noise data at Location 1 in Table 10.17, with the measured L<sub>Aeq,T</sub> during a train pass-by in Table 10.18, it is evident that during a train pass by the L<sub>Aeq,T</sub> increases from 61.3d(A) (representative value taken forward for Location 1), with a logarithmic average value of 65.1dB(A) calculated for a train pass-by.

## 10.2.5 Modelled Development Environment

### Future Road Network

The model of the Operational Phase will need to include noise from the new road network which will be different to the existing network.

Do Development movements are detailed in Table 10.19. To undertake a robust assessment the “Do Development” flows for 2030<sup>2</sup> have been presented and will be used in the Operational Phase Assessment.

**Table 10.19 Comparison of Traffic Flows and the Adjustments Required to the Noise Model**

Road	Do Development		
	AAWT	% HGV	Speed km/hr
1A	4518	1.21	50
1B	11739	2.00	50
2	10462	0.45	50
3	6225	0.75	50
4	13477	2.06	50
6	13740	2.31	50
2A	3554	1.08	50
2B	3554	1.08	50

### Future Train Network

At this stage, it is not known how many additional trains may run on the train line. Therefore, as a worst case, the train line has been modelled with a  $L_{Aeq, T}$  level at 25m of 65.4dB(A). This results in a  $L_{Aeq, T}$  level of 65.1 at measurement Location 1.

#### 10.2.6 Future Noise Environment at Existing Receptors

It is necessary to determine the impact of development related traffic upon existing receptors.

To determine noise from baseline traffic (which includes the redesigned network and new link road) and development related road traffic at Receptors abutting the following roads Basic Noise Levels for the following roads have been calculated. 2A and 2B have not been included as they are new roads within the development.

- 1A
- 1B
- 2
- 3
- 4
- 5
- 6

For clarity the baseline is termed “Do Minimum” and the baseline plus development is termed “Do Development”.

Do Minimum and Do Development traffic data is presented in Table 10.20. To undertake a robust assessment the traffic data for 2030 has been used.

Table 10.20 Do Minimum and Do Development 2030 Traffic Data

Road	Do Minimum			Do Development		
	AAWT	% HGV	Speed km/hr	AAWT	% HGV	Speed km/hr
1A	3873	1.5	50	4518	1.21	50
1B	10299	2.0	50	11739	2.00	50
2	3758	1.7	50	10462	0.45	50
3	3767	1.7	50	6225	0.75	50
4	12338	2.7	50	13477	2.06	50
5	9415	2.4	50	10094	1.88	50
6	12333	2.5	50	13740	2.31	50



## 10.3 Predicted Impacts

### 10.3.1 Construction Phase – Noise

It is inevitable with any project of this nature that some disturbance would be caused to those living and working nearby during the works should appropriate mitigation not be employed. However, disruption due to construction is a localised phenomenon and is temporary and intermittent in nature.

#### 10.3.1.1 Noise Sensitive Receptors

This assessment will consider the impact of construction noise and vibration upon existing residents in close proximity to the site. These receptors are shown on Figure 10.1 of this Report.

The construction noise limit at each receptor is detailed in Table 10.21. The limit has been determined using the ABC method detailed in of BS5228-1:2009+A1:2014.

**Table 10.21 Threshold Construction Noise Limits dB(A)**

Receptor	Baseline Ambient Noise Level	Threshold Noise Limit
Barnhill House	66.0	65
Receptors to N	52.5	65
Receptors to SE	50.0	65
Aldermere House	50.0	65
Meadow Brook	66.0	65

#### 10.3.1.2 Construction Phases and Plant

Construction of the development itself will be phased over five periods of development. For the purposes of this construction noise assessment, SLR has determined the noise level during five typical construction activities which are detailed below. The tables outline the items of plant which will be utilised during each activity, and the equipment sound power levels (determined from BS5228:2009+A1:2014), and the percentage on-time off each item of plant.

- Phase 1: Site Clearance and Enabling Works.
- Phase 2: Road Construction.
- Phase 3: Groundworks.
- Phase 4: Substructure Works.
- Phase 5: Superstructure Works.

It is accepted that the construction activities may vary from the activities presented, but as it would not be feasible to assess all construction configurations, the assessments undertaken in this Chapter are considered a robust representation of anticipated construction noise levels.

#### 10.3.1.3 Phase 1: Site Clearance and enabling works

Site clearance and enabling works typically include the installation of site offices, and levelling of the site. Table 10.21 details plant that is typically utilised during site clearance and enabling works.

**Table 10.22 Phase 1: Site Clearance and Enabling Works - Plant List**

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Large Excavator Mounted Breaker	2	110	20%
Tracked Excavator	2	107	80%
Hand Held Circular Saw	2	109	15%
Spreading Fill	2	109	25%
Vibratory Roller	2	102	30%
Lorry (Unloading)	3	108	40%
Concrete Truck Mixer	1	103	5%
Concrete Crusher	2	110	40%
Road Sweeper	1	104	10 movements per hour

10.3.1.4 Phase 2: Road Construction

Table 10.23 details the plant utilized during this phase.

**Table 10.23 Phase 2: Road Construction Works - Plant List**

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Compressor	1	100.0	80%
Lorry	1	108.0	4 movements
Road roller	1	107.0	80%
Breaker	1	114.0	80%
Road saw	1	114.0	80%
Planer	1	110.0	80%
Whacker Plate	1	103.0	80%
Excavator	1	101.0	80%
Asphalt Spreader	1	105.0	80%
Concrete Pump	1	96.0	80%
Dumper	1	110.0	4 movements

10.3.1.5 Phase 3: Groundworks

Table 10.24 details the plant utilized during this phase.

**Table 10.24 Phase 3: Groundworks – Plant List**

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Concrete Truck Mixer	3	103	25%
Piling Rig	1	111	90%
Mewp - Cherry Picker Genie	1	95	30%
Small Breaker	2	110	20%
Compressor	2	106	50%
Poker Vibrator	3	97	15%
Lorry Mounted Concrete Pump	1	109	80%
Concrete Agitator	3	103	80%
Lorry (Unloading)	2	108	40%
Petrol Saw	3	109	20%
Tracked Excavator	2	107	80%
Hand Held Circular Saw	2	109	35%
Dumper Trucks	2	106	10 movements per hour
Diesel Jet Washer	1	108	25%
Mobile Crane	1	103	90%
Vibratory Roller	2	102	30%

#### 10.3.1.6 Phase 4: Substructure Works

Table 10.25 details the plant utilized during this phase.

**Table 10.25 Phase 4: Substructure – Plant List**

Type of Machinery	Quantity on Site	Sound Power Level, dB	Percentage Use Per Hr.
Concrete Truck Mixer	2	103	25%
Small Breaker	2	110	20%
Compressor	2	106	70%
Lorry (Unloading)	2	108	40%
Petrol Saw	2	109	40%
Tracked Excavator (Rubber Tracks)	2	107	80%
Dumper Trucks	2	106	10 movements per hour
Vibratory Roller	2	102	30%
Poker Vibrator	2	97	40%
Mobile Crane	1	103	100%
Telescopic Forklift (17m) JCB 540	2	107	80%
Hand Tools (Hammers)	8	98	80%

#### 10.3.1.7 Phase 5: Superstructure Works

It is envisaged that this phase would include the erection of buildings. Table 10.26 details the plant utilised during this phase.

**Table 10.26 Phase 5: Superstructure Works – Plant List**

Type of Machinery	Quantity On Site	Sound Power Level, dB	Percentage Use Per Hr.
Concrete Truck Mixer	2	103	25%
Mewp-Cherry Picker Genie	2	95	60%
Lorry (unloading)	3	108	20%
Petrol Saw	2	109	40%
Tracked Excavator (rubber tracks)	2	107	70%
Dumper Trucks	2	106	10 movements per hour
Poker Vibrator	2	97	40%
Mobile Crane Operation	2	103	90%
Telescopic Forklift (17m) JCB 540	1	107	80%
Hand Tools (hammers)	8	98	40%
Concrete Pump (pumping)	2	112	70%

At this stage it is envisaged that all activities will take place within normal daytime working hours (07:30 to 18:00 hours, Monday to Friday and 07:00 to 13:00 on a Saturday).

#### 10.3.1.8 Noise Prediction Methodology

Using the sound power levels and associated percentage on-times shown in Tables 10.21 to 10.25, noise levels from each construction activity have been predicted at the nearest noise sensitive receptors to the site.

The predictions have been undertaken using the proprietary noise modelling software CadnaA which incorporates the methodology outlined in BS5228:2009+A1:2014. The model assumes hard ground and applies the screening effect of barriers from Figure F.3 of BS5228:2009+A1:2014 at 500Hz.

With the exception of Superstructure Works it has been assumed that most of the plant will be operating at ground level. A height of 2m above ground level of each item of plant has been assumed.

During superstructure works, some plant will be operating at increased heights. A height of 12m above ground level of each item of plant (that will operate at height) has been assumed.

The location of each item of plant during each phase of construction has been positioned across the site. At times plant would be closer and further away from the receptor.

#### 10.3.1.9 Predicted Noise Level and Assessments

With reference to the methodology above, the predicted noise levels for each activity of the construction works at each of the nearest noise-sensitive receptors are shown in Table 10.27 below.

The table also compares the predicted noise levels with the threshold value adopted for the assessment.

Noise levels have been predicted at a height of 4m which is representative of a first-floor window.

**Table 10.27 Predicted Noise Levels and Assessment, LAeq dB(A)**

Receptor	Construction Activity	Predicted Noise Level	Threshold Value	Difference	Impact	Effect
<b>Barnhill House</b>	P1: Clearance and Enabling Works	57.8	65	-7.2	Negligible	Negligible
	P2: Road Construction	61.6		-3.4	Negligible	Negligible
	P3: Ground Works	60.5		-4.5	Negligible	Negligible
	P4: Substructure Construction	58.9		-6.1	Negligible	Negligible
	P5: Superstructure Works	60.5		-4.5	Negligible	Negligible
<b>Receptors to North</b>	P1: Clearance and Enabling Works	61	65	-4	Negligible	Negligible
	P2: Road Construction	64.2		-0.8	Negligible	Negligible
	P3: Ground Works	63.7		-1.3	Negligible	Negligible
	P4: Substructure Construction	63.9		-1.1	Negligible	Negligible
	P5: Superstructure Works	64.1		-0.9	Negligible	Negligible
<b>Receptors to SE</b>	P1: Clearance and Enabling Works	55.7	65	-9.3	Negligible	Negligible
	P2: Road Construction	58.1		-6.9	Negligible	Negligible
	P3: Ground Works	57.3		-7.7	Negligible	Negligible
	P4: Substructure Construction	56		-9	Negligible	Negligible
	P5: Superstructure Works	57.3		-7.7	Negligible	Negligible
<b>Aldermere House</b>	P1: Clearance and Enabling Works	57.8	65	-7.2	Negligible	Negligible
	P2: Road Construction	60.7		-4.3	Negligible	Negligible
	P3: Ground Works	60		-5	Negligible	Negligible
	P4: Substructure Construction	58.8		-6.2	Negligible	Negligible
	P5: Superstructure Works	60.6		-4.4	Negligible	Negligible
<b>Meadow Brook</b>	P1: Clearance and Enabling Works	64.3	65	-0.7	Negligible	Negligible
	P2: Road Construction	64		-1	Negligible	Negligible
	P3: Ground Works	62.3		-2.7	Negligible	Negligible
	P4: Substructure Construction	61.9		-3.1	Negligible	Negligible
	P5: Superstructure Works	64.8		-0.2	Negligible	Negligible

Table 10.27 shows that:

- The Impact at Barnhill House is negligible with a Negligible Effect.
- The Impact at Aldermere House is negligible with a Negligible Effect.
- The impact at Meadow Brook is negligible with a Negligible Effect.
- The level of Impact to receptors to the North and South-East is Negligible with a Negligible Effect



Whilst the Impact and Effect is Negligible and Not Significant, mitigation to manage construction noise is discussed later in this Chapter.

### 10.3.2 Construction Phase – Vibration

It is inevitable with any project of this nature that some disturbance would be caused to those living and working nearby during the works should appropriate mitigation not be employed. However, disruption due to construction is a localised phenomenon and is temporary and intermittent in nature.

#### 10.3.2.1 Vibration Prediction Methodology

Desktop predictions of vibratory compaction (steady state) and vibratory compaction (start up and run-down) have been completed in accordance with Table E.1 of BS5228:2009+A1:2015 BS5228-2:2009+A1:2014 Part 2 Vibration.

#### 10.3.2.2 Predicted Construction Vibration Levels and Assessment

With reference to the methodology detailed the predicted vibration levels at set distances from each vibration-sensitive Receptors are shown in Table 10.28 below.

For the purpose of the calculation the following parameter values have been assumed:

- Maximum amplitude of drum vibration = 2.38mm (the middle value of the accepted range).
- Vibrating roller drum width = 1.48m (the middle value of the accepted range).
- Number of vibrating drums = 1 (the lowest value of the accepted range).

Table 10.28 Predicted Construction Vibration Levels

Distance from Location (m)	Operation	Predicted <sup>3</sup> Vibration Level, mms <sup>-1</sup>	Impact Magnitude	Significance of Effect
5	Vibratory Compaction (steady state)	31.83	High	High
	Vibratory Compaction (start up and run-down)	34.29	High	High
10	Vibratory Compaction (steady state)	13.5	High	High
	Vibratory Compaction (start up and run-down)	16.3	High	High
15	Vibratory Compaction (steady state)	7.85	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	10.19	High	High
20	Vibratory Compaction (steady state)	5.27	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	7.22	Moderate	Moderate
25	Vibratory Compaction (steady state)	3.85	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	5.5	Moderate	Moderate
30	Vibratory Compaction (steady state)	2.97	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	4.39	Moderate	Moderate
55	Vibratory Compaction (steady state)	1.24	Moderate	Moderate
	Vibratory Compaction (start up and run-down)	2.05	Moderate	Moderate
85	Vibratory Compaction (steady state)	0.65	Minor	Minor
	Vibratory Compaction (start up and run-down)	1.18	Moderate	Moderate
100	Vibratory Compaction (steady state)	0.51	Minor	Minor
	Vibratory Compaction (start up and run-down)	0.96	Minor	Minor
125	Vibratory Compaction (steady state)	0.37	Minor	Minor
	Vibratory Compaction (start up and run-down)	0.72	Minor	Minor

<sup>3</sup> Probability of predicted value being exceeded 33%

Table 10.28 shows that:

- There will be a Minor Impact and Effect at Aldemere House, which is located 150m from the site.
- There will be a Minor Impact and Effect at Meadow Brook which is located 116m from the site.
- There will be a Minor Impact and Effect at Barnhill House as the property is located 95 from the site.
- There will be a Moderate Impact and Effect at the receptors to the north will be moderate as they are located approximately 65m from the site.

Whilst the Impact and Effect is Minor and Not Significant, with only a Moderate Impact and Effect to the receptors to the north, mitigation to manage construction vibration is discussed later in this Chapter.

#### 10.3.2.3 Operational Phase Effects Suitability of the Site for a Residential Development - British Standard 8233:2014

As the road network in the vicinity of the Site is to be reconfigured, future road traffic noise levels at the Site have been predicted with reference to CRTN. To undertake a robust assessment the “*Do Development*” flows for 2030 have been used in the Operational Phase Assessment.

##### **External**

With the development masterplan included in the noise model the impact of environmental noise upon proposed residential receptors has been determined in accordance with BS8233:2014. Figure 10.2 illustrates the areas of the Site where the impact upon residential receptors would be Negligible, Minor, Moderate or High.



Figure 10.2 External Daytime  $L_{Aeq,T}$  Noise Levels

It can be seen from Figure 10-2, the noise impact across most of the Site is either Negligible or Minor, with corresponding levels of effect of either Negligible or Minor.

At a small number of plots the amenity space is within an area of Moderate or High Impact. At these plots mitigation will be discussed later in this Chapter.

### **Internal**

Noise levels incident upon the façade will require mitigation to meet the internal noise limits stipulated in BS8233:2014. Mitigation to reduce internal noise levels is discussed later in this Chapter.

#### **10.3.2.4 Operational Effects – Impact of Development Related Traffic Noise - CRTN**

The Development will cause an increase in local traffic noise levels.

To determine noise from baseline traffic (which includes the redesigned network and new link road) and development related road traffic at Receptors abutting the following roads Basic Noise Levels for the following roads have been calculated for the year 2030.

- 1A
- 1B
- 2
- 3
- 4
- 5
- 6

For clarity the baseline is termed “Do Minimum” and the baseline plus development is termed “Do Development”.

The calculated BNL's and the short-term impact are detailed in Table 10.29.



Table 10.29 Calculated BNL And Short-Term Impact

Link	Do Minimum 2030					Do Development 2030					Change in BNL	Impact	Effect
	18-hour traffic flow	% HGV	Average km/h	Speed	BNL	18-hour traffic flow	% HGV	Average km/h	Speed	BNL			
1A	3873	1.5	50		62.8	4518	1.21	50		63.3	0.5	Negligible	Negligible
1B	10299	2.0	50		67.2	11739	2.00	50		67.8	0.6	Negligible	Negligible
2	3758	1.7	50		62.8	10462	0.45	50		66.9	4.1	Moderate	Moderate
3	3767	1.7	50		62.9	6225	0.75	50		64.7	1.8	Minor	Minor
4	12338	2.7	50		68.0	13477	2.06	50		68.4	0.4	Negligible	Negligible
5	9415	2.4	50		66.8	10094	1.88	50		67.1	0.3	Negligible	Negligible
6	12333	2.5	50		68.0	13740	2.31	50		68.5	0.5	Negligible	Negligible

With reference to Table 10.29:

- Overall, the sensitivity of each receptor is Medium. At all links except Link 2 and 3 the Impact is Negligible. Therefore, there is likely to be a short-term effect which is Negligible. The effect is Not Significant.
- At Link 2 the Impact is Moderate. Therefore, there is likely to be a short-term effect which is Moderate, an Impact however which would fall to Minor in the Long-term. The effect is therefore considered Not Significant.

#### 10.3.2.5 Cumulative

The model of the proposals includes traffic on the new road network. The assessment therefore includes cumulative development that are included in the traffic flows.

## 10.4 Mitigation Measures

### 10.4.1.1 Construction Phase Mitigation

Mitigation measures that may be implemented to reduce construction noise and vibration levels are set out in Appendix 10.1. The majority of these mitigation measures can be incorporated within a suitable Construction Environmental Management Plan ('CEMP') to be implemented during the construction phase.

In general, construction methods adjacent to existing residents will be like those adopted where construction works in basements take place. The basement is set back a minimum of 2.4m from the Barbarstown lane north and approximately 15m from existing houses. However, if piling is required bored secant piles will be used to minimise vibration. Full dilapidation surveys will be carried out on existing houses in advance of construction. Noise and vibration monitors will be installed with real time alarms set to minimum thresholds to ensure damage will not occur to existing houses.

### 10.4.1.2 Operational Phase Mitigation

#### **Operational Phase Mitigation – External**

At a small number of plots the amenity space is within an area of Moderate or High Impact. At these plots mitigation will be required.

At these plots mitigation will be included in the Site design as follows:

- 1.8m high solid wooden fences at the boundary of the effected plots. The effected plots are those directly adjacent to the road network that have gardens parallel to the road, i.e. with no building between the amenity space and the adjacent road.

#### **Operational Phase Mitigation – Internal**

With regards to acceptable internal noise levels BS8233:2014 has the following three limits:

- Bedrooms 30 dB  $L_{Aeq}$  (15 Minutes) (2300 hrs – 0700 hrs).
- Living/Bedrooms 35 dB  $L_{Aeq}$  (15 Minutes) (0700 hrs – 2300 hrs).
- All Other Habitable Rooms 40 dB  $L_{Aeq}$  (15 Minutes) (0700 hrs – 2300 hrs).

With regards to the maximum internal noise level limit of 45dB(A) in a bedroom, at this stage this cannot be tested as maximum noise levels across the Site cannot be determined from the traffic flow data provided for 2030. It is recommended that if permitted consideration is given to further modelling of maximum noise levels across the Site to determine an appropriate glazing specification.

Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window and by extension, the resulting noise levels within the receiving room.

However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates. This performance index is known as the  $R_{TRA}$ , and the sound reduction requirement set out above should be considered as an  $R_{TRA}$  noise level.

From an analysis of the data, it has been determined that the highest glazing specification is decided by the daytime limit except for facades facing (with a clear line of sight) the northern railway line where an intensification of use has been factored into the model. The glazing required to meet the daytime and the night-time ambient limits is presented for each plot in Appendix 10.2. At those facades facing the northern railway line it is indicated that the required glazing specification is 5dB higher than the number shown.

With regards to the ventilation strategy to be adopted, at this stage the exact design is not known, the design will however have due regard to internal noise levels, i.e., should overheating require an open window, an open window would not be the primary means for mitigation, with for example MVHR provided. With reference to overheating, the apartment buildings that are located close to the boundary with the railway are designed with dual aspect apartment units that are orientated both north toward the train line and either east, west or south onto an adjacent open space. This orientation enables these units to be ventilated to the east, west or south accordingly. As the train line lies directly to the north of the proposed development, there will be no anticipated overheating to any of the facades facing onto the train line – which are exclusively north facing facades.

## **10.5 Residual Impacts**

### **10.5.1 Construction Phase Residual Impacts**

The noise limit is met during all assessed activities at each Receptor assessed. However, construction noise levels may be reduced.

Whilst the mitigated limits are expected to be met, at the request of the Council the applicant would undertake attended short term monitoring at nearby noise sensitive receptors to validate the predicted construction noise levels in this Report.

With regards to construction vibration, it is anticipated that with good site management, and communication with residents should impacts be encountered, the Impact would be at worst Minor, a Minor level of Effect. As it is anticipated that there may be an impact, at the request of the Council the applicant would undertake attended short term monitoring at nearby noise sensitive receptors to validate the predicted construction vibration levels in this Report.

It is anticipated that short term noise and vibration monitoring may be completed on a minimum of four occasions to coincide with the beginning of each phase of construction. If the limit is exceeded, SLR would recommend that further provision is made for additional monitoring.

### **10.5.2 Operational Phase Residual Impacts – External**

With the installation of 1.8m high solid wooden fences at the boundary of plots where the impact is Moderate and/or High the Impact is reduced to Minor, and the resultant Effect would be Not Significant As indicated on Figure 10-3.

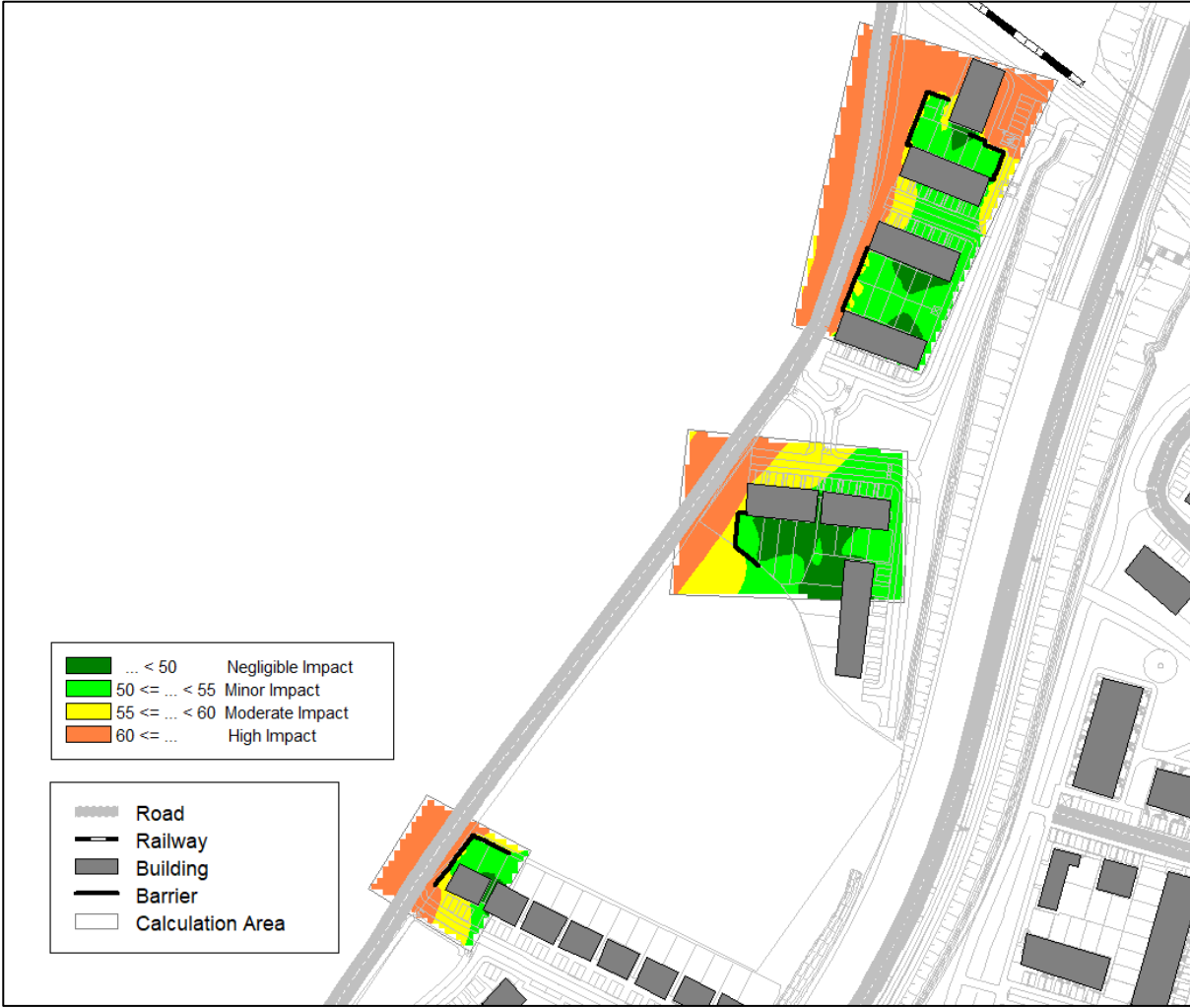


Figure 10.3 Mitigated External Daytime LAeq,T Noise Levels

10.5.3 Operational Phase Residual Impacts – Internal

The glazing required to meet the daytime and the night-time ambient limits is presented for each plot in Appendix 10.2. With windows closed the Impact and Effect would be Negligible.

## 10.6 References

Fingal Development Plan 2017 – 2023 Local Plan (2017) [https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement\\_compressed\\_compressed.pdf](https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement_compressed_compressed.pdf)

Barnhill Local Area Plan (2019) <https://www.fingal.ie/barnhill-local-area-plan-2019>

The National Planning Framework 2040 (2018) <https://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf>

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BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (2014) <https://www.en-standard.eu/bs-5228-2-2009-a1-2014-code-of-practice-for-noise-and-vibration-control-on-construction-and-open-sites-vibration/>

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<https://www.who.int/europe/publications/i/item/9789289053563>

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[https://www.euro.who.int/\\_data/assets/pdf\\_file/0017/43316/E92845.pdf](https://www.euro.who.int/_data/assets/pdf_file/0017/43316/E92845.pdf)

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BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.(2019)  
<https://www.en-standard.eu/bs-4142-2014-a1-2019-methods-for-rating-and-assessing-industrial-and-commercial-sound/>



# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 11

Air Quality

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 11 Air Quality

### Contents

11	Air Quality.....	11-3
11.1	Introduction .....	11-3
11.1.1	Scope of the Assessment .....	11-3
11.2	Air Quality Legislation, Policy and Guidance .....	11-3
11.2.1	Air Pollution Act.....	11-3
11.2.2	Air Quality Standards Regulations .....	11-3
11.2.3	Dublin Regional Air Quality Management Plan.....	11-4
11.2.4	Planning Policy.....	11-5
11.3	Assessment Guidance .....	11-6
11.3.1	Construction and Demolition Dust Guidance.....	11-6
11.3.2	Guidance on Traffic Emission Assessment .....	11-7
11.4	Assessment Methodology .....	11-7
11.4.1	Baseline Evaluation.....	11-7
11.4.2	Construction Phase Impact Assessment .....	11-7
11.4.3	Operational Phase Impact Assessment.....	11-7
11.5	Description of Existing Environment .....	11-9
11.5.1	Site Setting & Sensitive Receptor Locations .....	11-9
11.5.2	Baseline Air Quality .....	11-9
11.6	Construction Impacts, Mitigation & Monitoring Measures.....	11-10
11.6.1	Assessment Screening .....	11-11
11.6.2	Potential Dust Emission Magnitude .....	11-12
11.6.3	Sensitivity of the Area .....	11-12
11.6.4	Risk of Impacts (Unmitigated).....	11-13
11.7	Operational Impacts, Mitigation and Monitoring Measures.....	11-14
11.7.1	Screening for Affected Roads .....	11-14
11.7.2	DMRB Assessment .....	11-16
11.7.3	Predicted Impacts & Significance of Effect .....	11-19
11.8	Mitigation Measures and Residual Impacts .....	11-22
11.8.1	Construction Phase .....	11-22
11.8.2	Operational Phase .....	11-24
11.9	Residual Impacts.....	11-24
11.9.1	Construction Phase.....	11-24
11.9.2	Operational Phase .....	11-24
11.10	Cumulative Impacts.....	11-24
11.10.1	Construction Phase.....	11-24

11.10.2 Operational Phase .....	11-25
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## Tables

Table 11.1 Key Relevant Air Quality Assessment Levels .....	11-4
Table 11.2 Magnitude of Change.....	11-8
Table 11.3 Air Quality Impact Descriptors .....	11-8
Table 11.4 Air Quality Monitoring Data .....	11-10
Table 11.5 Potential Dust Emission Magnitude .....	11-12
Table 11.6 Sensitivity of the Area – Unoccupied .....	11-13
Table 11.7 Sensitivity of the Area – Occupied .....	11-13
Table 11.8 Risk of Dust Impacts - Unoccupied.....	11-13
Table 11.9 Risk of Dust Impacts - Occupied.....	11-13
Table 11.10 Predicted Changes in Annual Average Daily Traffic Flow - 2025.....	11-15
Table 11.11 Predicted Changes in Annual Average Daily Traffic Flow - 2030.....	11-15
Table 11.12 Predicted Changes in Annual Average Daily Traffic Flow - 2040.....	11-16
Table 11.13 DMRB Input Data 2025.....	11-17
Table 11.14 DMRB Input Data 2030.....	11-18
Table 11.15 DMRB Input Data 2040.....	11-18
Table 11.16 Impact on Annual Mean NO2 Concentrations at Receptors - 2025 .....	11-19
Table 11.17 Impact on Annual Mean NO2 Concentrations at Receptors - 2030 .....	11-19
Table 11.18 Impact on Annual Mean NO2 Concentrations at Receptors - 2040 .....	11-20
Table 11.19 Impact on Annual Mean PM10 Concentrations at Receptors - 2025 .....	11-20
Table 11.20 Impact on Annual Mean PM10 Concentrations at Receptors - 2030 .....	11-21
Table 11.21 Impact on Annual Mean PM10 Concentrations at Receptors - 2040 .....	11-21
Table 11.22 Construction Dust Mitigation and Monitoring Measures .....	11-22
Table 11.23 Projects included in the ‘Without Development’ Scenario .....	11-25

## Figures

Figure 11.1 Site Setting.....	11-9
Figure 11.2 Construction Phase Screening .....	11-11
Figure 11.3 Road Links .....	11-14
Figure 11.4 Traffic Emissions Receptors .....	11-17

# 11 Air Quality

## 11.1 Introduction

SLR Consulting Ltd has been commissioned to undertake an Air Quality Assessment as part of the Environmental Impact Assessment Report (EIAR) for a proposed Strategic Housing Development (SHD) at Barnhill (the 'Site'). The full project description is detailed within Chapter 2 – Project Description.

The assessment describes the scope, relevant legislation, assessment methodology and the baseline conditions currently existing in the area. It then presents the potential impacts of the development and an evaluation of the significance of the effects.

### 11.1.1 Scope of the Assessment

The scope of the assessment considers:

- construction phase impacts – identification and assessment of potential impacts associated with the construction phase of the proposed scheme, primarily dust impacts and suspended particulate matter with a diameter of less than 10 micrometres (PM<sub>10</sub>);
- operational phase – screening and assessment of potential impacts from road traffic emissions as a result of additional trips associated with the development once fully occupied; and
- the requirement for and identification of appropriate mitigation measures.

## 11.2 Air Quality Legislation, Policy and Guidance

The Site is within Fingal County Council's (FCC) administrative area and falls into Air Quality Agglomeration A, defined as the 'Dublin Conurbation'. As such, the following legislation, guidance and policy is relevant to air quality and the area.

### 11.2.1 Air Pollution Act

The principal national legislation for the control of air pollution is the Air Pollution Act, 1987 (No. 6 of 1987). This act provides a comprehensive statutory framework for the control of air quality by Local Authorities, specifically through 'orders' or 'plans' produced under *Part IV Special Control Areas* and *Part V Air Quality Management Plans and Standards* to which Local Authorities must have regard to in planning. Part V of the Act also makes provision for transposing Air Quality Standards into law, see section below.

The Act also has relevance to potential nuisance emissions, which is of relevance to construction dust, in Section 24(2) which states "*The occupier of any premises shall not cause or permit an emission from such premises in such a quantity, or in such a manner, as to be a nuisance*".

### 11.2.2 Air Quality Standards Regulations

The Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) provide a transposition of the European Commission Ambient Air Quality and Cleaner Air for Europe Directive (2008/50/EC), and transpose the Fourth Daughter Directive (2004/107/EC) within Irish legislation. The regulations include Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed Air Quality Assessment Levels (AQALs) throughout this Chapter). Those of key relevance to this Chapter, being the principal pollutants of concern to local air quality from construction activities and road traffic emissions, are presented within Table 11.1.



**Table 11.1 Key Relevant Air Quality Assessment Levels**

Pollutant	Standard (µg/m <sup>3</sup> )	Measured as	
Nitrogen dioxide (NO <sub>2</sub> )	40	Annual mean	
	200	1 hour mean	Not to be exceeded more than 18 times a calendar year
Particulate matter with an aerodynamic diameter of less than 10µm (PM <sub>10</sub> ) (gravimetric)	40	Annual mean	
	50	24 hour mean	Not to be exceeded more than 35 times a calendar year

### 11.2.3 Dublin Regional Air Quality Management Plan

The Dublin Regional Air Quality Management Plan 2021<sup>1</sup> was prepared following notification of the exceedance of the annual permissible limit for nitrogen dioxide at one monitoring location (St Johns Road West) in the Dublin region in 2019. There were no other exceedances recorded elsewhere for nitrogen dioxide or any other specified air pollutant during 2019. There have been no exceedances recorded at any monitoring stations subsequently during 2020 or 2021 to date.

The air quality plan sets out 14 broad measures and a number of associated actions, designed to support the principle that local authorities will select actions most appropriate to their circumstance. In most cases, the measures when selected will be adopted by means of the statutory plan. The 14 measures are summarised below:

- Integrate “15 Minute Neighbourhoods” concept in City and County development Plans
- Public Parking Controls
- Residential Parking Standards
- Workplace Parking Standards
- Continue delivery of the Active Travel Programme
- Electrical Vehicle (EV) Charging Strategy
- Publication of National Clean Air Strategy
- Air Quality Enabling Legislation
- Introduction of Clean Air Zones / Low Emission Zones
- Remote / Flexible Working
- Enhanced Air Quality Monitoring and Modelling
- Air Quality – Citizen Engagement
- Air Quality and Health Research
- Behavioural Change Campaigns to Cleaner Fleets

The Dublin Regional Air Quality Management Plan for the 2009-2012 period remains a material planning consideration given its reference in other planning documentation. The key policies of relevance to this assessment are policy 2 and 3, sections of which are reproduced below:

“POLICY 2

*It is the policy of the Local Authorities to control development within their functional areas to provide efficient use of land and infrastructure, thereby controlling and limiting air emissions.*

**STRATEGY:**

*(i) The Local Authorities shall examine all matters relating to major new developments to ensure that any emissions to atmosphere from the development do not result in a change in air quality likely to exceed the target values specified in the Plan for 2001.*

<sup>1</sup> [https://www.dlrco.ie/sites/default/files/atoms/files/dublin\\_region\\_air\\_quality\\_plan\\_2021.pdf](https://www.dlrco.ie/sites/default/files/atoms/files/dublin_region_air_quality_plan_2021.pdf)

*(ii) The Local Authorities shall require that planning proposals for development of suburban or green-field sites requiring an environmental impact statement shall address the local impact of alterations in traffic flows on air quality.*

*(iii) The Local Authorities shall require that adequate information on the air quality impact of new developments is submitted as part of the environmental assessment procedure under the requirements of the E.U. Legislation on Environmental Impact Assessments and in accordance with the provisions of the Local Government (Planning and Development) Acts 1963-98 and any subsequent legislation.*

[...]

### POLICY 3

*It is the policy of the Local Authorities to take such measures as deemed appropriate to prevent a nuisance from dust emissions occurring during building/demolition activities within their functional areas.*

### STRATEGY:

*(i) The Local Authorities shall require, when necessary that a documented plan is submitted indicating measures to prevent and reduce dust and airborne particulate emissions prior to carrying out activities that may result in a nuisance."*

## 11.2.4 Planning Policy

### 11.2.4.1 National Planning Framework

The National Planning Framework (NPF) provides a set of overarching national objectives and key principles to guide future regional and local development plans. The key National Policy Objective's with respect to air quality, for consideration within this assessment, are 52 and 64 reproduced below:

#### *"National Policy Objective 52*

*The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital."*

#### *"National Policy Objective 64*

*Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, the promotion of energy efficient buildings and homes, heating systems with zero local emissions, green infrastructure planning and innovative design solutions."*

The National Planning Framework called Ireland 2040 Our Plan includes a vision and strategy that is supported by a series of National Policy Objectives and will be aligned with the Government's ten-year Investment Plan. The key National Policy Objective's with respect to air quality are broadly similar to the NPF, namely Objectives 54 and 61 reproduced below:

#### *"National Planning Objective 54*

*That the planning system is responsive to our national environmental challenges and ensures that development occurs within environmental limits having regard to the requirements of all relevant environmental legislation and promotes the sustainable management of our natural capital."*

#### *"National Planning Objective 61*

*Improve air quality and help prevent people being exposed to unacceptable levels of pollution in our urban and rural areas through integrated land use and spatial planning that supports public transport, walking and cycling as more favourable modes of transport to the private car, the promotion of energy efficient buildings and homes, green infrastructure planning and innovative design solutions."*

#### 11.2.4.2 Fingal Development Plan 2017-2023

In March 2017, FCC adopted the Fingal Development Plan 2017-2023 which sets out the policies and objectives for the development of the County over that period. Development proposals will be assessed for consistency with the Plan and in relation to air quality it states:

*“[...] Pollutants that are of most concern are those derived from traffic including Particulate Matter and Nitrogen Dioxide.*

*The Council adopted the Dublin Regional Air Quality Management Plan 2009-2012 and has regard to this Management Plan, in conjunction with other relevant legislation when considering planning applications. [...]*”

Two objectives relate to air quality, as follows:

*“Objective AQ01:*

*Implement the provisions of EU and National legislation on air, light and noise and other relevant legislative requirements, as appropriate and in conjunction with all relevant stakeholders.”*

*“Objective AQ02:*

*Implement the recommendations of the Dublin Regional Air Quality Management Plan (or any subsequent plan) and any other relevant policy documents and legislation in order to preserve good air quality where it exists or aim to improve air quality where it is unsatisfactory.”*

The Fingal Development Plan 2023 – 2029 is currently in draft format and yet to be formally adopted. The sets out the vision for how Fingal should develop over the life of the Plan whilst ensuring compliance with national and regional policy. Draft development proposals in relation to air quality include:

*“Policy IUP 38:*

*Continue to work proactively with the EPA to monitor and improve air quality in Fingal”*

*“Policy IUO 57:*

*Monitor, pro-actively manage and improve air quality in the County through integrated land use and spatial planning measures to avoid, mitigate and minimise unacceptable levels of air pollution in accordance with national and EU policy Directives on air quality and, where appropriate, promote compliance with established targets.”*

*“Policy IUO 58:*

*Continue to work with the Dublin Local Authorities and relevant agencies in the collection of local air quality data through the EPA's air quality monitoring network, to maintain good air quality in the County.*

*“Policy IUO 59:*

*Implement the recommendations of the Dublin Regional Air Quality Management Plan (and any subsequent Plan) and to implement the relevant spatial planning recommendations and actions of the Dublin Agglomeration Environmental Noise Action Plan 2018–2023 or any superseding action plan.”*

## 11.3 Assessment Guidance

### 11.3.1 Construction and Demolition Dust Guidance

The Institute of Air Quality Management (IAQM) in the UK has published guidance on the assessment of dust from demolition and construction. The IAQM is the professional body for air quality practitioners in the UK. The use of the construction dust guidance has become a requirement of many UK Local Authorities

The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

### 11.3.2 Guidance on Traffic Emission Assessment

Following NRA 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes'<sup>2</sup>, the traffic emissions screening and local air quality assessment has been undertaken on the basis of the DMRB guidance (specifically Volume 11, Section 3, Part 1, HA 207/07).

## 11.4 Assessment Methodology

The scope of the assessment and methodology is explained in the following sections.

### 11.4.1 Baseline Evaluation

The assessment requires a review of the existing air quality and the identification of relevant receptors in the Site locale. The baseline evaluation is undertaken by:

- review of FCC's air quality reports;
- review of the Environmental Protection Agency (EPA) 'Air Quality in Ireland' reports; and
- reference to the air quality monitoring data available in the public domain through the EPA website.

### 11.4.2 Construction Phase Impact Assessment

In lieu of specific guidance for the Republic of Ireland, the potential risk of dust impacts during the construction phase of the development have been considered using the qualitative approach defined in '*Guidance on the Assessment of Dust from Demolition and Construction*' (v1.1, 2016) by the IAQM.

The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:

- demolition;
- earthworks;
- construction; and
- track-out.

The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM<sub>10</sub>; and
- harm to ecological receptors.

The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the scheme. No further assessment is required if there are no receptors within a certain distance of the works; 350m for human receptors and 50m for designated ecological receptors.

The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements.

Descriptors for magnitude of impact and impact significance used in this assessment of construction phase dust are freely available in the guidance from the IAQM website and not reproduced in this Chapter. The full methodology is freely available to download at the IAQM website<sup>3</sup>.

### 11.4.3 Operational Phase Impact Assessment

There is the potential for the generation of emissions by additional vehicle trips on local roads associated with the Site during the operational phase (both existing local roads and the proposed new roads).

---

<sup>2</sup> <https://www.tii.ie/technical-services/environment/planning/Guidelines-for-the-Treatment-of-Air-Quality-during-the-Planning-and-Construction-of-National-Road-Schemes.pdf>

<sup>3</sup> <http://iaqm.co.uk/guidance/>

Following NRA 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes', a traffic emissions screening assessment should be undertaken following the DMRB guidance (specifically Volume 11, Section 3, Part 1, HA 207/07). The guidance includes criteria to define what constitutes a significant increase in traffic movements to determine whether an existing road is 'affected' therefore requiring a quantitative assessment of traffic emissions. If none of the roads in the network meet any of the traffic/alignment criteria or there are no properties or relevant ecological sites (with statutory protection) within 200m of the affected roads, then the impact of the scheme can be considered to be neutral in terms of local air quality and no further work is needed.

Affected roads are those that meet any of the following criteria:

- road alignment will change by 5m or more;
- daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) or more;
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more;
- daily average speed will change by 10 km/hr or more;
- peak hour speed will change by 20 km/hr or more; or
- new roads within the scheme.

For sensitive receptors close to 'affected' roads the DMRB tool is used to predict the pollutant concentrations at receptors using an empirical relationship between the flow of traffic (number, type, and speed) on the road, and the distance to receptor.

The NRA guidelines provide a matrix against which to assess the impact and assign descriptors for the significance of the effect. These are presented in Table 11.2 and Table 11.3 below.

**Table 11.2 Magnitude of Change**

Magnitude of Change	Annual mean NO <sub>2</sub> / PM <sub>10</sub>	No. days with PM <sub>10</sub> concentration greater than 50 µg/m <sup>3</sup>
Large	Increase/decrease ≥4 µg/m <sup>3</sup>	Increase/decrease ≥4 days
Medium	Increase/decrease 2 - <4 µg/m <sup>3</sup>	Increase/decrease 3 or 4 days
Small	Increase/decrease 0.4 - <2 µg/m <sup>3</sup>	Increase/decrease 1 or 2 days
Imperceptible	Increase/decrease <0.4 µg/m <sup>3</sup>	Increase/decrease <1 day

**Table 11.3 Air Quality Impact Descriptors**

	Small Increase*	Medium Increase*	Large Increase*
Above Limit Value With Scheme (≥40 µg/m <sup>3</sup> for NO <sub>2</sub> /PM <sub>10</sub> annual mean) (≥35days >50 µg/m <sup>3</sup> PM <sub>10</sub> 24-hour mean)	Minor Adverse	Major Adverse	Major Adverse
Just Below Limit Value With Scheme (36-<40 µg/m <sup>3</sup> for NO <sub>2</sub> /PM <sub>10</sub> annual mean) (32-<35 days >50 µg/m <sup>3</sup> PM <sub>10</sub> 24-hour mean)	Minor Adverse	Moderate Adverse	Moderate Adverse
Below Limit Value With Scheme (30-<36 µg/m <sup>3</sup> for NO <sub>2</sub> /PM <sub>10</sub> annual mean) (26-<32 days >50 µg/m <sup>3</sup> PM <sub>10</sub> 24-hour mean)	Negligible	Minor Adverse	Minor Adverse
Well Below Limit Value With Scheme (<30 µg/m <sup>3</sup> for NO <sub>2</sub> /PM <sub>10</sub> annual mean) (<26 days >50 µg/m <sup>3</sup> PM <sub>10</sub> 24-hour mean)	Negligible	Negligible	Minor Adverse
Note: *for decreases the descriptor becomes 'beneficial' as opposed to 'adverse'			



## 11.5 Description of Existing Environment

### 11.5.1 Site Setting & Sensitive Receptor Locations

The Site is located in Barnhill, County Fingal, Ireland. The general Site context is described in Chapter 1 – Introduction and the approximate Site boundary is displayed in Figure 11.1. The full project description is detailed within Chapter 2 – Project Description.

Residential neighbourhoods are located in close proximity to the Site's northern boundary alongside Hansfield Educate Together Secondary School, located approximately 20m to the north. Isolated dwellings are located along the proposed future Ongar-Barnhill Distributor Road along the Site's western and southern boundary that would be constructed prior to the occupation of the Proposed Development. A small number of existing dwellings are encompassed within the indicative Site boundary, adjacent to the existing Barberstown Lane North road. The surrounding land to the east, south and west is dominated by open fields / agricultural land with the Royal Canal Way and the railway line, running in a north to south orientation, in close proximity to the Site's eastern boundary.

As identified in Chapter 9 of this EIAR, there are four international nature conservation designations (all European sites, i.e. SPAs and SACs) within 15km and two statutory nationally designated sites within 2km. For reference, the nearest statutory designated site is the Rye Water Valley/Carton Special Area of Conservation (SAC) approximately 3.5km to the south-east. The closest non-statutory site is the proposed Natural Heritage Area (pNHA), the Royal Canal, located within 0m of the Site's eastern boundary at its closest point.



**Figure 11.1 Site Setting**

**Note: Site boundary shown in Figure 11.1 is indicative**

### 11.5.2 Baseline Air Quality

The EPA manages the national ambient air quality monitoring network. The closest air quality monitoring stations to the Site are the Blanchardstown Station situated approximately 4.5km east (which monitors NO<sub>2</sub> and PM<sub>10</sub>), the Phoenix Park Station approximately 6.6km south east (which monitors

PM<sub>10</sub>) and the Ballyfermot Station approximately 7.7km south east (which monitors NO<sub>2</sub> and PM<sub>10</sub>). The latest ratified and published monitoring results<sup>4</sup> are presented in Table 11.4. The data indicates that concentrations were below the annual mean and short-term (1-hour and 24-hour) AQALs at all sites.

**Table 11.4 Air Quality Monitoring Data**

Location	2017 NO <sub>2</sub> annual mean (µg/m <sup>3</sup> ) <sup>(a)</sup>	2018 NO <sub>2</sub> annual mean (µg/m <sup>3</sup> ) <sup>(a)</sup>	2019 NO <sub>2</sub> annual mean (µg/m <sup>3</sup> ) <sup>(a)</sup>	2017 PM <sub>10</sub> annual mean (µg/m <sup>3</sup> ) <sup>(b)</sup>	2018 PM <sub>10</sub> annual mean (µg/m <sup>3</sup> ) <sup>(b)</sup>	2019 PM <sub>10</sub> annual mean (µg/m <sup>3</sup> ) <sup>(b)</sup>
Blanchardstown (Roadside)	26.2 (1)	25.3 (0)	31.0 (0)	15.0 (3)	17.2 (2)	18.9 (12)
Phoenix Park (Sub-Urban Background)	-	-	-	9.1 (1)	11.4 (0)	11.3 (3)
Ballyfermot Station (Urban Background)	16.5 (0)	17.4 (1)	19.7 (0)	12.0 (1)	15.8 (0)	13.9 (8)

Note:  
 (a) The number of 1 hour mean concentrations in excess of 200µg/m<sup>3</sup> are displayed in brackets.  
 (b) The number of 24 hour mean concentrations in excess of 50µg/m<sup>3</sup> are displayed in brackets.

The Blanchardstown monitor is of a roadside classification, situated 9m from the N3 dual carriageway in the vicinity of the junction with the M50, as such it is a heavily trafficked location. The Phoenix Park monitor is in a park more than 500m from a road. The Ballyfermot Station monitor is located at Ballyfermot library in a largely residential area.

Based on the surroundings of the Site, background NO<sub>2</sub> and PM<sub>10</sub> concentrations are considered likely to fall somewhere in between the values measured at the Ballyfermot Station and Phoenix Park monitors and therefore it is considered that the baseline air quality at the Site is below the AQALs. Therefore, the proposal would not result in the introduction of new receptors (residents) to areas that exceed the AQALs according to the reviewed data.

## 11.6 Construction Impacts, Mitigation & Monitoring Measures

This section presents the potential air quality impacts associated with the construction of the development.

Construction activities will include:

- Demolition/removal of existing structures;
- material export and import;
- temporary stockpiling of materials;
- groundwork for foundations and services;
- construction of buildings;
- landscaping works; and
- vehicle movements (with the potential to track-out material from site).

Given the large size and scale of the development and the level of infrastructure required, planning permission is to be sought for a 10-year period. It is envisaged that the construction phase is likely to occur over a phased 7-year period. Construction would commence by the 2<sup>nd</sup> quarter of 2024, following the completion of the Ongar Barnhill Distribution Road (by FCC). Completion is expected by the end of the 2<sup>nd</sup> quarter of 2031.

<sup>4</sup> EPA, "EPA Ireland Archive of Monitoring Data. Secure Archive For Environmental Research Data (SAFER) managed by Environmental Protection Agency Ireland <http://erc.epa.ie/safer/resource?id=216a8992-76e5-102b-aa08-55a7497570d3> (accessed August 2019).

The construction activities would be divided into five separate phases. During each Phase, the works would be divided into the enabling works phase (site establishment, demolition and utility diversions construction) followed by the construction phase (earthworks, construction, façade and fit outs and landscaping works).

From the phasing overview, it is evident that there would be more than one phase being worked at any one time. In the absence of a confirmed plan of the phases, the assessment of construction impacts has been undertaken on a precautionary basis, adopting a worst-case scenario whereby construction works are assumed to be undertaken across all phases as the same time. Although this has the consequence of overestimating the risk of dust impacts, it does ensure that the level of control required is more than satisfactory to control any emissions during the 10-year construction phase.

The following subsections provide a consideration of potential construction dust and conclude with a determined emission class and risk category, from each of the categories identified by the IAQM Guidance.

### 11.6.1 Assessment Screening

There are 'human receptors' within 350m of the Site but no ecological habitat sites with statutory protection within 50m of the indicative Site boundary or within 50m of the Site entrance (according to EPA GIS maps<sup>5</sup>), as shown in Figure 11.2. Therefore, an assessment of construction dust impact on ecological receptors can be screened out from this assessment but an assessment of construction dust impact on human receptors is required.

EIAR Chapter 9, Biodiversity, provides an assessment of potential impacts on biodiversity within the site.

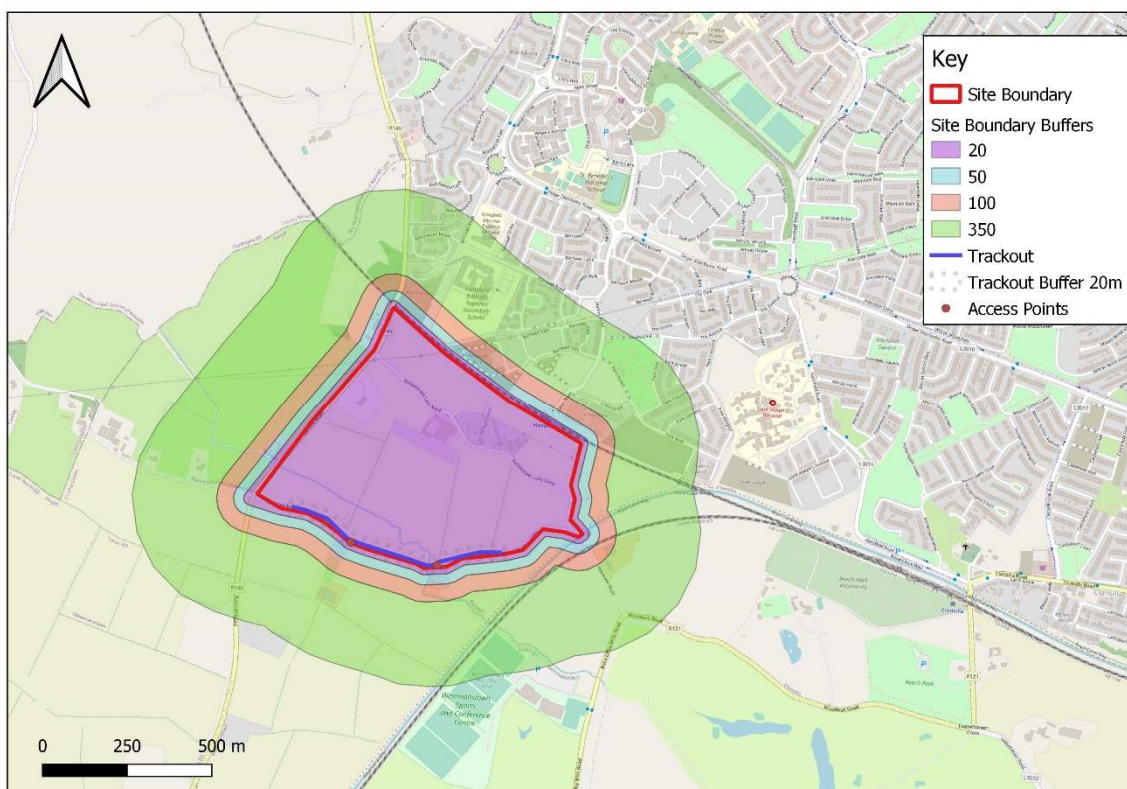


Figure 11.2 Construction Phase Screening

**Note:** Site boundary shown in Figure 11.2 is indicative

<sup>5</sup> <https://gis.epa.ie/EPAMaps/>

## 11.6.2 Potential Dust Emission Magnitude

The most significant potential source of dust emissions during construction would be the earthworks and construction activities. Dust is potentially generated by the action of heavy vehicles (e.g. bulldozer, front-end loader, hydraulic excavator, and dump trucks), as well as by the movement of the vehicles on potentially dusty surfaces. Handling and storage of construction materials (aggregates/hard core), haulage across unsurfaced areas are also potential sources of dust generation. The potential dust emission magnitude for each activity is described in Table 11.5.

**Table 11.5 Potential Dust Emission Magnitude**

Activity	Comments	Dust Emission Magnitude
Demolition	The volume of the existing farm buildings requiring demolition is classified as small (12,900m <sup>3</sup> of demolition waste arising from the demolition of existing structures on the site) and are less than 10m in height. The majority of the building material is considered to be of low dust potential being predominantly corrugated steel sheeting although some removal of concrete hard-standings will be required.	Small
Earthworks	The total site area is classified as large (>10,000m <sup>2</sup> ). It has been assumed that the soil is potentially dusty. Excavation is required, e.g. for services and foundations etc, but no significant bund construction or significant excavations for sub-ground level floors is required. It has been assumed given the area that >10 earth moving vehicles could be in use at any one time.	Large
Construction	The total buildings volume requiring construction can be classified as large (i.e. >100,000m <sup>3</sup> ). Typical construction methods will be employed and construction materials considered potentially dusty such as concrete and brick would be used.	Large
Trackout	The potential for trackout is considered to be within the medium classification with less than 50 outward HDV movements in any one day and vehicles typically tracking over less than 100m unpaved road length.	Medium

## 11.6.3 Sensitivity of the Area

The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM<sub>10</sub>, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

The sensitivity of the area and the factors considered are presented in Table 11.6. Given the 10-year construction phase, residential units constructed in the earlier phases have the potential to be occupied whilst construction works are ongoing in the latter phases. To ensure the future occupants are taken into account within the risk assessment, Table 11.7 considers the proposed occupants in the sensitivity of the area.

**Table 11.6 Sensitivity of the Area – Unoccupied**

Activity	Comments	Sensitivity
Dust Soiling Impacts	Demolition: There are less than 10 receptors within 50m.	Low
	Earthworks and Construction: The surroundings comprise residential properties that are classified as of high sensitivity to dust soiling. Within 20m there are between 10 to 100 high sensitivity receptors.	High
	Trackout: There are less than 10 high sensitivity receptors within 50m of the road edge.	Low
Human Health Impacts	The background is 13.9µg/m <sup>3</sup> (i.e. falls into the <24µg/m <sup>3</sup> class) and there are less than 100 receptors within 20m of any site activity, and less than 100 receptors within 50m of the traffic route road edge within a 500m distance from the site access.	Low

**Table 11.7 Sensitivity of the Area – Occupied**

Activity	Comments	Sensitivity
Dust Soiling Impacts	Demolition: There are less than 10 existing receptors within 50m. There would be no proposed residential units constructed and occupied within 50m of the demolition area	Low
	Earthworks and Construction: The surroundings comprise residential properties that are classified as of high sensitivity to dust soiling. Within 20m and 50m there is potential for there to be more than 10 but less than 100 high sensitivity receptors.	High
	Trackout: Should residential properties along the southern boundary be constructed and occupied whilst construction works are ongoing, there is the potential for between 10 to 100 high sensitivity receptors to be within 20m and 50m of the road edge	High
Human Health Impacts	The background is 13.9µg/m <sup>3</sup> (i.e. falls into the <24µg/m <sup>3</sup> class) and there are less than 100 receptors within 20m of any site activity, and less than 100 receptors within 50m of the traffic route road edge within a 500m distance from the site access.	Low

#### 11.6.4 Risk of Impacts (Unmitigated)

The outcome of the assessment of the potential ‘magnitude of dust emissions’, and the ‘sensitivity of //the area’ are combined in Tables 11.8 and 11.9 to determine the risk of impact which is used to inform the selection of appropriate mitigation. As per the Section 11.6.3, the assessment has been divided into an ‘unoccupied’ and ‘occupied’ scenarios going forward.

**Table 11.8 Risk of Dust Impacts - Unoccupied**

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Negligible	High Risk	High Risk	Low Risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk

**Table 11.9 Risk of Dust Impacts - Occupied**

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Negligible	High Risk	High Risk	Medium Risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk

Tables 11.8 and 11.9 indicate there is an increased risk of dust soiling from the trackout activities during the scenario whereby the development is occupied. This increase in risk specifically relates to the scenario whereby the residential units within the Site and within 50m of the potential trackout route associated with the Site construction along the Ongar-Barnhill Distribution Road are built out and



populated. In the event that no proposed dwellings are built out and occupied within 50m of potential route of trackout, then the dust risk is as indicated by Table 11.8.

## 11.7 Operational Impacts, Mitigation and Monitoring Measures

### 11.7.1 Screening for Affected Roads

Predicted traffic flows as a result of the Proposed Development have been provided by the Highways and Transport Consultants for the scheme. Predicted traffic flows are provided which relate to the 3 future assessment years provided by the Transport Consultant. Figure 11.3 illustrates the location of the road links relative to the Site. The selection of links that exceed the 1,000 AADT change over the three assessment years provided by the Transport Consultant.

The maximum increase in vehicle movements as a result of the development, is more than 1,000 AADT on all links in the immediate Site locale (see Tables 11.10 to 11.12). As such a DMRB local air quality assessment has been completed to quantify potential impacts at relevant receptor locations. For roads where there is a change less than 1,000 AADT, there is considered to be a 'neutral effect' following the DMRB guidance and no further assessment is required.

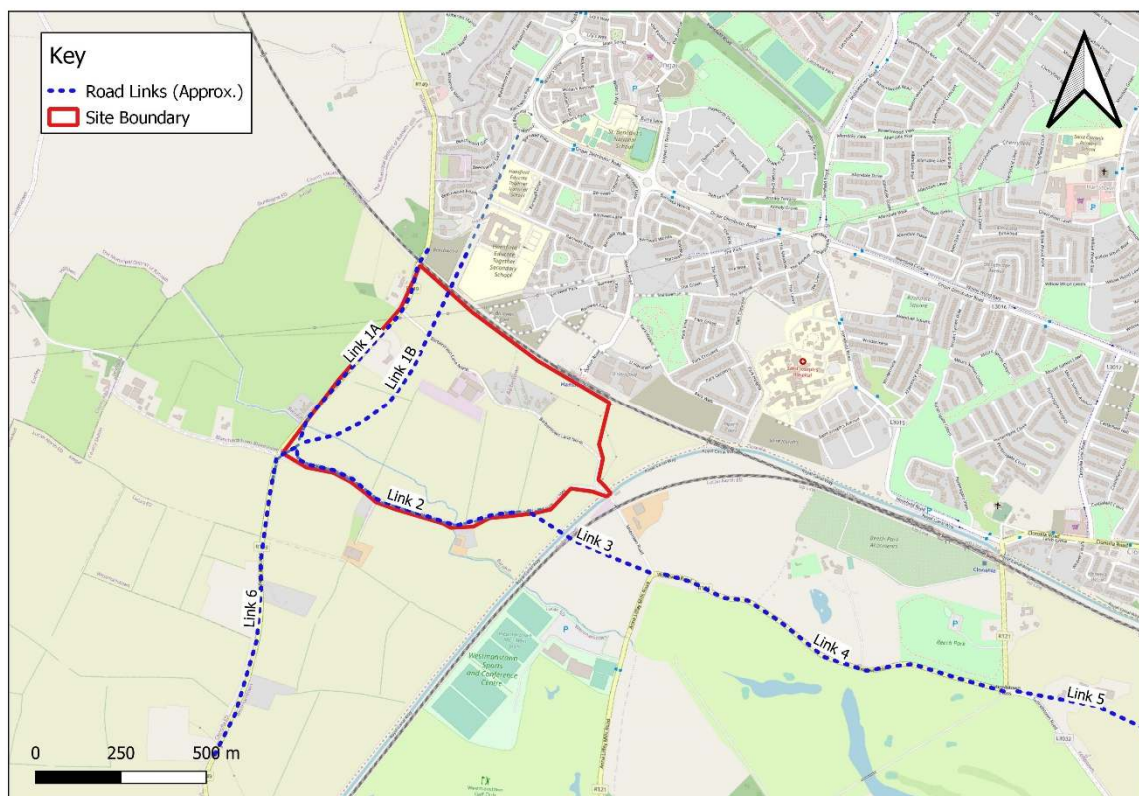


Figure 11.3 Road Links

Note: Site boundary shown in Figure 11.3 is indicative

**Table 11.10 Predicted Changes in Annual Average Daily Traffic Flow - 2025**

<b>ID</b>	<b>Link Description</b>	<b>Without Development (AADT)</b>	<b>With Development (AADT)</b>	<b>Change due to Development (AADT)</b>
1A	R149 – south of J1	3,298	4,151	+853
1B	Proposed Ongar – Barnhill Distributor Road (between J1 and J2)	9,351	10,100	+749
2	Proposed Ongar – Barnhill Distributor Road	898	8,115	+7,217
3	Future Kellystown Link Road (west of Milestown Road)	898	2,929	+2,031
4	R121 (part of future Kellystown Link Road, west of Clonsilla Rd)	10,795	12,404	+1,608
5	Future Kellystown Link Road (east of east of Clonsilla Rd)	8,617	9,491	+875
6	R149 (south of J1 of proposed Ongar - Barnhill Distributor Road)	10,464	13,429	+2,965

**Table 11.11 Predicted Changes in Annual Average Daily Traffic Flow - 2030**

<b>ID</b>	<b>Link Description</b>	<b>Without Development (AADT)</b>	<b>With Development (AADT)</b>	<b>Change due to Development (AADT)</b>
1A	R149 – south of J1	3,951	4,608	+657
1B	Proposed Ongar – Barnhill Distributor Road (between J1 and J2)	10,505	11,974	+1,469
2	Proposed Ongar – Barnhill Distributor Road	3,833	10,671	+6,838
3	Future Kellystown Link Road (west of Milestown Road)	3,842	6,350	+2,508
4	R121 (part of future Kellystown Link Road, west of Clonsilla Rd)	12,585	13,747	+1,162
5	Future Kellystown Link Road (east of east of Clonsilla Rd)	9,603	10,296	+693
6	R149 (south of J1 of proposed Ongar - Barnhill Distributor Road)	12,579	14,015	+1,435

**Table 11.12 Predicted Changes in Annual Average Daily Traffic Flow - 2040**

<b>ID</b>	<b>Link Description</b>	<b>Without Development (AADT)</b>	<b>With Development (AADT)</b>	<b>Change due to Development (AADT)</b>
<b>1A</b>	R149 – south of J1	3,993	6,583	+2,589
<b>1B</b>	Proposed Ongar – Barnhill Distributor Road (between J1 and J2)	11,658	11,997	+338
<b>2</b>	Proposed Ongar – Barnhill Distributor Road	6,438	10,114	+3,676
<b>3</b>	Future Kellystown Link Road (west of Milestown Road)	6,427	7,754	+1,327
<b>4</b>	R121 (part of future Kellystown Link Road, west of Clonsilla Rd)	12,250	12,577	+327
<b>5</b>	Future Kellystown Link Road (east of east of Clonsilla Rd)	8,830	8,875	+44
<b>6</b>	R149 (south of J1 of proposed Ongar - Barnhill Distributor Road)	14,485	15,925	+1,440

### 11.7.2 DMRB Assessment

To provide for a precautionary assessment the traffic flows for each assessment year (2025, 2030 and 2040) alongside 2025 traffic emission factors have been applied in the assessment. This assumption assumes there is no improvement in vehicle emissions between the 2025 and 2030 / 2040 scenario years. Similarly, to present a precautionary assessment, the monitoring results presented from the Urban Background Site of Ballyfermot Station for 2019 in Table 11-4 have been applied as backgrounds without projecting future year reductions as described in Appendix 5 of the NRA guidelines.

Five existing receptors and four proposed human receptors have been selected adjacent to the affected road network (see Figure 11.4). These locations have been selected to represent locations where impacts would be expected to be greatest given factors such as proximity to the affected road network, the change in traffic flow, and the presence of junctions, as such not all existing receptors (such as the cottages in the middle of the site) are specifically modelled as impacts at this distance from new link roads would be less. There are no statutory designated ecological sites within 200m of affected road links that require inclusion within the assessment, as described in Section 11.5.1. The input data applied in the DMRB assessment is presented in Tables 11.13 to 11.15.



Figure 11.4 Traffic Emissions Receptors

Note: Site boundary shown in Figure 11.4 is indicative

Table 11.13 DMRB Input Data 2025

Receptor	Link	Distance to link centre receptor (m)	Annual Average speed (km/h)	AADT (combined veh/day)		Total % HDV	Total % HDV	
				Without development	With development		Without development	With development
DR1	1a	16	20	3,298	2.52	4,151	1.14	
	6	60	20	10,464	2.25	13,429	1.77	
DR2	6	18	50	10,464	2.25	13,429	1.77	
DR3	2	44	20	898	2.64	8,115	0.29	
DR4	2	28	20	898	2.64	8,115	0.29	
DR5	4	7	50	10,795	2.20	12,404	1.78	
DR6	1a	175	50	-	-	4,151	1.14	
	1b	28	50	-	-	10,100	1.59	
DR7	2	27	20	-	-	8,115	0.29	
	1b	25	20	-	-	10,100	1.59	
DR8	2	19	20	-	-	8,115	0.29	

Table Notes:

a) Road links have been defined in accordance with the DMRB guidance, as such links 1a / 2 and 1b / 6 are defined as one contiguous link, with traffic data utilised from the link closest to the receptor.

**Table 11.14 DMRB Input Data 2030**

Receptor	Link	Distance to link centre from receptor (m)	Annual Average speed (km/h)	AADT (combined veh/day)		Total % HDV	
				Without development	With development	Without development	With development
DR1	1a	16	20	3,951	2.26	4,608	1.75
	6	60	20	12,579	2.56	14,015	2.39
DR2	6	18	50	12,579	2.56	14,015	2.39
DR3	2	44	20	3,833	1.73	10,671	0.44
DR4	2	28	20	3,833	1.73	10,671	0.44
DR5	4	7	50	12,585	2.61	13,747	1.98
DR6	1a	175	50	-	-	4,608	1.75
	1b	28	50	-	-	11,974	1.91
DR7	2	27	20	-	-	10,671	0.44
	1b	25	20	-	-	11,974	1.91
DR8	2	19	20	-	-	10,671	0.44

Table Notes:

a) Road links have been defined in accordance with the DMRB guidance, as such links 1a / 2 and 1b / 6 are defined as one contiguous link, with traffic data utilised from the link closest to the receptor.

**Table 11.15 DMRB Input Data 2040**

Receptor	Link	Distance to link centre from receptor (m)	Annual Average speed (km/h)	AADT (combined veh/day)		Total % HDV	
				Without development	With development	Without development	With development
DR1	1a	16	20	3,993	0.89	6,583	0.30
	6	60	20	14,485	2.05	15,925	1.83
DR2	6	18	50	14,485	2.05	15,925	1.83
DR3	2	44	20	6,438	1.89	10,114	1.09
DR4	2	28	20	6,438	1.89	10,114	1.09
DR5	4	7	50	12,250	1.30	12,577	1.15
DR6	1a	175	50	-	-	6,583	0.30
	1b	28	50	-	-	11,997	1.35
DR7	2	27	20	-	-	10,114	1.09
	1b	25	20	-	-	11,997	1.35
DR8	2	19	20	-	-	10,114	1.09

Table Notes:

a) Road links have been defined in accordance with the DMRB guidance, as such links 1a / 2 and 1b / 6 are defined as one contiguous link, with traffic data utilised from the link closest to the receptor.



### 11.7.3 Predicted Impacts & Significance of Effect

#### 11.7.3.1 NO<sub>2</sub> Impacts & Significance of Effect

The predicted impacts on annual mean NO<sub>2</sub> concentrations at considered receptor locations are presented in Tables 11.16 to 11.18. The magnitude of change ranges from 'imperceptible' to 'small'. On the basis of the NRA guidelines, the impact on annual mean NO<sub>2</sub> exposure can be described as 'negligible' at all receptors in each of the 2025, 2030 and 2040 assessment scenario years.

With respect to the 1-hour mean NO<sub>2</sub> AQAL, on the basis of empirical evidence the NRA guidelines state that *'the hourly mean standard is unlikely to be exceeded at roadside locations unless the annual mean is above 60µg/m<sup>3</sup>'*. On this basis and in consideration of the absolute predictions in annual mean NO<sub>2</sub> concentrations, none of the receptor locations are considered likely to exceed the 1-hour mean AQAL.

**Table 11.16 Impact on Annual Mean NO<sub>2</sub> Concentrations at Receptors - 2025**

Receptor	Without Development NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	With Development NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	Change (µg/m <sup>3</sup> )	Magnitude of Change	Impact Significance
DR1	20.72	20.88	+0.16	Imperceptible	Negligible
DR2	20.95	21.24	+0.29	Imperceptible	Negligible
DR3	19.77	20.18	+0.41	Small	Negligible
DR4	19.80	20.41	+0.61	Small	Negligible
DR5	21.41	21.59	+0.18	Imperceptible	Negligible
DR6	-	20.60	-	-	-
DR7	-	21.49	-	-	-
DR8	-	20.60	-	-	-

**Table 11.17 Impact on Annual Mean NO<sub>2</sub> Concentrations at Receptors - 2030**

Receptor	Without Development NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	With Development NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	Change (µg/m <sup>3</sup> )	Magnitude of Change	Impact Significance
DR1	20.92	21.04	+0.12	Imperceptible	Negligible
DR2	21.23	21.37	+0.15	Imperceptible	Negligible
DR3	19.97	20.34	+0.37	Imperceptible	Negligible
DR4	20.10	20.65	+0.55	Small	Negligible
DR5	21.74	21.82	+0.08	Imperceptible	Negligible
DR6		20.79		-	-
DR7		21.95		-	-
DR8		20.90		-	-

**Table 11.18 Impact on Annual Mean NO<sub>2</sub> Concentrations at Receptors - 2040**

Receptor	Without Development NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	With Development NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )	Change (µg/m <sup>3</sup> )	Magnitude of Change	Impact Significance
DR1	20.91	21.20	+0.29	Imperceptible	Negligible
DR2	21.39	21.46	+0.07	Imperceptible	Negligible
DR3	20.16	20.35	+0.20	Imperceptible	Negligible
DR4	20.37	20.67	+0.29	Imperceptible	Negligible
DR5	21.50	21.53	+0.03	Imperceptible	Negligible
DR6	-	20.75	-	-	-
DR7	-	21.90	-	-	-
DR8	-	20.92	-	-	-

11.7.3.2 PM<sub>10</sub> Impacts & Significance of Effect

The predicted impacts on annual mean PM<sub>10</sub> concentrations at considered receptor locations are presented in Tables 11-19 to Table 11.21. The magnitude of change at all receptors is 'imperceptible'. On the basis of the NRA guidelines, the impact on annual mean PM<sub>10</sub> exposure can be described as 'negligible' at all receptors in each of the 2025, 2030 and 2040 assessment scenario years.

With respect to the 24-hour mean PM<sub>10</sub> AQAL, there is predicted to be 1 day where 24-hour mean concentrations are in excess of 50µg/m<sup>3</sup> (as predicted at DR7 in both the 2030 and 2040 assessment scenarios). All other receptors in each of the 2025, 2030 and 2040 assessment scenario years are predicted to result in 0 days where 24-hour mean concentrations are in excess of 50µg/m<sup>3</sup>. Therefore, following NRA guidelines the impact on 24-hour mean PM<sub>10</sub> concentrations is predicted to be 'negligible'.

**Table 11.19 Impact on Annual Mean PM<sub>10</sub> Concentrations at Receptors - 2025**

Receptor	Without Development PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	With Development PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	Change (µg/m <sup>3</sup> )	Magnitude of Change	Impact Significance
DR1	14.43	14.55	+0.13	Imperceptible	Negligible
DR2	14.40	14.54	+0.14	Imperceptible	Negligible
DR3	13.93	14.19	+0.25	Imperceptible	Negligible
DR4	13.95	14.33	+0.38	Imperceptible	Negligible
DR5	14.60	14.69	+0.10	Imperceptible	Negligible
DR6	-	14.27	-	-	-
DR7	-	14.94	-	-	-
DR8	-	14.45	-	-	-

**Table 11.20 Impact on Annual Mean PM10 Concentrations at Receptors - 2030**

Receptor	Without Development PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	With Development PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	Change (µg/m <sup>3</sup> )	Magnitude of Change	Significance
DR1	14.53	14.61	+0.08	Imperceptible	Imperceptible
DR2	14.51	14.58	+0.07	Imperceptible	Imperceptible
DR3	14.04	14.28	+0.24	Imperceptible	Imperceptible
DR4	14.11	14.47	0.36	Imperceptible	Imperceptible
DR5	14.72	14.78	+0.06	Imperceptible	Imperceptible
DR6	-	14.35	-	-	-
DR7	-	15.20	-	-	-
DR8	-	14.62	-	-	-

**Table 11.21 Impact on Annual Mean PM10 Concentrations at Receptors - 2040**

Receptor	Without Development PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	With Development PM <sub>10</sub> Concentration (µg/m <sup>3</sup> )	Change (µg/m <sup>3</sup> )	Magnitude of Change	Significance
DR1	14.57	14.77	+0.20	Imperceptible	Imperceptible
DR2	14.59	14.63	+0.04	Imperceptible	Imperceptible
DR3	14.14	14.27	+0.13	Imperceptible	Imperceptible
DR4	14.26	14.45	+0.19	Imperceptible	Imperceptible
DR5	14.68	14.69	+0.02	Imperceptible	Imperceptible
DR6	-	14.34	-	-	-
DR7	-	15.17	-	-	-
DR8	-	14.60	-	-	-

## 11.8 Mitigation Measures and Residual Impacts

### 11.8.1 Construction Phase

In order to control potential impacts, the mitigation and monitoring measures presented within Table 11.22 are recommended. In accordance with the IAQM guidance, the mitigation measures proposed are identical for both the 'Unoccupied' and 'Occupied' assessment scenarios.

**Table 11.22 Construction Dust Mitigation and Monitoring Measures**

Site Application	Mitigation / Monitoring Measure
<b>Highly Recommended</b>	
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the indicative site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
Demolition	Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
	Bag and remove any biological debris or damp down such material before demolition.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
	Use Hessian, mulches or tackifiers 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.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of indicative site boundary, with cleaning to be provided if necessary.
	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

	Agree dust deposition, dust flux, or real-time PM <sub>10</sub> continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
Operating Vehicle / Machinery and Sustainable Travel	Ensure all vehicles switch off engines when stationary - no idling vehicles.
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
	Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
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 indicative site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
	Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.
Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.



	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site log book.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
	Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
	Access gates to be located at least 10m from receptors where possible.
Waste Management	Avoid bonfires and burning of waste materials.
Desirable	
Waste Management	Waste Management
Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

### 11.8.2 Operational Phase

The road traffic emissions assessment predicts a 'negligible' impact on annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations, a 'negligible' impact on 24-hour mean PM<sub>10</sub> concentrations at all considered receptors in each of the 2025, 2030 and 2040 assessment scenario years. Exceedences of the 1-hour mean NO<sub>2</sub> AQAL are unlikely to occur, and there is no predicted risk of exceedence of the 24-hour mean AQAL. Predicted absolute annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations indicate large headroom with the AQALs. As such, specific mitigation are not considered to be necessary.

## 11.9 Residual Impacts

### 11.9.1 Construction Phase

With the effective implementation of the defined best practice dust mitigation measures identified within Table 11.22 the residual impacts are considered 'not significant'. The potential residual impacts would be short-term (i.e. for the duration of the construction phase only) and local in extent.

### 11.9.2 Operational Phase

The impact on local air quality as a result of road traffic emissions from development generated traffic flows is predicted to be 'negligible' and not exceed the Limit Values set in the Air Quality Standards Regulations. As such, specific mitigation and monitoring is not considered to be required and residual impacts are considered to be negligible.

## 11.10 Cumulative Impacts

### 11.10.1 Construction Phase

There is the potential for cumulative dust impacts to occur, arising during the construction of both the Site and any other surrounding developments should:

- the 350m IAQM screening buffer overlaps for the Site and other relevant developments; and
- the construction phase for both developments run either concurrently or sequentially.

On the basis that there are no other identified construction sites within the 350m IAQM screening criteria confirmed to be active at the same time as the Proposed Development, there is not considered to be a risk of cumulative impact. However, in the event that surrounding developments are within the criteria, the measures proposed within this assessment for the Site and measures required to be implemented by other surrounding sites would produce a negligible effect and cumulative impacts would be considered 'not significant'.

## 11.10.2 Operational Phase

The baseline 'without development' dataset includes for a number of committed developments (see Table 11.23) within the Hansfield Strategic Development Zone (SDZ), as such the traffic emissions assessment is cumulative in nature with corresponding trip rates and associated impacts on air quality accounted for within both 'with development' and 'without development' scenarios.

**Table 11.23 Projects included in the 'Without Development' Scenario**

<b>Planning Reference Number</b>	<b>Development</b>
FW15A/0161	206 units in zone 2
FW15A/0032	128 units in Zone 4
FW16A/0117	47 units in zone 2
FW16A/0123	219 units in zone 2 and zone 6
FW17A/0234	155 units in Zone 6
FW18A/0021	95 units in zone 6
FW18A/0110	618 units in zone 7
FW18A/0197	200 units in Zone 7
FW18A/0161	247 units in Zone 7
FW18A/0162	62 units in Zone 1
FW20A/0059	83 units in Zone 7
FW20A/0084	15 units in Zone 1 and 7
DAC/046/20	12 units in Zone 6
DAC/047/20	22 units in Zone 6
DAC/048/20	10 units in Zone 6



# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 12

### Climate Change

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 12 Climate Change

### Contents

12	Climate Change.....	12-3
12.1	Introduction .....	12-3
12.1.1	Contributors / Author(s).....	12-3
12.2	Legislative Framework/ Policy Context.....	12-3
12.2.1	Adaptation to Climate Change .....	12-3
12.2.2	Planning Policy.....	12-7
12.2.3	Green House Gas Emissions.....	12-10
12.3	Methodology.....	12-13
12.4	Limitations / Difficulties Encountered .....	12-16
12.5	Baseline Environment .....	12-16
12.5.1	Regional Context.....	12-16
12.5.2	Local Context .....	12-18
12.6	Potential Impact of the Proposed Project.....	12-19
12.6.1	Development Vulnerability .....	12-19
12.6.2	Greenhouse Gas Emissions .....	12-22
12.7	Mitigation Measures .....	12-23
12.7.1	Project Adaptation against Expected Climate Change Effects .....	12-23
12.7.2	Future Reduction of GHG Emissions.....	12-24
12.8	Residual Impacts.....	12-26
12.8.1	Project Adaptation against Expected Climate Change Effects .....	12-27
12.8.2	Future GHG Emissions .....	12-27
12.9	References.....	12-27

### Tables

Table 12.1	Summary of Adaptation to Climate Change Actions in Ireland.....	12-6
Table 12.2	Scale of Likelihood of Climate Hazard .....	12-14
Table 12.3	Climate Hazard Impact Analysis .....	12-15
Table 12.4	Sensitivity of Project to Climate Hazards.....	12-15
Table 12.5	Exposure of the Project to Climate Hazards .....	12-15
Table 12.6	Vulnerability Analysis of Project to Climate Hazards .....	12-16
Table 12.7	Climate Impacts Projections: 30-year overview.....	12-17
Table 12.8	Dublin Airport 1981-2010 Temperature Averages .....	12-18
Table 12.9	Average Precipitation Dublin Airport (mm) 1981-2010 .....	12-18
Table 12.10	Analysis of Likelihood of Climate Hazards during construction phase. ....	12-19
Table 12.11	Climate Hazard Impact Analysis .....	12-20
Table 12.12	Sensitivity of Project during construction phase to Climate Hazards .....	12-20

Table 12.13 Exposure of the Project during construction phase to Climate Hazards without Mitigation.....	12-20
Table 12.14 Vulnerability Analysis of Project to Climate Hazards.....	12-21
Table 12.15 Analysis of Likelihood of Climate Hazards.....	12-21
Table 12.16 Climate Hazard Impact Analysis.....	12-21
Table 12.17 Sensitivity of Project to Climate Hazards.....	12-22
Table 12.18 Name of Table Exposure of the Development to Climate Hazards without Mitigation	12-22
Table 12.19 Vulnerability Analysis of Project to Climate Hazards.....	12-22
Table 12.20 Mitigation Measures Related to Climate Change Adaptation.....	12-24

## Figures

Figure 12.1 Windrose for Dublin Airport.....	12-19
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## 12 Climate Change

### 12.1 Introduction

Chapter 12 of the EIAR will assess the potential climate related impacts associated with the proposed Barnhill Strategic Housing Development (SHD).

Details on the proposed development are provided in Chapter 2, Project Description. However, in summary, the proposed development will consist of 1,243 residential units, with some commercial and service provision.

The Barnhill site is situated directly south of the Dunboyne to Clonsilla rail line, west of the Royal Canal and the Dublin-Maynooth railway line, and to the east of the R149. The R149 is to be upgraded under an approved Part 8 scheme, prior to the commencement of development on the site. Hansfield Train Station is located on the northern site boundary. To the south, the site is bound by Barberstown Lane South (L7005). Barberstown Lane North runs east west through the site, providing access to 7 residential units. A small stream (Barnhill Stream) runs in a west to east direction on the southern part of the lands to a lake in Luttrellstown Demesne and then into the River Liffey.

The following sections of this Chapter describe the potential climate change impacts associated with the proposed Barnhill Strategic Housing Development (SHD). The issues identified below are addressed separately:

- climate change legislative framework/policy context;
- analysis of evolving environmental baseline trends;
- identifying climate change concerns in relation to proposed development;
- assessing effects;
- identifying alternatives and mitigation measures; and
- identifying monitoring and adaptive management.

#### 12.1.1 Contributors / Author(s)

SLR Consulting Ireland undertook the impact assessment presented in this chapter. The lead consultant for the preparation of the Climate Change Chapter of the EIAR is Aldona Binchy MSc. Eng PIEMA Environmental Engineering. Ms Binchy is supported by Martyn Macefield Msc, BSc MCIEEM BREEAM AP. AECOM undertook the Greenhouse Gas Assessment presented as an appendix in this chapter. The lead consultant is Hayley Maynard, BSc (Hons), MIEMA, CEnv Principal Consultant, Climate Change and Sustainability Services.

## 12.2 Legislative Framework/ Policy Context

### 12.2.1 Adaptation to Climate Change

The Irish National Policy Position (Climate Action and Low Carbon Development (Amendment) Bill 2021) <sup>1</sup> establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out the context for the objective; clarifies the level of GHG mitigation ambition envisaged; and establishes the process to pursue and achieve the overall objective. Specifically, the National Policy Position envisages that policy development will be guided by a long-term vision based on:

- an aggregate reduction in carbon dioxide (CO<sub>2</sub>) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors;
- in parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by Government of a series of national plans over the period to 2050. Greenhouse gas mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through National Mitigation Plans and National Climate Change Adaptation Frameworks<sup>2</sup>. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals,

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<sup>1</sup> [136803\\_667bb25f-c366-4de8-9a56-3e9f2f30417c.pdf](#)

<sup>2</sup> [gov.ie - National Climate Change Adaptation Framework \(NCCAF\) \(www.gov.ie\)](#)

and at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

The Climate Action and Low Carbon Development Act 2015<sup>3</sup> was enacted in December 2015. The Act identified and provided for the development and submission to Government of national mitigation and adaptation plans. In 2021 the act was updated as the Climate Action and Low Carbon Development (Amendment) Bill 2021 and will support Ireland's transition to Net Zero and achieve a climate neutral economy by no later than 2050.

The Department of Communications, Climate Action and Environment (DCCAE) published a National Adaptation Framework (NAF) in January 2018<sup>4</sup>. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.

The NAF builds on the work already carried out under the National Climate Change Adaptation Network (NCCAF, 2012). Under the NAF a number of Government Departments will be required to prepare sectoral adaptation plans in relation to a priority area that they are responsible for. Local authorities are required to prepare local adaptation strategies NAF also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector and the research community.

National Development Plan 2021-2030 was launched in October 2021, this plan is strategy for a cleaner, greener and connected Ireland, it sets climate goal to cut Ireland's emissions in half by 2030, and to create a new green and digital economy.

#### 12.2.1.1 Sectoral Adaptation Plans

Under the National Adaptation Framework (NAF) Sectoral Adaptation Plans were prepared for twelve sectors under 7 Government Departments The sectors are:

- Seafood - Department of Agriculture, Food and the Marine.
- Agriculture - Department of Agriculture, Food and the Marine.
- Forestry - Department of Agriculture, Food and the Marine.
- Biodiversity - Department of Culture, Heritage and the Gaeltacht
- Built and Archaeological Heritage - Department of Culture, Heritage and the Gaeltacht.
- Transport infrastructure - Department of Transport, Tourism and Sport.
- Electricity and Gas Networks - Department of Communications, Climate Action and Environment.
- Communications networks - Department of Communications, Climate Action and Environment.
- Flood Risk Management - Office of Public Works.
- Water Quality - Department of Housing, Planning and Local Government.
- Water Services Infrastructure - Department of Housing, Planning and Local Government.
- Health - Department of Health.

Under the non-statutory 2012 Framework, four Government Departments prepared draft sectoral plans covering 5 sectors. These plans are:

- Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017);
- Adaptation Plan for the Electricity and Gas Networks Sector (DCCAE, 2017).

Government Departments must develop statutory sectoral adaptation plans in accordance with the NAF and with a six-step adaptation planning process described in Sectoral Planning Guidelines for Climate Change Adaptation. This Department published the guidelines for the use of the sectors required to prepare statutory sectoral adaptation plans under the Framework. The guidelines aim to ensure that a coherent and consistent approach to adaptation planning will be adopted by the key sectors in Ireland. Actions in completed plans could include actions that:

- Mainstream (integrate) adaptation into key sectoral plans and policies;

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<sup>3</sup><https://www.dccae.gov.ie/en-ie/climate-action/legislation/Pages/Climate-Action-and-Low-Carbon-Development-Act-2015.aspx>

<sup>4</sup><https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/default.aspx>

- Identify and understand the key vulnerabilities, risks, and opportunities facing their sectors. This should include major cross cutting risks;
- Ensure that plans related to emergencies assigned to a sectoral department as lead Government department under the Strategic Emergency Planning Guidelines are climate proofed;
- Identify and collect information on the costs and benefits of adaptation within their sectors;
- Build capacity within their sectors to cope with climate change;
- Identify and address key research gaps within their sectors;
- Improve co-ordination with the local government sector;
- Develop appropriate monitoring and verification systems within their sectors.

#### 12.2.1.2 Local Level Adaptation

The National Adaptation Framework identifies the critical role to be played by local authorities in addressing climate change adaptation. This will effectively build on their existing expertise and experience as first responders in emergency planning scenarios. Under the NAF each local authority will also be developing their own adaptation strategies in line with guidelines developed for the sector. Local authorities had been set a deadline for the completion of local adaptation strategies of 30 September 2019.

The NAF explores how local authorities might adopt a joint or regional approach to adaptation planning. In January 2018 the DCCAE entered into a five-year financial commitment of €10m to establish four Climate Action Regional Offices (CAROs). Building on a business case prepared by the local government sector itself, this commitment recognises the significant obligation which has been placed on local government to develop and implement its own climate action measures, as well as the need to build capacity within the sector to engage effectively with climate change – both in terms of mitigation and adaptation.

The Climate Action Regional Offices are being operated by a lead local authority in four different regions that have be grouped together based on a climate risk assessment with a focus on the predominant risk(s) in each geographical area. The establishment of these offices will enable a more coordinated engagement across the whole of government and will help build on the experience and expertise which exists across the sector.

Table 12-1 summarises the adaptation actions to climate change in Ireland.



**Table 12.1 Summary of Adaptation to Climate Change Actions in Ireland<sup>5</sup>**

<b>Item</b>	<b>Status</b>	<b>Programs</b>
National Climate Adaptation Strategy	Legislation enacted. Statutory Framework adopted	Climate Action and Low Carbon Development Act 2015 National Adaptation Framework Climate Action and Low Carbon Development (Amendment) Act 2021
Action Plans	Sectoral Adaptation Plans in development. Local authority plans in development.	Local Authority Adaptation Strategy Development Guidelines (2016) Sectoral Planning Guidelines for Climate Change Adaptation Local Authority Adaptation Support Tool The Climate Change Action Plan 2021
Impacts, Vulnerability and Adaptation Assessments	National Vulnerability Assessment	2012 National Climate Change Vulnerability Scoping Study Climate Change Impacts on Biodiversity in Ireland (2013) Climate change Impacts on Phenology in Ireland(2013) COCOADAPT (2013) 2013 HydroDetect Project Robust Adaptation to Climate Change in the Water Sector in Ireland (2013) Ensemble of Regional Climate Projections for Ireland(2015) Urb-ADAPT Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015) Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017) Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017) Adaptation Plan for the Electricity and Gas Networks Sector (DCCA, 2017)
Research Programs	EPA Research Programme (Climate Pillar)	<a href="http://www.epa.ie">http://www.epa.ie</a>
Climate services / Met Office	Established	<a href="http://www.met.ie">http://www.met.ie</a>
Web Portal	Established	<a href="http://www.climateireland.ie">http://www.climateireland.ie</a>
Monitoring, Indicators, Methodologies	In development	
Training, Education	Ongoing / in development	<a href="http://www.climateireland.ie">http://www.climateireland.ie</a>

<sup>5</sup> <http://climate-adapt.eea.europa.eu/countries-regions/countries/ireland>

### 12.2.1.3 Fingal County Council Climate Adaption Strategy 2019- 2024

Fingal County Council's Climate Change Action Plan 2019-2024 was approved in 2019 and contains 133 actions that are on-going or planned within the Council, covering five key action areas:

- Energy and Buildings;
- Transport;
- Flood Resilience;
- Nature-Based Solutions; and
- Resource Management.

The action areas addressed the targets of this plan and to achieve these targets, Climate Change Action Plan sets out the current and future climate change impacts and greenhouse gas emission levels in the County, through the development of adaptation and mitigation baselines. It also examines the future impacts that climate change may have on the region and then sets out a first iteration of actions that will be used to reduce the source and effects of these impacts.

The four targets of the plan include:

- A 33% improvement in the Council's energy efficiency by 2020;
- A 40% reduction in the Council's greenhouse gas emissions by 2030 ;
- To make Dublin a climate resilient region, by reducing the impacts of future climate change-related events;
- To actively engage and inform citizens on climate change.

Fingal County council produced annual progress reports, the 2021 report details Fingal County Council's effort made to date on the implementation of its CCAP and demonstrates the commitment the Council has shown in providing local level leadership on climate action.

Fingal County Council has met and exceeded its 2020 energy efficiency target for Council operations and is working towards achieving more onerous 2030 targets for energy efficiencies and emissions reductions.

The Council has enhanced its efforts in relation to the provision of Active Travel infrastructure across the county and promoting behavioral changes to more active travel modes, particularly in relation to walking and cycling.

### 12.2.2 Planning Policy

#### 12.2.2.1 National Policy and Guidance

#### **S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018**

The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) in schedule 6 to the Planning and Development Regulations 2001-2021 specifically requires an environmental impact assessment report to assess (Irish Statute Books, 2018):

*“the impact of the proposed development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change”*

#### **The EU Climate and Energy Package**

In March 2007, the EU's leaders endorsed an integrated approach to climate and energy policy that aims to combat climate change and increase the EU's energy security while strengthening its competitiveness. They committed Europe to transforming itself into a highly energy efficient, low carbon economy. A series of climate and energy targets to be met by 2020 were set; these are known as the “20-20-20” targets and are key to determining subsequent national policy.

These EU wide targets are as follows:

- A 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

#### **National Planning Framework – Project Ireland 2040**

The National Planning Framework (NPF) is the Government's high-level strategic plan for shaping the future growth and development of Ireland out to the year 2040. It is a framework to guide public and private investment, to create and promote opportunities for people, and to protect and enhance the

environment - from villages to our cities, and everything around and in between. Section 9 - Realising our Sustainable Future, is of particular pertinence to this statement, addressing issues including:

- Resource Efficiency and Transition to a Low Carbon Economy;
- Protecting, Conserving and Enhancing Our Natural Capital; and
- Creating a Clean Environment for a Healthy Society.

Covering topics as diverse as:

- Sustainable Land Management and Resource Efficiency;
- Low Carbon Economy;
- Renewable Energy;
- Managing Waste;
- Sustainable Water Management;
- Green Infrastructure Planning;
- Water Quality;
- Promoting Cleaner Air; and
- Noise Management.

### **Climate Action and Low Carbon Development (Amendment) Act 2021**

This Act is to provide for the approval of plans by the Government in relation to climate change 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. It also promotes climate justice, and just transition; to make certain changes to the Climate Change Advisory Council; to provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy.

### **National Energy Efficiency Action Plan (NEEAP) 2009-2020**

Ireland's 2009-2020 National Energy Efficiency Action Plan builds on the previous plan submitted to the European Commission in 2007. Published in May 2009, the updated plan outlines 90 measures towards achieving, a 20% reduction in energy demand (over average 2001-2005 levels) across the whole of the economy through energy efficiency measures by 2020. Recognising that Government must lead by example, the public sector is committed to achieving a 33% reduction in energy use.

### **Sustainable Residential Development in Urban Areas (2009)**

Forecast growth in the Irish economy and population indicates that strong demand for housing will continue, with the majority of these houses to be built in urban areas, it is vitally important that this is achieved in a way which supports the development of sustainable, integrated neighbourhoods within our cities, towns and villages. In some cases, residential development will be part of a mixed-use scheme, where there will be design challenges in ensuring the amenity of residents, but there are also inherent benefits if these challenges can be met.

The aim of the guidelines is to set out the key planning principles which should be reflected in development plans and local area plans, and which should guide the preparation and assessment of planning applications for residential development in urban areas, and they are accompanied by a non-statutory residential design manual.

The range of relevant national policies summarised above can be distilled into a series of high-level aims for successful and sustainable residential development in urban areas. Housing developers, their design teams, the planning system, and the community share a common goal to create high quality places which:

- Prioritise walking, cycling and public transport, and minimise the need to use cars;
- Deliver a quality of life which residents and visitors are entitled to expect, in terms of amenity, safety and convenience;
- Provide a good range of community and support facilities, where and when they are needed and that are easily accessible;
- Present an attractive, well-maintained appearance, with a distinct sense of place and a quality public realm that is easily maintained;
- Are easy to access for all and to find one's way around;
- Promote the efficient use of land and of energy, and minimise greenhouse gas emissions;
- Provide a mix of land uses to minimise transport demand;

- Promote social integration and provide accommodation for a diverse range of household types and age groups;
- Enhance and protect the green infrastructure and biodiversity; and
- Enhance and protect the built and natural heritage.

#### 12.2.2.2 Local Policy and Guidance

##### **Fingal Development Plan 2017- 2023**

The Fingal Development Plan 2017-2023 sets out the Council's proposed policies and objectives for the development of the County over the Plan period. The Development Plan seeks to develop and improve, in a sustainable manner, the social, economic, environmental and cultural assets of the County.

As with the articles of policy and guidance, sustainability issues arise throughout the Fingal Development Plan, but Section 3.2 Sustainable Communities is of particular pertinence, defining the Characteristics of a Successful and Sustainable Community as:

- 'Successful areas are places where people want to live, work and visit. A successful community is made up of many components. The most successful and popular places and neighbourhoods are generally those which:
- Include a range of facilities focused in a consolidated area with a critical mass of attractions and make best use of the already established investment in the built environment; these attractions include a mix of shops as well as a wide range of financial, professional and government services together with cultural, entertainment and leisure facilities.
- Include a thriving local residential population which adds to the vitality and vibrancy of the area as it ensures activity outside of standard retail and office opening hours
- Are easily accessible by a range of transport modes including cycling and walking, have sufficient good quality short stay car parking close to the core area, have good transport linkages within the centre, and have efficient arrangements for delivery of goods.
- Present an attractive amenity in terms of the built environment and streetscape, streets and public spaces which are considered clean and safe, and have a sense of local identity and character, all of which greatly enhances the attraction of the centre.
- Have the vision and mechanisms in place to build on these existing assets, can overcome problems, adapt to both market and consumer needs and can secure appropriate and necessary improvements where required; and
- Encourage and facilitate sustainable lifestyles and livelihoods.'

Fingal County Council is at the initial stage of forming an adaptation team and assessing the current climate change adaptation baseline and have established expert steering groups with the goal of developing co-ordinated action plans to address the interconnected challenges of climate mitigation, adaptation and carbon free sustainable energy. Private commercial opportunities are also encouraged wherever possible to deliver solutions.

Fingal development plan list the following objectives:

##### **Objective EN23**

*Establish a Climate Change Adaptation Team within Fingal County Council to prepare a Climate Change Mitigation and Adaptation Strategy with relevant stakeholders, Dublin Local Authorities and various interest groups. The Climate Change Mitigation and Adaptation Strategy will include targets for emissions reduction from the County; provision for reporting on progress in reducing emissions; and a process of engagement with citizens, businesses and civil society in relation to the changes required.*

Objective PM01 of the Fingal Development Plan, states that the aim of the objective is to 'Support the development of sustainable low carbon climate resilient communities'.

Objective PM12 of the Fingal Development Plan States that developments should 'ensure high standards of energy efficiency in existing and new residential developments in line with good architectural conservation practice and promote energy efficiency and conservation in the design and development of new residential units, encouraging improved environmental performance of building stock'.

## Draft Fingal Development Plan 2023 – 2029

Brief comment to reference draft plan and any substantive proposed changes on climate change policy. It will be enough to state something along the lines of “Review of the Fingal Development Plan is currently underway. Objectives on climate change remain strong / or have been strengthened in the Plan.

### Barnhill Local Area Plan (LAP)

The Barnhill LAP promotes energy efficiency in building design, and use of renewable energy sources, public transport usage, walking and cycling, efficient waste management and recycling, surface water management and protection and integration of natural features including trees, hedgerows and existing flood plains to mitigate the effects of climate change.

The Barnhill LAP promotes development of “decentralised energy systems” and potential for renewable energy in new development in Barnhill through solar collection (photovoltaic and solar thermal), ground source heat pumps and biomass.

The Barnhill LAP lists the following objectives:

- *SD7 Ensure that commercial buildings, community facilities, housing and infrastructure employ best practice in all aspects of environmental sustainability.*
- *SD8 Support and facilitate European and national objectives for climate adaptation and mitigation as detailed in the National Climate Change Adaptation Framework 2012 and the National Mitigation Plan and their successors.*
- *SD9 Promote the integration of green infrastructure/ networks and other physical features on land into new development proposals in order to mitigate and adapt to climate change*
- *SD10 Ensure that development accords with the policies and requirements set out in the Flood Risk Guidelines*

### 12.2.3 Green House Gas Emissions

Ireland is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, which together provide an international legal framework for addressing climate change.

In December 2015, an ambitious new legally binding, global agreement on climate change was agreed in Paris. The Paris Agreement aims to restrict global temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. It aims to increase global ability to adapt to the adverse impacts of climate change and to foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten sustainable food production. It also seeks to achieve a balance between anthropogenic emissions by sources, and removals by sinks, of greenhouse gases in the second half of this century.

The first Irish National Mitigation Plan<sup>6</sup> represents an initial step to set us on a pathway to achieve the level of decarbonisation required. It is a whole-of-Government Plan, reflecting in particular the central roles of the key Ministers responsible for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture, as well as drawing on the perspectives and responsibilities of a range of other Government Departments.

The measures that will be implemented through the plan will lay foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. To support this ongoing work, the Plan also includes over 100 individual actions for various Ministers and public bodies to take forward.

Emissions reduction measures and actions set out in this National Mitigation Plan are aligned with and build upon commitments made in the 2015 Energy White Paper. The Paper will be guided by the following strategic objectives:

- policy will contribute to reductions in Ireland’s greenhouse gas emissions and enhancement of sinks in a manner that achieves the optimum benefits at least cost;
- a stable and predictable policy and regulatory framework will be underpinned by rigorous analysis and appraisal, supported by strong research and analytical capacity;

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<sup>6</sup> <https://www.dccae.gov.ie/en-ie/climate-action/topics/national-mitigation-plan/Pages/default.aspx>



- the Government will pursue investment, innovation and enterprise opportunities towards building a competitive, low carbon, climate-resilient and environmentally sustainable economy; and
- the citizen and communities will be at the centre of the transition.

### **Carbon Budgets**

The Climate Change Advisory Council every year undertakes a review of progress that Ireland makes against set carbon budgets. The review assesses reductions achieved in GHG emissions, compliance with the carbon budget, and every sectoral emissions ceiling for that period.

The first three carbon budgets cover the following five-year periods: 2021 to 2025, 2026 to 2030, and 2031 to 2035 (although the budget for the third period is provisional). All greenhouse gas emissions and all relevant sectors are included in the carbon budgets and are as follows:

- 2021-2025: 295 Mt CO<sub>2</sub> eq. an average of -4.8% for the first budget period.
- 2026-2030: 200 Mt CO<sub>2</sub> eq. an average of -8.3% for the second budget period.
- 2031-2035: 151 Mt CO<sub>2</sub> eq. an average of -3.5% for the third provisional budget.

### **Paris Agreement**

The Paris Agreement entered into force on the 4<sup>th</sup> November 2016.

The Paris Agreement aims to tackle 95% of global emissions through 188 Nationally Determined Contributions (NDCs) which will increase in ambition over time. Ireland's contribution to the Paris Agreement will be via the NDC tabled by the EU on behalf of its Member States. This is a binding target for an overall reduction of at least 40% in greenhouse gas emissions by 2030 (relative to 1990 levels). The target will be delivered by the EU by 2030 through reductions in the Emissions Trading Scheme (ETS) and non-ETS sectors of 43% and 30% respectively (relative to 2005).

### **Kyoto Protocol (2008 – 2012)**

The EPA has overall responsibility for the national greenhouse gas inventory in Ireland's national system, which was established in 2007 under Article 5 of the Kyoto Protocol<sup>7</sup>. The EPA's OCLR<sup>8</sup> performs the role of inventory agency in Ireland and undertakes all aspects of inventory preparation and management as well as the reporting of Ireland's submissions annually in accordance with the requirements of Decision 280/2004/EC and the UNFCCC.

Ireland currently accounts for GHG emissions under the Kyoto Protocol. The Kyoto Protocol required Ireland to limit total national greenhouse gas emissions to 314.2 Mtonnes of CO<sub>2eq</sub> over the five-year period 2008 – 2012 which is equivalent to 62.8 Mtonnes of CO<sub>2eq</sub> per annum. The Kyoto Protocol limit is calculated as 13% above Ireland's 1990 baseline value which was established and fixed at 55.61 Mtonnes of CO<sub>2eq</sub> following an in-depth review of Ireland's 2006 greenhouse gas inventory submission to the UNFCCC.<sup>9</sup>

### **EU 2021-2030 Targets for non-ETS sector emissions- Effort Sharing Regulations<sup>10</sup>**

Under the EU Commission's Climate and Energy Package, sectors of the economy not covered by the EU ETS must reduce emissions by 30% by 2030 compared to 2005 as their contribution to the overall target.

The non-ETS sectors cover those sectors that are outside the EU Emissions Trading Scheme and includes agriculture, transport, built environment (residential, commercial/institutional), waste and non-energy intensive industry.

### **2015 Energy White Paper**

The White Paper on Energy Policy, Ireland's Transition to a Low Carbon Energy Future 2015-2030, published in 2015, sets out a framework to guide energy policy in the period to 2030. The White Paper recognises that a radical transformation of our energy system is required to meet our national, EU and

<sup>7</sup> [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php)

<sup>8</sup> <http://www.epa.ie/mobile/about/org/oclr/>

<sup>9</sup> [http://unfccc.int/files/national\\_reports/annex\\_i\\_natcom/submitted\\_natcom/application/pdf/nc6\\_br1\\_ire.pdf](http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6_br1_ire.pdf)

<sup>10</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018R0842>

international climate objectives and sets a course for an energy sector where the State will provide the supports that enable consumers to become active energy citizens. It posits a policy approach where our energy system will change from one that is almost exclusively led by Government and utilities to one where individuals and communities are agents of change in the way Ireland generates, transmits, stores, conserves and uses energy. It sets out a vision, a framework and over 90 actions for Irish energy policy up to 2030 as we transition to a low carbon society and economy by 2050.

#### 12.2.3.1 Catchment Flood Risk Assessment and Management (CFRAM) Programme<sup>11</sup>

The current Catchment Flood Risk Assessment and Management (CFRAM) Programme (see [www.cfram.ie](http://www.cfram.ie)) is the mechanism established to facilitate future adaptation to climate change. It provides for long-term flood risk management in Ireland and the embedment of flood risk assessment in the future development of capital projects. The future scenario flood maps produced under the CFRAM Programme will facilitate this approach, inform other industrial sectors, and provide a valuable resource for local adaptation planning and sustainable land use management and planning.

#### 12.2.3.2 EIA Directive 2014/52/EU

Directive 2014/52/EU<sup>12</sup> of the European parliament and of the Council of 16<sup>th</sup> April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment had to be transposed into national law by 16<sup>th</sup> May 2017, necessitating changes in laws, regulations, and administrative provisions across a number of legislative codes.

Key changes introduced in the 2014 Directive (in Annex IV - Information referred to in Article 5(1) – Information for the Environmental Impact Assessment Report) and the national transposing regulations (the European Union (Planning and Development)(Environmental Impact Assessment) Regulations, S.I. No. 296 of 2018) include a requirement for information on the impact of a project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change to be provided in the Environmental Impact Assessment Report.

#### 12.2.3.3 Guidelines

##### **Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EC, 2012)<sup>13</sup>**

EU Guidelines provide recommendations how to integrate climate change and biodiversity in Environmental Impact Assessment (EIA). The need for action on climate change and biodiversity loss is recognised across Europe and around the world. The guidelines contain explanation as to why climate change and biodiversity are so important in EIA, present the relevant EU-level policy background, provide advice on how to integrate climate change and biodiversity into selected stages of the EIA process. The annexes provide sources of further reading and links to other relevant information, data, and tools.

##### **Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2022)<sup>14</sup>**

Originally published in 2017, and updated in 2022, this IEMA Guidance provides information to assist practitioners with addressing greenhouse gas (GHG) emissions assessment and mitigation in statutory and non-statutory Environmental Impact Assessment (EIA). It complements IEMA's earlier guide on Climate Change Resilience and Adaptation and builds on the Climate Change Mitigation and EIA overarching principles. The requirement to consider this topic has resulted from the 2014 amendment to the EIA Directive.

##### **Climate Change and Major Projects (EC, 2016)<sup>15</sup>**

This publication provides guidance for assessing vulnerability and risk from Climate Change for major projects funded by the European Regional Development Fund (ERDF) and the Cohesion Fund and listed in the concerned operational programmes.

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<sup>11</sup> <https://www.cfram.ie/>

<sup>12</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052>

<sup>13</sup> <http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf>

<sup>14</sup> <https://www.iema.net/resources/reading-room/2022/02/24/iema-guide-assessing-greenhouse-gas-emissions-and-evaluating-their-significance>

<sup>15</sup> [https://ec.europa.eu/clima/sites/clima/files/docs/major\\_projects\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/docs/major_projects_en.pdf)

## **Sectoral Planning Guidelines for Climate Change Adaptation<sup>16</sup>**

The guidelines aim to ensure that a coherent and consistent approach to adaptation planning is adopted by the key sectors in Ireland. Sectors preparing sectoral adaptation plans under the NAF are required to prepare their plans in line with the process described in these guidelines while also being aware of the overall requirements regarding the development of sectoral adaptation plans.

## **Local Authority Adaptation Strategy Development Guidelines<sup>17</sup>**

Guidance was produced to provide a consistent and coherent process for local authorities in helping them develop local adaptation strategies and contain information on the process of developing an adaptation strategy:

- provide background information on what adaptation entails and provides the rationale behind implementing a local scale adaptation strategy
- outline the initial steps required in launching a strategy development process, describing key roles and who can fulfil them, and setting out important factors to consider in the early stages of strategy development.
- explains how to assess the role that weather extremes and periods of climate variability currently play within the local jurisdiction, and it describes why doing so is a fundamental element of working towards a more climate-resilient future.
- moves from the present to the identification of future climate risks, describing a staged risk assessment process and positioning the adaptation strategy within more detailed risk assessments undertaken during shorter term decision-making processes such as statutory plan-making.
- on the basis of the risk assessment process undertaken determination of adaptation goals and objectives and the types of adaptation actions that are available and outlines how each might be identified, assessed, prioritised and implemented is described.
- outlines the steps required to move from a phase of planning to one of implementation, and it explains the importance of monitoring and evaluation in ensuring that the strategy is achieving its anticipated adaptation objectives.

## **12.3 Methodology**

In Ireland some sectors have independently begun the process of identifying key vulnerabilities for their activities. The report by the Irish Academy of Engineering, Ireland at Risk Critical Infrastructure – Adaptation for Climate Change (The Irish Academy of Engineering, 2009) and the report by the Heritage Council and Fáilte Ireland (the National Tourism Development Authority), Climate Change, Heritage and Tourism, Implications for Ireland's Coast and Inland Waterways (ed. Kelly and Stack, 2009) are examples of initiatives of this kind.

Other research work on adaptation in specific sectors has been carried out or commissioned by other Government Departments / bodies such as the OPW, CoFoRD (programme of competitive forest research for development research programme, etc. (e.g. CLIMADAPT).

A National Climate Change Vulnerability Scoping Study (Sweeney and Coll, 2012) was undertaken to identify first generation vulnerabilities for Ireland based on a sensitivity analysis across key sectors. The analysis identified a clustering of impacts and their importance in relation to an assessment of likely resilience by sector. The assessment methodology used was an impacts-first, science-first classical approach. The priority sectors identified are: biodiversity and fisheries; water resources and the built coastal environment; forestry and agriculture.

As each sector develops its sectoral adaptation plan (under the Climate Action and Low Carbon Development Act 2015), detailed vulnerability and risk analysis will be required. Some preliminary work has been undertaken on costing the impacts of climate change in Ireland. This is now being supported by more detailed analysis of the current and future costs of flood risk management.

The implementation of adaptation is being supported by the development of a suite of guidelines, tools and approaches. These include the Local Authority Adaptation Strategy Development Guidelines and the Irish climate information platform “Climate Ireland”, which includes data, information, tools and

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<sup>16</sup><https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Sectoral.aspx>

<sup>17</sup><https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Localadaptation.aspx>

approaches for local level adaptation decision making. Work is ongoing to develop sectoral decision-making tools and supports.

The EPA is currently funding a research project called Urb-Adapt which aims to identify the impact of climate change on Dublin city and surrounding towns within the greater Dublin region. The project aims to identify possible risks to the population living in that area and future risks posed to it by the changing climate.

There are no specific tools developed for assessing climate change for the strategic housing. The Climate Change and Major Project guidelines on how to make vulnerable investments resilient to climate change provide methodology for undertaking a vulnerability and risk assessment.

Climate change adaptation and mitigation are to be integrated in the preparation and approval of planned development. Adaptation seeks to ensure adequate resilience of development to the adverse impacts of climate change, based on vulnerability. Mitigation seeks to reduce the emission of greenhouse gases.

### 12.3.1.1 Development Vulnerability Assessment Methodology

Development vulnerability assessment methodology was based on the guidance provided in the Climate Change and Major Projects (EC, 2016)<sup>18</sup>

The aim of the vulnerability assessment is to identify the relevant climate hazards for the development at the proposed location. Adaptation through project options, appraisal, and planning will depend on the assessed project vulnerability and risk.

Timescale for the project vulnerability and risk assessment shall correspond to the lifespan of the project. During the lifespan, there could be significant changes in frequency and intensity of weather events due to climate change, which should be taken into account.

The example of the scale for assessing the likelihood of a climate hazard is presented in Table 12-2. Analysis was undertaken of the final proposed development and it is presented in the potential impact section. The output of the likelihood analysis is an estimation of the likelihood for each of the essential climate variables and hazards.

**Table 12.2 Scale of Likelihood of Climate Hazard**

<b>Term</b>	<b>Qualitative</b>	<b>Quantitative</b>
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to Occur	50%
Likely	Likely to Occur	80%
Almost certain	Very likely to occur	95%

The example of scale for assessing the potential impact of a climate hazard is presented in Table 12-3. Analysis was undertaken of the final proposed development and it is presented in the potential impact section. The impact analysis provides an assessment of the potential impact of each of the essential climate variables and hazards.

<sup>18</sup> [https://ec.europa.eu/clima/sites/clima/files/docs/major\\_projects\\_en.pdf](https://ec.europa.eu/clima/sites/clima/files/docs/major_projects_en.pdf)

**Table 12.3 Climate Hazard Impact Analysis**

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Construction activities					
Asset damage					
Safety and Health					
Environment					
Social					
Financial					
Reputation					
Add based on design					

**NOTE: This table is an example only and is intended to be blank**

The example of matrix for assessing the sensitivity of project to climate hazards is presented in Table 12-4. Analysis was undertaken of the final proposed development and it is presented in the potential impact section. The sensitivity is summarised, along with the ranking of the relevant climate variables and hazards relating to the project.

**Table 12.4 Sensitivity of Project to Climate Hazards**

	Extreme rainfall, flash flood	Food	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Assets										
Inputs - Water										
Inputs - Energy										
Transport links										
Add based on design										

**NOTE: This table is an example only and is intended to be blank**

The example of matrix for assessing exposure of a project to climate hazards is presented in Table 12-5. The exposure analysis ranks climate variables and hazards as low, medium or high based on current and future climate.

**Table 12.5 Exposure of the Project to Climate Hazards**

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Current Climate										
Future Climate										

**NOTE: This table is an example only and is intended to be blank**

An example of the vulnerability of a project to climate hazards is presented in Table 12-6. Analysis was undertaken of the final proposed development and it is presented in the potential impact section. The vulnerability combines the sensitivity and the exposure analysis.



**Table 12.6 Vulnerability Analysis of Project to Climate Hazards**

Sensitivity	Exposure (current & future climate)		
	Low	Medium	High
Low			
Medium			
High			

**NOTE: This table is an example only and is intended to be blank**

### 12.3.1.2 Green House Gases Emissions

Currently there are no published thresholds for assessing the significance of a proposed development impact on climate for EIAR. As per IEMA (2022) guidance, all GHGs are classed as significant as all emissions contribute to climate change. Each project is evaluated according to its individual characteristics.

A lifecycle approach to calculating the GHGs has been used. This approach considers specific timescales and emissions from different lifecycle stages of a proposed development: product stage (construction materials), construction process stage, operational stage and decommissioning.

The full methodology, including assumptions and limitations of the assessment are addressed in Technical Appendix 12.1.

## 12.4 Limitations / Difficulties Encountered

There are currently no published guidelines and established methodology providing specifically for assessment of climate impacts at housing developments activities in Ireland. This Chapter of the EIAR is being prepared on the basis of general cross-sectoral guidance.

## 12.5 Baseline Environment

### 12.5.1 Regional Context

Observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea level are unequivocal evidence of warming of the climate system globally. Global mean temperature has increased by 0.8°C compared with pre-industrial times for land and oceans, and by 1.0°C for land alone. Most of the observed increase in global average temperatures is very likely due to increases in anthropogenic greenhouse gas concentrations.

In future years, landmasses are expected to warm more than the oceans, and northern, middle and high latitudes. Despite possible reductions in average summer precipitation over much of Europe, precipitation amounts exceeding the 95th percentile are very likely in many areas; thus, episodes of severe flooding may become more frequent despite the general trend towards drier summer conditions. In an ensemble-based approach using outputs from 20 global climate models (GCMs), the Mediterranean, north-east and north-west Europe are identified as warming hot spots but with regional and seasonal variations in the pattern and amplitude of warming.

Regional climate models (RCMs) also project rising temperatures for Europe until the end of the 21st century, with an accelerated increase in the second half of the century. For precipitation, the larger-scale summer pattern shows a gradient from increases in Northern Scandinavia to decreases in the Mediterranean region. By contrast, increases in wintertime precipitation primarily north of 45°N are a consistent feature of RCM projections over Europe, with decreases over the Mediterranean. Overall, then, there are consistent projections of change for northern and north-west Europe, including Ireland.

Ireland has a typical maritime climate, with relatively mild and moist winters and cool, cloudy summers. The prevailing winds are south-westerly in direction. The climate is influenced by warm maritime air associated with the Gulf Stream which has the effect of moderating the climate, and results in high average annual humidity across the country. The area of least precipitation is along the eastern seaboard of the country, in the rain shadow of the Leinster uplands.

Mean seasonal temperature will change across Ireland. A number of studies have applied selected IPCC Special Reports on Emissions Scenarios (SRESs) to model climatic changes across Ireland at a regional scale. Despite the different methods and scenario combinations used, there is agreement in projected changes in temperature for Ireland. However, there are more disparities in the magnitude and sign for the precipitation changes projected for the island.

Table 12-7 summarises climate impact projections for Ireland, estimates of projections confidence are derived from published projection data from the Local Authority Adaptation Strategy Development Guidelines.

**Table 12.7 Climate Impacts Projections: 30-year overview<sup>19</sup>**

Variable	Summary	Confidence	Projected Changes
Sea Levels Rise	Strong increase	High	Projections of sea level rise to 2100 suggest a global increase in the range of 0.09-0.88m with a mean value of 0.48m. For 2050, it is reasonable to assume a sea level rise in the region of 25cm above present levels. It should be noted that due to a limited understanding of some important effects that contribute to rates of increase, these estimates of sea level rise may prove optimistic, and estimates of up to 4-6 m have been projected by some models.
Storm surge	Strong increase	Medium	An increase in the number of intense cyclones and associated strong winds are expected over the north - east Atlantic. By the 2050s, storm surge heights in the range of 50-100cm are expected to increase in frequency for all coastal areas with exception of the southern coast.
Costal Erosion	Moderate increase	Low	Currently approximately 20% of Ireland's coastline is at risk of costal erosion, particularly areas of the south and east coast and also in isolated areas on the west coast. Rates of increase will be determined by local circumstances; however, it is expected that areas of the south-west are likely to experience the largest increase.
Cold Snaps/ Frost (winter/night)	Moderate decrease	High	By mid-century, minimum temperatures during winter are projected to increase by ~20C in the southeast and ~2.90C in the north. This change will result in fewer frost days and milder nigh-time temperatures.
Heatwaves	Strong increase (summer)	High	Seven significant heatwaves (defined as 5+ days@>250C) have been recorded in Ireland over the past 30 years, resulting in approximately 300 excess deaths. By mid-century, a projected increase in summer maximum daily temperature of approximately 20C will likely intensify heatwaves, with maximum temperatures increasing and heatwave duration lengthening.
Dry Spells	Strong increase (summer)	Medium	There have been seven periods of insignificant rainfall in Ireland in the past 40 years. Of these, the events of 1976 and 1995 were the most severe, averaging 52 and 40 days in duration respectively across Irish rainfall stations. An approximate 20% decrease in summer precipitation in many areas is strongly indicated under a high emissions scenario. This decrease is likely to result in progressively longer periods without significant rainfall, posing potentially severe challenges to water sensitive sectors and regions.
Extreme Rainfall	Strong increase (winter)	Low	Heavy precipitation days (in which more than 20mm of rainfalls) are likely to increase in frequency in winter. By the 2050s an increase in the number of heavy precipitation days of around 20% above the level of 1981-2000 is projected under both low- medium and high emissions scenarios. This may have serious consequences for flood risk in sensitive catchments.
Flooding	Moderate increase (winter)	Low	An Irish Reference Network of hydrometric stations has been established to assess signals of climate charge in

<sup>19</sup> Local Authority Adaptation Strategy Development Guideline, EPA 2016

			Irish hydrology. This network has detected an increasing trend in high river flows since 2000. Projections of future flows are beset by uncertainty at the catchment scale, but a broad signal of wetter winters and drier summers is evident across a number of independent studies.
Wind Speed	Minor increase (winter)	Medium	Observed wind speed over Ireland has not changed significantly in recent times, but it is anticipated that the distribution of wind will alter slightly in future, with winters marginally windier and summers marginally less so. Though the average wind speed is anticipated to change in only a minor way over the coming decades, the frequency of extreme windstorms is expected to increase due to alternations in the origin and track of tropical cyclones.

### 12.5.2 Local Context

The closest weather station to the application site and are considered representative of conditions experienced at the application site is that at Dublin airport, which is located approximately 10km to north-east of the application site.

The moderating influence of the Atlantic Ocean is felt throughout Ireland. The annual mean temperature for different areas in Ireland varies between mountainous regions, lowlands and the coast. Mean daily maximum temperatures are typically between 8.1°C to 19.5°C and mean daily minimum temperatures are typically between 2.3°C to 11.7°C for the area surrounding Dublin Airport.

**Table 12.8 Dublin Airport 1981-2010 Temperature Averages**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Daily Max		8.1	8.3	10.2	12.1	14.8	17.6	19.5	19.2	17	13.6	10.3	8.3	13.3
Mean Daily Min		2.4	2.3	3.4	4.6	6.9	9.6	11.7	11.5	9.8	7.3	4.5	2.8	6.4
Mean Temperature		5.3	5.3	6.8	8.3	10.9	13.6	15.6	15.3	13.4	10.5	7.4	5.6	9.8

The east of Ireland, which is sheltered from Atlantic frontal systems, is sunnier than the west. The sunniest months are May and June. The mean daily duration recording of sunshine for the area around Casement Aerodrome is 3.9 hours. December is the dullest month, with 1.7 hours of mean daily duration. May is the sunniest month, with 6.2 hours of mean daily duration, explained largely by its long days and finer weather.

For the period 1981-2010, mean monthly total for year rate of precipitation was 758 mm / year at Dublin Airport, with winter months receiving the heaviest amounts, refer to Table 12-9.

**Table 12.9 Average Precipitation Dublin Airport (mm) 1981-2010**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Total	62.6	48.8	52.7	54.1	59.5	66.7	56.2	73.3	59.5	79	72.9	72.7	758
Greatest Daily Total	27.1	28.1	35.8	30.4	42.1	73.9	39.2	72.2	40.6	53.2	62.8	42.4	73.9

Results from the synoptic meteorological station at Dublin Airport over a ten-year period indicate that the predominant wind direction is from the south-western quadrant. Moderate to high-speed winds (>2 m/s) occur for approximately 87.7% of the time. A windrose for the wind data recorded at Dublin Airport is presented in Figure 12-1.

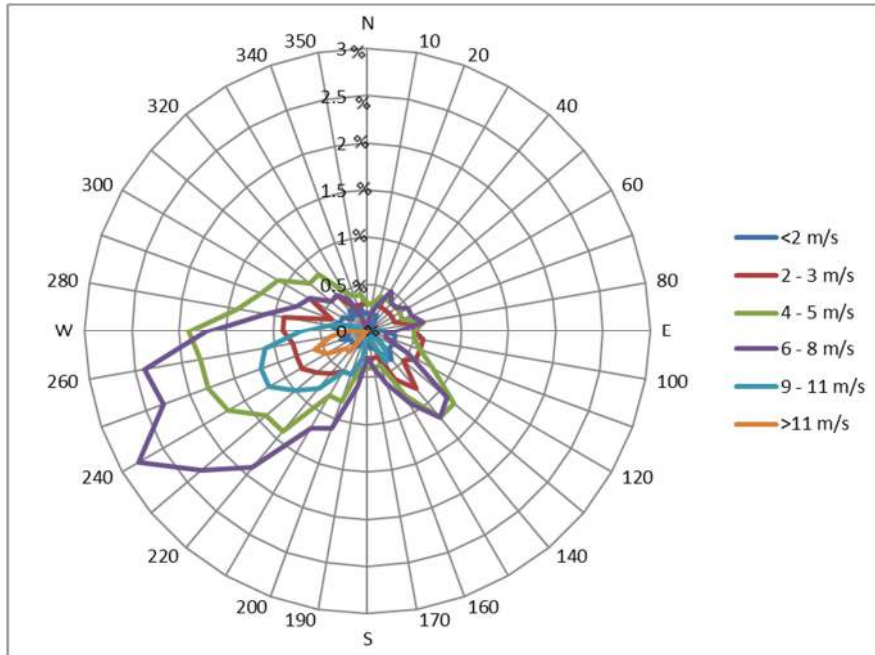


Figure 12.1 Windrose for Dublin Airport

## 12.6 Potential Impact of the Proposed Project

### 12.6.1 Development Vulnerability

The aim of the vulnerability assessment is to identify the relevant climate hazards for the project at the foreseen location.

#### 12.6.1.1 Do Nothing Scenario

At present, the environment within the study area is farmland with surrounded by local road with traffic, the land is used as grassland to graze animals with very low vulnerability to climate change. The vulnerability would be related to land use and required rainfall for farming activities.

#### 12.6.1.2 Construction Phase

The likelihood analysis of the proposed development during construction phase to climate hazards is presented in Table 12-10.

The proposed development during construction phase has been assessed to be moderately affected by extreme rainfall, flash (pluvial) flood, storms, and winds. The proposed development during construction phase would be unlikely affected to cold spells, landslides and snow. The proposed development during construction phase would not be affected by flood, heat, drought, wildlife fires and freeze –thaw damage. The proposed development will not be affected by rising sea level during construction phase.

Table 12.10 Analysis of Likelihood of Climate Hazards during construction phase.

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Rare		√	√	√	√				√	√
Unlikely							√	√		
Moderate	√					√				
Likely										
Almost certain										

Table 12-11 shows the climate hazard impact analysis of the proposed development construction phase. It was assessed that climate hazards will have major impacts on health and safety, the environment and financial areas, moderate impacts on asset damage and engineering, operational, social and reputation areas.

**Table 12.11 Climate Hazard Impact Analysis**

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational			√		
Safety and Health				√	
Environment				√	
Social			√		
Financial				√	

Table 12-12 below assesses the sensitivity of the project construction phase to climate hazard. It was assessed that site assets, energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms and winds; water inputs will be highly sensitive to droughts. On site assets will be medium sensitive to cold spells and snow and freeze – thaw damage. Transport links will be medium sensitive to cold spells and snow.

**Table 12.12 Sensitivity of Project during construction phase to Climate Hazards**

	Extreme rainfall, flash flood	Flood	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
On site assets	High	Low	Low	Low	Low	High	Low	Medium	Medium	Low
Inputs - Water	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs - Energy	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	Low	High	Low	Medium	Low	Low

In Table 12-13, the exposure of the project construction phase to current climate hazards was assessed. In the current climate, as the construction activities will be carried out short term, the exposure of the project extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium.

**Table 12.13 Exposure of the Project during construction phase to Climate Hazards without Mitigation**

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze –thaw damage	Rising sea levels
Current Climate	Medium	Low	Low	Low	Low	Medium	Low	Low	Low	Low

Table 12-14 shows the vulnerability analysis of the project during construction phase to climate hazards; it combines the sensitivity and the exposure analysis. The project was assessed to be most sensitive to extreme rainfall, flash flood, storms, and winds.



**Table 12.14 Vulnerability Analysis of Project to Climate Hazards**

Sensitivity	Exposure (current & future climate)		
	Low	Medium	High
Low	Rising sea levels, Flood, Landslides, Freeze –thaw damage, Drought, Heat, Wildlife Fires		
Medium		Cold Spells and Snow	
High			Extreme Rainfall, Flash Flood, Storms and Winds

Based on the development vulnerability assessment, measures to improve the resilience of the project during construction phase to extreme rainfall, flash (pluvial) flood, storms, and winds are required.

### 12.6.1.3 Operational Phase

Detailed development vulnerability assessment for the proposed project is presented below.

The likelihood analysis of the proposed development to climate hazards is presented in Table 12-15.

The proposed development has been assessed to be almost certainly affected by extreme rainfall, flash (pluvial) flood, storms, and winds and heat. The proposed development would be likely affected by drought. The proposed development would be unlikely affected to cold spells, landslides and snow. The proposed development would not be affected by flood, wildlife fires and freeze –thaw damage. The proposed development will not be affected by rising sea level.

**Table 12.15 Analysis of Likelihood of Climate Hazards**

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Rare		√			√				√	√
Unlikely							√	√		
Moderate										
Likely				√						
Almost certain	√		√			√				

Table 12-16 shows the climate hazard impact analysis of the proposed development. It was assessed that climate hazards will have major impacts on health and safety, the environment, moderate impact social areas.

**Table 12.16 Climate Hazard Impact Analysis**

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Safety and Health				√	
Environment				√	
Social			√		
Financial				√	

Table 12-17 below assesses the sensitivity of the project to climate hazard. It was assessed that the project energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms and winds; water inputs will be highly sensitive to droughts. Transport links will be medium sensitive to cold spells and snow.

**Table 12.17 Sensitivity of Project to Climate Hazards**

	Extreme rainfall, flash flood	Flood	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Inputs - Water	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs - Energy	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	Low	High	Low	Medium	Low	Low

In Table 12-18, the exposure of the project to climate hazards was assessed. In the current climate, the exposure of the project extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium. The project was assessed to have high exposure to rainfall, flash flood, storms, winds and heat in future.

**Table 12.18 Name of Table Exposure of the Development to Climate Hazards without Mitigation**

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze –thaw damage	Rising sea levels
Current Climate	Medium	Low	Low	Low	Low	Medium	Low	Low	Low	Low
Future Climate	High	Low	High	Low	Low	High	Low	Low	Low	Low

Table 12-19 Shows the vulnerability analysis of the project to climate hazards; it combines the sensitivity and the exposure analysis. The project was assessed to be most sensitive to extreme rainfall, flash flood, storms, winds and heat.

**Table 12.19 Vulnerability Analysis of Project to Climate Hazards**

Sensitivity	Exposure (current & future climate)		
	Low	Medium	High
Low	Rising sea levels, Flood, Landslides, Freeze –thaw damage, Wildlife Fires		
Medium		Cold Spells and Snow Drought	
High			Extreme Rainfall, Flash Flood, Storms and Winds Heat

Based on the development vulnerability assessment, measures to improve the resilience of the project to extreme rainfall, flash (pluvial) flood, storms, and winds heat are required.

### 12.6.2 Greenhouse Gas Emissions

The impact of the Proposed Development on greenhouse gases and climate change are addressed in Technical Appendix 12.1. A summary of the Appendix 12.1 report is presented below.

The GHGs from construction of the Proposed Development are estimated to be 63,691tCO<sub>2</sub>e (excluding Phase 1a, namely 2 no. access roads, SuDS infrastructure, pumping station, Railway station access plaza).

To contextualise the level of significance, emissions are compared to the current Irish carbon budgets. Emissions from the construction of the Proposed Development contribute considerably less than 1% of

the current published carbon budgets which extent to 2036. The magnitude of impact during construction is therefore considered low. The significance of effects is considered as 'minor adverse'.

The net GHGs (including all GHG avoidance deductions) from operating the Proposed Development over its 60-year life are estimated to be 419,036 tCO<sub>2</sub>e (representing a worst-case scenario assuming no decarbonization of the countries electricity supply).

GHGs from the operation of the Proposed Development will contribute considerably less than 1% of any of the existing ROI carbon budgets. The Proposed Development can be defined as low magnitude of impact and representing a 'minor adverse' effect.

## **12.7 Mitigation Measures**

Following completion of the frozen design a detailed impact assessment of the proposed development is to be undertaken and, where required, appropriate mitigation measures determined. Any residual impacts associated with the proposed development will also be detailed in the EIAR. Preliminary mitigation measures being taken into account as part of the design process are detailed in Table 12.20.

### **12.7.1 Project Adaptation against Expected Climate Change Effects**

In the context of climate change, measures to increase the adaptive capacity of the proposed development and disaster risk reduction strategies can be developed with a view to reducing vulnerability and increasing the resilience of the planned development. Significant incidents related to the climate change that affect operation of the proposed strategic housing development should be recorded for future analysis.

Based on a development vulnerability assessment measures to improve the resilience of the project to extreme rainfall, flash flood, storms, and winds are required. Table 12-20 details specific mitigation measures being incorporated into the design process for the proposed development relating to climate change adaptation.

**Table 12.20 Mitigation Measures Related to Climate Change Adaptation**

Main concerns related to:	Proposed alternatives or mitigation measures
Construction phase	
Extreme Rainfall, Flash Flood	Mitigation measure will consider changes / flexibility in construction / operations that allow for rising water levels and groundwater levels based on the masterplan design.
	Mitigation measure will consider design of adequate surface water drainage during construction phase based on the masterplan design.
Risk Reduction Mechanism	Mitigation measure will consider secure insurance for damage of assets / site incidents based on the masterplan design.
Storms and Winds	Mitigation measure will ensure construction activities can withstand increases in high winds and storms based on the masterplan design.
	Mitigation measure will ensure the choice of equipment is weather efficient based on the masterplan design.
Other concerns based on the design	In this section the mitigation measures will be considered on the design in the masterplan layout.
Operational phase	
Extreme Rainfall, Flash Flood	Mitigation measure will consider changes / flexibility in construction / operations that allow for rising water levels and groundwater levels based on the masterplan design.
	Mitigation measure will consider design of provide adequate surface water drainage during construction phase based on the masterplan design.
Storms and Winds	Mitigation measure will ensure design can withstand increases in high winds and storms based on the masterplan design.
Heat	Mitigation measure will ensure building design for ventilation and cooling based on the masterplan design.
	Mitigation measure will ensure design of outdoor spaces to reduce urban heat island effect based on the masterplan design.
Drought	Mitigation measure will ensure design for droughts emergency based on the masterplan design.
Other concerns based on the design	In this section the mitigation measures will be considered on the design in the masterplan layout.

### 12.7.2 Future Reduction of GHG Emissions

The construction and occupation of any new development at the scale proposed will inevitably result in increased Greenhouse Gas Emissions. Whilst current technologies and construction techniques can deliver properties that are effective carbon sinks when associated with environmentally friendly lifestyles, it is not currently possible to deliver such properties in a commercially viable way at the scales required to meet current housing demands.

However, the construction of new build properties provides the greatest opportunity for the reduction of energy demand as it is considerably easier, cheaper and more effective to build in energy reduction strategies than it is to retro-fit them to existing housing stock. The proposed development will adopt a 'fabric first' approach to the reduction of energy demand, seeking to reduce energy demand through the materials, development design and layout, and the mechanical and electrical specification.

In addition to the buildings themselves, the proposed development is also being designed to be efficient and sustainable at a masterplan landscape scale. This level of large-scale planning results in significant benefits for sustainability as the use of land, infrastructure and transport links can be planned to a greater degree, at the community scale, and the development overall has a greater weight with regards

to the creation of new public transport links etc. which would not be feasible for a smaller, independent development.

In particular, the development layout has been designed to reduce reliance on private travel by motorcar for the future residents. A local centre has been incorporated to provide the services most used by residents on a regular basis, including a primary school (with secondary education facilities 150m to the north of the application site), units designed to provide a range of shops/cafes, play areas, and access to open green space. This will be served by a network of dedicated car-free pedestrian and cycle paths assisting in the reduction of CO<sub>2</sub> emissions arising from transport by providing a safe and pleasant alternative to private vehicle use.

Greenhouse gas emissions from transport will further be reduced by the location of the existing Hansfield railway station on the northern boundary of the application site. Direct pedestrian access to the station will be possible from the application site, with all residential properties being located within approximately 850m of the station via safe dedicated pedestrian routes, and the majority lying within approximately 500m. Hansfield Station gives direct access to Dublin and a range of other major employment centres.

Specific approaches and mitigation to greenhouse gas emissions to be employed within the development are described further below.

#### 12.7.2.1 Energy Demand Reduction

As described above, the construction of new build properties provides the greatest opportunity for the reduction of energy demand as it is considerably easier, cheaper and more effective to build in energy reduction strategies than it is to retro-fit them to existing housing stock. The proposed development would adopt a 'fabric first' approach to the reduction of energy demand, seeking to reduce energy demand through the materials, development design and layout, and the mechanical and electrical specification.

At the macro-scale the development seeks to reduce energy demand by incorporating the dwellings into blocks and terraces where possible, as this has notable benefits for energy reduction:

Combining the dwellings into blocks, rather than having numerous smaller individual properties, enables the buildings to take advantage of better surface area to volume ratios. Larger buildings with multiple residences have less surface area for a given internal volume/floor area and as heat loss through the building envelope is one of the key sources of wasted energy for residential developments, reducing the proportional area through which energy can dissipate can significantly increase the energy efficiency of the building and dwellings within. Larger buildings typically also have a greater thermal mass, this makes them slower to overheat in summer and slower to cool down in winter, as the building fabric can store more thermal energy. In turn this results in less energy being expended to cool the buildings in summer and warm them in winter.

The orientation of the buildings has been carefully designed to balance the risk of over-heating through thermal gain, whilst still seeking energy efficiencies available from positioning habitable rooms on south-facing aspects. This is particularly important with respect to the larger buildings where whilst the size of the buildings has benefits for energy efficiency, as described above, this can result in a greater risk of large buildings overheating in the sun, particularly as they frequently have a proportionally larger glazed surface area than smaller dwellings. By orienting the apartment buildings along a north/south alignment wherever possible, and presenting the majority of the windows to the east and west, the risk of over-heating through solar gain is minimised, and with it the energy demand for cooling is also consequently minimised.

Each dwelling will be constructed with high levels of insulation, air tightness and fabric energy efficiency and high quality double glazed uPVC window systems will be provided to all openings, manufactured and installed by manufacturers with a U-value to comply with TGD Part L 2011 or subsequent improved standards.

Air leakage will be limited in the building fabric by sealing all external door and window frames, and service penetrations to walls, floors, joists and ceilings will be sealed both internally and externally with proprietary sealing products such as mastic sealants, expanding foam and approved tape. It would be proposed to conduct pressure testing in compliance with Part L 2011. As a minimum, the thermal resistivity of the walls will be in compliance with TGD Part L 2011. The roofs will be similarly thermally insulated and compliant with TGD Part L 2011 as a minimum standard.

Space and hot water heating methods have not yet been confirmed but will be specified by the mechanical and electrical engineer to achieve at least a minimum efficiency to comply with TGD Part L



of the Building Regulations. It is proposed that the systems shall be provided with automatic time and zone control for space heating, to minimise energy wastage resulting from heating being on when not required or heating zones of the dwelling unnecessarily. All hot water cylinders will be insulated with a minimum of 50mm factory applied PU foam and likewise connected to time control systems.

Once the dwellings are occupied, their energy demand is partially a function of the habits of the occupants. However, measures will be taken to encourage energy efficient living:

- All lighting installed within the development will be highly efficient, being fitted with lamps which must have a luminous efficiency greater than 40 lumens per circuit-watt and a total output greater than 400 lamp lumens.
- It is proposed to fit Energy Display Devices to the electricity supply of each dwelling. These will display (amongst other information): current mains energy consumption, current emissions, the current tariff and the current cost of the energy bill. This will encourage occupants to minimise wastage and improve energy efficiency.
- Information on the EU Energy Efficiency Labelling Scheme would be provided to each dwelling, educating occupants about the benefits of efficient white goods (washing machines, tumble driers, dishwashers etc.) and encouraging their purchase. Additionally, each dwelling will be provided with a secure drying space (internal or external) for drying laundry without the requirement of a tumble drier. Internal drying spaces will be adequately ventilated to prevent damp related issues. The ability to dry washing without recourse to electric machinery can significantly reduce non-regulated energy demands.
- Motor vehicle movement throughout the development is minimised, being limited to short spurs from the perimeter road giving access to the residential buildings. The development has been designed to be pleasant and easily traversable on foot and by cycle, with car-free pedestrian and cycle routes throughout, which are green and safe, being overlooked by adjacent properties. The development will have a pedestrianised, green and leafy character that encourages walking and cycling over transport by car.
- The proposed development has excellent public transport links, with the positioning of the railway station on the northern boundary and accessible by safe walking and cycling routes. It is proposed to investigate the extension of bus routes into the residential development areas once occupation of the properties reaches the critical weight required to support the services, reducing the distance to the nearest bus stops (currently 600m to the north of the boundary on Ongar Road). Combining the excellent access to public transport with the pedestrian and cyclist focussed design, the requirement for private vehicle transport will be minimised.
- Where private transport is required, the development will have excellent access to the M3 via the L302.

## 12.8 Residual Impacts

Prior to the completion of detailed development design plans and the associated architectural, mechanical and electrical specifications it is not possible to provide an estimate for the volume greenhouse gases anticipated to be produced by the development. These calculations would be derived as the required technical information for each phase becomes available.

Demand for homes will continue to grow, and with construction comes an increase in greenhouse gas emissions. The proposed development would inevitably result in an increase of greenhouse gas emissions over the greenfield rate of the currently undeveloped site, and this will add to the cumulative impact of the greenhouse gases emitted by the existing and consented future development within the locality. As the impacts of greenhouse gas emission are felt on a global scale, it is of negligible benefit to relocate development (whereas, for example, noise or air quality impacts may be ameliorated by locating a development elsewhere), and instead efforts must be made to tackle emissions in-situ.

The proposed development will result in a permanent negative impact with respect to the inevitable increase in greenhouse gas emissions. Prior to the completion of detailed development design plans and the associated architectural, mechanical and electrical specifications it is not possible to provide an estimate for the volume greenhouse gases anticipated to be produced by the development, and therefore the significance of this impact cannot currently be calculated. These calculations would be derived as the required technical information for each phase becomes available.

However, whilst the development will result in increased greenhouse gas emissions, due to the enhanced construction methods, energy specification and master planning design features, the

greenhouse gas emissions per bedspace associated with the proposed development will be considerably lower than that of the existing older housing stock in the region. Therefore, the average greenhouse gas emissions per head of population will be reduced within the region. As existing housing stock is redeveloped in the future, new technologies are brought online, and the electricity grid is decarbonized, the situation will further improve.

### 12.8.1 Project Adaptation against Expected Climate Change Effects

A set of indicators shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This can be carried out by the property management company or resident association. This process shall include regular feedback and/or updates from the implementation efforts.

### 12.8.2 Future GHG Emissions

Future greenhouse gas emissions from the proposed development are anticipated to steadily decline over time as advances in the decarbonisation of the national electricity supply are progressed, and reduced emission vehicle technology (such as electric vehicles) become more widely adopted.

The EPA 2018 Greenhouse Gas Emissions Projections report anticipates that greenhouse gas emissions from energy generation will decline between 21% and 40% dependent on the implementation of various policies. This will have a direct impact with regard to reducing the emissions from the development.

## 12.9 References

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Barnhill LAP

Fingal Development Plan 2017-2023



# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 13

### Cultural Heritage

# Volume II

Environmental Impact Assessment Report



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## Chapter 13 Cultural Heritage

### Contents

13	Cultural Heritage .....	13-2
13.1	Introduction .....	13-2
13.2	Characteristics of the Proposed Development .....	13-3
13.3	Methodology .....	13-3
13.3.1	Study Methodology – Desktop Survey .....	13-3
13.3.2	Site Inspection .....	13-4
13.3.3	Assessment Criteria .....	13-4
13.3.4	Difficulties Encountered .....	13-4
13.3.5	Consultations .....	13-4
13.4	Receiving Environment .....	13-4
13.4.1	Archaeological and historical background .....	13-4
13.4.2	Archaeological Monuments .....	13-6
13.5	Site survey and investigations .....	13-9
13.6	Review of cartographic sources .....	13-10
13.7	Townland Names .....	13-14
13.8	Identification of Likely Significant Impacts .....	13-14
13.8.1	Construction Phase .....	13-14
13.8.2	Operational Phase .....	13-14
13.8.3	Cumulative Impact .....	13-14
13.8.4	Worst Case Scenario .....	13-14
13.9	Do Nothing Scenario .....	13-14
13.10	Mitigation Measures .....	13-15
13.10.1	Construction Phase Mitigation .....	13-15
13.10.2	Operational Phase Mitigation .....	13-15
13.11	Residual Impact Assessment .....	13-15
13.12	Interactions Arising .....	13-15
13.13	Monitoring .....	13-15
13.14	References .....	13-15

### Tables

Table 13.1	Archaeological Features in the Vicinity of the Study Area .....	13-13-7
Table 13.2	Protected Structures and NIAH sites in the Vicinity of the Study Area .....	13-13-8

### Figures

Figure 13.1	Down Survey map for the area .....	13-13-10
Figure 13.2	Rocque Map for the area .....	13-13-11
Figure 13.3	First edition OS Map with the Site Marked .....	13-13-12
Figure 13.4	25-inch OS Map with the Site Marked .....	13-13-13
Figure 13.5	First edition OS Map with the Site Marked .....	13-13-13



## 13 Cultural Heritage

### 13.1 Introduction

This chapter assesses the impacts of the proposed development 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 (e.g. folklore, oral tradition and language).

The guidelines relevant to the assessment include *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 EPA (2017) *Draft Guidelines for Information to be Contained in EIAR* as well as guidelines for the assessment of impacts on the cultural heritage resource published by the International Council on Monuments and Sites (ICOMOS 2011).

The chapter has been prepared by John Purcell (of John Purcell Archaeology) and Eamonn Hunter and John Cronin (of John Cronin & Associates) and includes the results of desktop study and site inspections.

#### Professional Expertise

Individual	Company	Expertise	Qualifications
John Purcell BA	John Purcell Archaeological Consultancy	Archaeology  20 years' continuous postgraduate experience	B.A. Archaeology, University College Cork, 1997  Licence eligible archaeologist since 2002.
Eamonn Hunter BSc	John Cronin & Associates	Built Heritage  15 years' continuous postgraduate experience	B.Sc Heritage Conservation, Bournemouth University, 2005
John Cronin BA MRUP MUBC MIAI	John Cronin & Associates	Archaeology, Built Heritage and Cultural Heritage Assessment  29 years' continuous postgraduate experience	Master of Urban & Building Conservation, School of Architecture, University College Dublin, 1999  Diploma in Geology, University College Cork, 1996  Master of Regional & Urban Planning, University College Dublin, 1993  Bachelor of Arts (Honours) - Archaeology & Geography, University College Cork, 1991

The recorded and potential cultural heritage resource within the proposed development site and the surrounding its boundary were assessed in order to compile a complete cultural heritage context.

The desktop research for this chapter was compiled using resources such as the Records of Monuments and Places (RMP), the online Historic Environment Viewer (HEV) of the Archaeological Survey of Ireland (ASI), the National Inventory of Architectural Heritage (NIAH), Excavations Bulletin ([www.excavations.ie](http://www.excavations.ie)) and the Fingal County Development Plan. The research was also informed by a review of publicly-accessible historic maps and aerial photographs. An archaeological field inspection

was undertaken in 2019 by Mr John Purcell and a built heritage inspection was undertaken by Mr Eamonn Hunter of John Cronin & Associates in June 2022.

Archaeological testing undertaken by Mr John Purcell uncovered three pits at the north of the site (**Excavation Licence 19E0329**) -a summary of the archaeological testing programme is included in **Appendix 13.1**. There is potential for further associated features in the environs of these remains.

The site subject of the proposed residential development does not include (a) any recorded/designated archaeological monuments or (b) structures identified by the NIAH or Fingal County Council as being of architectural heritage significance.

## 13.2 Characteristics of the Proposed Development

The proposed development subject of this application relates to a proposed development site comprising 1,243 residential units and associated commercial, community and amenity facilities within the townlands of Barberstown, Barnhill, and Pass-if-you-can at Clonsilla, Dublin 15, Co. Fingal. The proposed development will be known as Barnhill Garden Village and encompasses one land parcel consisting of **11** contiguous pasture and tillage fields of approximately 30 hectares.

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

## 13.3 Methodology

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

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018)
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017)
- National Monuments Acts, 1930-2014
- The Planning and Development (Strategic Infrastructure) Bill, 2006
- Heritage Act 1995
- Frameworks and Principles for the protection of Archaeological Heritage 1999
- Architectural Heritage (National Inventory) and Historic Monuments and the Local Government (Planning and Development) Act 2000
- Architectural Heritage Protection – Guidelines for Planning Authorities (Government of Ireland 2004, 2011)

### 13.3.1 Study Methodology – Desktop Survey

This assessment consists of a paper survey identifying all recorded sites within the vicinity of the proposed development and a site inspection. The methodology has been conducted based on the guidelines from the Department of Housing, Local Government and Heritage.

The desktop survey undertaken consisted of a document and cartographic search utilising a number of sources including the following:

- Record of Monuments and Places (RMP); The RMP records known upstanding archaeological monuments, the original location of destroyed monuments and the location of possible sites identified through, documentary, cartographic, photographic research and field inspections.
- The RMP consists of a list, organised by county and subdivided by 6" map sheets showing the location of each site. The RMP data is compiled from the files of the Archaeological Survey.
- National Inventory of Architectural Heritage; The inventory of architectural heritage lists all post 1700 structures and buildings in the country. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.
- County Development Plans; The Development plan was consulted to ascertain if any structures listed in the Record of Protected Structures (RPS) and/or any Architectural Conservation Areas (ACAs). The Record of Protected Structures lists all protected structures and buildings in Dublin. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.
- Cartographic Sources; The following maps were examined: Down Survey, 1st edition Ordnance Survey Maps (1836-1846) and 2nd edition Ordnance Survey Maps (1908), Rocque Map and the Cassini Map.
- Literary Sources; Various published sources, including local and national journals, were consulted to establish a historical background for the proposed development site. Literary sources are a valuable means of completing the written record of an area and gaining insight into the history of the environs of the proposed development. Principal archaeological sources include: The Excavations Bulletin; Local

Journals; Published archaeological and architectural inventories; Peter Harbison, (1975). Guide to the National Monuments of Ireland; and O'Donovan's Ordnance Survey Letters.

- Previous archaeological assessments and excavations for the area were reviewed. This includes the 2009 geophysical survey and the subsequent archaeological testing undertaken in 2010.

### 13.3.2 Site Inspection

An archaeological field inspection was undertaken in 2019 by Mr John Purcell and a built heritage inspection was undertaken by Mr Eamonn Hunter of John Cronin & Associates in June 2022. Furthermore, a programme of archaeological testing was undertaken by Mr Purcell (Excavation Licence 19E0329). This uncovered three pits at the north of the site. There is potential for further associated features in the environs of these remains. **Appendix 13.1** contains a summary of the archaeological testing report that was prepared by Mr Purcell in 2019. **Appendix 13.2** contains a photographic record arising from a built heritage inspection undertaken by Mr Eamonn Hunter of John Cronin & Associates.

### 13.3.3 Assessment Criteria

The criteria used to assess the significance of the impact of a development on an archaeological, built, or cultural heritage site or feature are defined as follows:

- **Profound:** Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological, built, or cultural heritage site is completely and irreversibly destroyed by a proposed development.
- **Significant:** An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about the archaeological, built, or cultural heritage feature/site.
- **Moderate:** A moderate direct impact arises where a change to the site is proposed which though noticeable, is not such that the archaeological, built, or cultural heritage integrity of the site is compromised, and which is reversible.
- **Slight:** An impact which causes changes in the character of the environment which are not significant or profound and do not directly impact or affect an archaeological, built, or cultural heritage feature or site.
- **Imperceptible:** An impact capable of measurement but without noticeable consequences.

### 13.3.4 Difficulties Encountered

No difficulties that could hinder the cultural heritage assessment were encountered.

### 13.3.5 Consultations

Archaeological testing was undertaken under licence from the National Monuments Service at the Department of Housing, Local Government and Heritage.

## 13.4 Receiving Environment

The proposed development consists of 11 fields in use for agricultural purposes. These are in use for a mixture of pasture and tillage. These are delineated by mature hedgerows containing earthen ditch and banks. The centre of the site contains a large farmyard with a mixture of 19th and 20th century structures and a large open yard covered in concrete. Previously this was the location of Barnhill House which gave its name to the townland. To the south of the yard a more recent yard has been developed for storage.

The site is divided by Barberstown Lane North at the north and by a small tributary of the River Liffey at the south.

Ongar village is located to the north as is the Royal Canal and a rail line linking the area to Dublin City. The town of Leixlip is to the south and Luttrellstown Castle to the east. The site lies close to the county boundaries for Counties, Meath, Kildare and Dublin.

### 13.4.1 Archaeological and historical background

#### Prehistory

The Sites and Monuments Record (SMR) lists a number of prehistoric sites in the west of Co. Dublin. The earliest recorded archaeology in the area dates from the Neolithic (4,200-2,500BC). At this stage

communities became more stable with the introduction of agricultural practices. The more permanent settlement allowed communities to construct large ceremonial sites.

The bronze age marks the introduction of metal working to Ireland. This allowed for more efficient farming and hunting techniques. It also allowed for small industry and trade to take place between communities. Barrows are a common form of monument across in this area from this period. These are associated with the Bronze/Iron Age burial tradition (c. 2400 BC - AD 400) and are defined by an artificial mound of earth or earth and stone, normally constructed to contain or conceal burials. These sites vary in shape and scale and can be variously described as bowl- barrow, ditch barrow, embanked barrow, mound barrow, pond barrow, ring-barrow and stepped barrow. The incidence and frequency of these sites in the area attests to the extent of prehistoric settlement in this area from earliest times. Prehistoric settlements sites are generally not visible at ground level and can only be uncovered as a result of ground works.

### **Iron Age to Early Medieval Period**

In late Bronze Age Ireland, the use of the metal reached a high point with the production of high-quality decorated weapons, ornament and instruments, often discovered from hoards or ritual deposits. The Iron Age however is known as a 'dark age' in Irish prehistory. Iron objects are found rarely, but there is no evidence for the warrior culture of the rest of Europe, although the distinctive La Tené style of art with animal motifs and spirals was adopted. Political life in the Iron Age seems to have been defined by continually warring petty kingdoms vying for power. These kingdoms, run on an extended clan system, had their economy rooted in mixed farming and, in particular cattle. Settlement was typically centred on a focal hillfort.

Another more domestic site common to the Bronze Age is the fulachta fiadh. These are located along the edges of streams or in damp areas. They consist of a mound of charcoal enriched soil with fragmented burnt rocks. They usually are accompanied by a wooden or stone lined trough. These were used seasonally possibly for cooking or may have been used for recreational purposes.

Settlement in the Early Medieval Period is defined by the ringfort. The country was a patchwork of competing kingdoms during this period numbering up to 150. Ringforts were a farmstead surrounded by one or more earthen banks. These are the commonest monument across Co. Meath and have been frequently recorded in the area. These are generally located in areas with commanding views over the countryside to provide security.

The introduction of Christianity to Ireland in the fifth century had a profound impact on Gaelic society, not in the least in terms of land ownership and the development of churches and the development of a large number of religious houses. The earliest churches were constructed of wood and mortar and wattle walls. By the ninth and tenth centuries these were being replaced by stone structures. These settlements became very important around the country and became small towns.

The lands on which the town of Clonsilla was established has an ecclesiastical history dating back to 500 AD where the last surviving disciple of St. Patrick (Saint Machutus) founded 'the white church of Saint Machutus' in Coolmine early in the first half of the 6th century.

Several other early Christian Monuments are located in the vicinity of the site these include Holy Wells and Bullaun stones. Prior to the Anglo-Norman conquest, Clonsilla was part of the ancient kingdom of Brega.

### **Historic Period**

Following the Norman Conquest of the country a series of castles and boroughs were built across Co. Dublin, the area was intensively settled during this period. Geoffrey de Lutrel (c. 1158–1218), a courtier and confidant of King John, was granted lands in Dublin from King John. He established the township of Luttrellstown, which would remain the family's demesne for centuries. A series of medieval parish churches were also constructed across the area to service this growing population. A series of Anglo-Norman castles and towns were developed across the county.

Clonsilla was an established cloister of Coolmine church, however there appears to be little evidence supporting the construction of a church in Clonsilla until 1215/17. Prior to this the manor of Castleknock was granted to Hugh Tyrell in 1177 and included Castleknock, Clonsilla and Mulhuddart.



## Post Medieval Ireland

Seventeenth century Ireland saw massive upheaval a result of the Confederate wars, the Cromwellian response and the Wars of the two kings. It is estimated that up to a third of the population was wiped out because of famine, disease and war. Soldiers were given land as payment resulting in further upheaval of the local population and the establishment of large estates. These came to dominate the landscape from this period onwards. Religious intolerance in other parts of Europe resulted in the expulsion of the Huguenot from France which were welcomed by the English Crown into Ireland. The 15th and 16th centuries appeared to be a time of great uncertainty in Clonsilla and the greater area with warring Irish clans in constant dispute over the land.

## Industrial Period

The eighteenth century saw considerable industrial growth across the country. In Dublin a series of mills were constructed along the local river to facilitate the industrialisation of the country. The late 18<sup>th</sup> century saw the construction of the Royal Canal in Ongar. Pakenham Bridge, a single-arch limestone humpback road bridge, provided access over the canal and was erected c.1820. The Midland Great Western Railway line was established in 1845 and the Clonsilla to Navan line opened in 1862 (Shephard 1994). Between 1890 and 1910, Barnhill Bridge, a single arch stone bridge, was constructed and is located to the immediate west of the proposed development site.

The 1<sup>st</sup> edition 6-inch Ordnance survey map show a group of vernacular farmhouses in the townland of Barnhill to the north of enclosed fields. The 25-inch and Cassini 6-inch OS maps show a house labelled Barnhill to the southwest of enclosed ornamental gardens. Griffith's Valuation (1847-64) records Benjamin Clarke Esq. as owning the land and house of Barnhill, i.e. 'Land valued at 115l. 1s., raised to 166l. 13s.; and house valued at 5l. 14s., to be 36l.'. He married Mathilda Graham (d. 1912) in 1857 and had two children B.W. (d. 1909) and Mathilda (Maud) (d. 1888). He died September 30<sup>th</sup> 1865 (aged 47), and was buried in the Mount Jerome Cemetery, the main Protestant burial-ground in Dublin. His obituary suggested that he may have lived at Corbetstown House, Killucan, Co. Meath at one time.

The landlord was named as the 'heirs of Col. Thos White' and the lands were recorded as roughly 104 acres, valued at £160 per annum. Col. Thomas White (1783-1847) was the son of Luke White (c.1750-1824), who purchased Luttrelestown demesne from Henry Luttrell, the 2<sup>nd</sup> Earl of Carhampton (1743 – 1821) in 1800.

The 1901 Census records Daniel Murphy, Catholic, 55, living at the house, along with wife Ellen (32), son Joseph (5), niece Ellen Handy (16) and servant William Balfe (17). The house had five windows in front, 14 outbuildings and farm-steadings, the majority of which were one-roomed. They comprised two stables, one coach house, two cow houses, one calf house, one dairy, one piggery, one fowl house, one boiling houses, one barn, one turf house, one potato house and one store house. In 1911, 13 outbuildings are recorded.

### 13.4.2 Archaeological Monuments

The study area (i.e. the subject lands) **does not** include any monuments listed in the Record of Monuments and Places for County Dublin. A number of other monuments are recorded in the wider environs of the study area, the details of all these sites are listed below (all information taken from [www.archaeology.ie](http://www.archaeology.ie)). The nearest recorded archaeological site is a ring ditch (Monument DU013-047---) located approximately 350 metres to the south of the proposed development site.

**Table 13.1 Archaeological Features in the Vicinity of the Study Area**

Monument Numbers	Classification	Townland	Distance
DU013-047----	Ring ditch	Westmanstown	0.35km
DU013-017001-	Church	Clonsilla	1.7km
DU013-017002-	Graveyard	Clonsilla	1.7km
DU013-018----	Ringbarrow	Kellystown	1.46m
ME053-005----	Church	Jarrettstown	2.49km
DU013-019001-	Church	Coolmine	3.19km
DU013-019002-	Graveyard	Coolmine	3.19km

The following are extracts from the Archaeological Survey of Ireland files as they relate to the aforementioned monuments.

**DU013-017001-/ DU013-017002-**

**Class:** Church and Graveyard

**Townland:** CLONSILLA

**Scheduled for inclusion in the next revision of the RMP:** Yes

**Description:** St Mary's church is located on higher ground to the north of a circular graveyard. To rear of the church is the White mausoleum. Between it and the church a parish centre has been erected. The site was subject to archaeological excavation (Licence no. 04E0033) prior to the construction of a parish centre extending north from St Mary's church. A total of 32 burials were uncovered of which 30 were excavated, two being left under the crypt (built 1802) boundary wall. The majority of burials appeared to date from the 19th century to mid 20th century (Keith 2004). Graveyard is in use.

**DU013-018----**

**Class:** Barrow - ring-barrow

**Townland:** KELLYSTOWN

**Scheduled for inclusion in the next revision of the RMP:** Yes

**Description:** Situated beside the railway line at Greenmount in the paddock are three conjoined circular features, comprising external bank (av. dims. Wth 2.5m; H 0.6m), internal fosse (av. dims. Wth 2m; D 0.25m) and raised interiors (av. ext. diams. 11m). Test excavation (Licence no. 06E0348) was undertaken to determine the exact nature of three conjoined ringbarrows possible barrows. Testing on the east-west axis located a ditch along the interior of the bank of one of the three conjoined circular embanked features. Its presence strongly suggests that the feature is a type of barrow and, by inference, that the other two circular features belong to the same monument typology (Lynch 2006).

**DU013-019001-**

Church

**Townland:** COOLMINE (Castleknock By.)

**Scheduled for inclusion in the next revision of the RMP:** Yes

**Description:** There is a raised oval area (dims. L 50m E-W, Wth.30m) formerly within the grounds of Coolmine House. According to Healy there were human bones exposed on the site (1974, 21). Traditionally associated with St. Machtus and believed to be the site of the 'white chapel' which went out of existence about 1490 (Ronan 1940, 188). In the list of the churches of the dioceses c. AD 1275, the Crede Mihi, the church of 'Culmyn' is mentioned. It is also mentioned in the Taxation of 1292 and 1294.

Now contained within the Blanchardstown Millennium Park. The site was subject to geophysical survey (Licence no. 09R195) in advance of the proposed Metro West. Remains of enclosure ditches and possible pit type features associated with the Coolmine Church (DU013-019001-) and graveyard (DU013-019002-) were identified. A sub-circular enclosure (c.50m diam. NS) and further ditch remains extending to the south and east were associated with possible burnt/fired features which may indicate hearths or kilns (Nicholls 2009, 14). A dog run was instated directly abutting the eastern limit of the oval area without archaeological supervision.

**DU013-019002-**

Class: Graveyard

**Townland:** COOLMINE (Castleknock By.)

**Scheduled for inclusion in the next revision of the RMP:** Yes

**Description:** A raised oval area (dims. L 50m E-W, Wth.30m) formerly in the grounds of Coolmine House, now Blanchardstown Millennium Park. According to Healy there were human bones exposed on the site (1974, 21). There are no grave markers. Associated with the 'white chapel' which went out of existence about 1490 (Ronan 1940, 188 (DU013-019001-)).

The site was subject to geophysical survey (Licence no. 09R195) in advance of the proposed Metro West. Remains of enclosure ditches and possible pit type features associated with the Coolmine Church (DU013-019001-) and graveyard (DU013-019002-) were identified. A sub-circular enclosure (c.50m diam. NS) and further ditch remains extending to the south and east were associated with possible burnt/fired features which may indicate hearths or kilns (Nicholls 2009, 14).

**ME053-005----**

**Class:** Church

**Townland:** JARRETSTOWN

**Scheduled for inclusion in the next revision of the RMP:** Yes

**Description:** Situated on a low rise in a level landscape. A chapel at Jarretstown in the large parish of Dunboyne does not occur in the ecclesiastical lists, but it is amongst nine chapels recorded by Cogan (1862-70, vol. 1, 190), who says that this church had been destroyed and the stones removed, including those around the graveyard, although burial continued until c. 1820. John O'Donovan, writing in 1836, records that the reilicín was still being used for the burial of unbaptized infants (Herity 1001, 114). The graveyard is marked as an irregularly-shaped area described as an 'Old Burying Ground' on the 1836 ed. of the OS 6" map.

The foundations of a small building (int. dims 7m NE-SW; 3.5m NW-SE) survive within a small sub-triangular enclosure (dims c. 20m NW-SE; c. 20m NE-SW) defined by low earthen banks or a plough scarp.

**DU013-047----**

**Class:** Ring-ditch

**Townland:** WESTMANSTOWN (Newcastle By., Lucan ED)

**Scheduled for inclusion in the next revision of the RMP:** Yes

**Description:** Situated in flat terrain, in a field directly adjacent to the Royal Canal, with views restricted to adjacent fields, is a very regular ring-ditch (overall diam. 9m). The circular interior is enclosed by a continuous ring-ditch and probably represents a levelled barrow.

The density of sites within the area shows high archaeological potential. Evidence of additional archaeological remains may be preserved below the ground level as has been evidenced through geophysical surveys of the area. Early house site and burials may be detected through archaeological excavation within the farm yard. Ground disturbance may uncover buried archaeological sites, features or artefacts.

## Architectural Heritage

The proposed development site **does not** include any protected structures included on the Record of Protected Structures of Fingal County Council. However, a number of structures in the wider vicinity of the proposed development site are protected structures and these have also been recorded by the National Inventory of Architectural Heritage (NIAH). The nearest protected structure to the subject site is Pakenham Bridge (Fingal RPS Ref. 0711). See **Table 13.2** for further details on these NIAH sites.

**Table 13.2 Protected Structures and NIAH sites in the Vicinity of the Study Area**

RPS No.	NIAH Registration No.	Class/Name	Townland	Distance from subject site
0712	11352001	Barnhill Bridge	Barnhill	150m north
0711	11352002	Pakenham Bridge	Barberstown (CA By.)	19m east
0717	11360001	Westmanstown Park House	Westmanstown (NE By.)	428m southwest

The following are descriptions taken from the NIAH's website (www.buildingsofireland.ie):

**Barnhill Bridge (NIAH Reg. 11352001)**

*Description: Single-arch stone bridge over river, c.1900. Cut limestone walls and voussoirs.*

**Packenham Bridge (NIAH Reg. 11352002)**

*Description: Single-arch limestone humpback road bridge over Royal Canal, c.1820, with ashlar parapet walls.*

**Westmanstown Park House (NIAH Reg. 11360001)**

*Description: Detached three-bay two-storey over basement house, c.1830, with central Ionic doorcase approached by granite steps. Two-bay single-storey extension to south-west gable, c.1980. Rubble stone coach house and outbuildings to north-west. ROOF: Concealed by granite parapet; U-plan double pitched roof; asbestos cement tiles; terracotta ridge tiles; rendered chimneys; slates to bow; slate roof to hipped canted bay; cast-iron rainwater goods. WALLS: Rough cast render; nap rendered plinth. OPENINGS: Square headed; patent reveals; granite cills; Wyatt windows to ground and first floors; timber replacement casements to basements; timber casements to rear; ionic stone doorcase with leaded side lights; original panelled doors.*

## 13.5 Site survey and investigations

Two programmes of site inspections were undertaken, first in 2019 and again in 2022.

The site consists of a series of 11 interlinking fields. The site is level and is in use as a pasture, at the centre of the site lies a farmyard with associated buildings. The fields are separated by mature native Irish hedgerow. A third class road splits the study area in two. A train line forms the eastern boundary of the site and the Clonee to Lucan Road the R149 forms the northern boundary. No features indicative of archaeological remains were visible during the site visits

Archaeological testing was taken over the entire study area in 2019 under licence to the NMS (see **Appendix 13.1**). These trenches were excavated by a mechanical excavator and covered the entire site. A number of archaeological features were revealed in Test Trenches 5 and 6. They consisted of three pits. They all contained burning, the pits were sub circular in plan with steep slopes. They were similar in dimensions (0.6-0.8m in diameter) and were sub circular in shape. They were approximately 0.3m in depth with a steep break of slope.

In June 2022, a dedicated built heritage inspection was undertaken of the subject lands. The survey was focused on relict farm buildings and the site of the former Barnhill House. An annotated photographic record from the inspection is included in **Appendix 13.2**.

The farmyard's disused entrance way retains square masonry gate piers with pyramidal granite caps, replacement wrought-iron gate and curved masonry wing wall on west (right) side. The gateway leads to a vernacular (formerly residential) farmyard which predates the mid- to late-nineteenth-century Barnhill House, which is no longer extant. The farmyard (see **Appendix 13.2: Plates 13.2.1 – 13.2.17**) includes a derelict dwelling that is much modified and devoid of architectural heritage significance. The associated farm buildings are all in very poor condition and are much altered; none of the surviving buildings are of particular architectural heritage significance or value.

To the south of the subject lands, a former recessed field entrance was identified however no historic fabric of any note remains extant at this location (see **Appendix 13.2; Plates 13.2.24 & 25**).

It was noted that a number of existing hedgerows and stands of trees (see **Appendix 13.2; Plates 13.2.19 – 22**) that are evident on historical mapping are to be retained.

In all, nothing of particular architectural heritage significance was identified during the dedicated built heritage inspection.

## 13.6 Review of cartographic sources

An examination of the cartographic evidence for the area of proposed development was undertaken. Maps dating from the 17th century were examined (Figures 13.1 – 5).

### The Down Survey

The Down Survey was a cadastral survey of Ireland, carried out by English scientist, William Petty, in 1655 and 1656. This was undertaken to reward Cromwellian soldiers with confiscated lands. The maps show townland and barony boundaries. Though the map does not show detail, prominent structures and features are marked on the maps. The Down survey shows the area for development as open agricultural land.

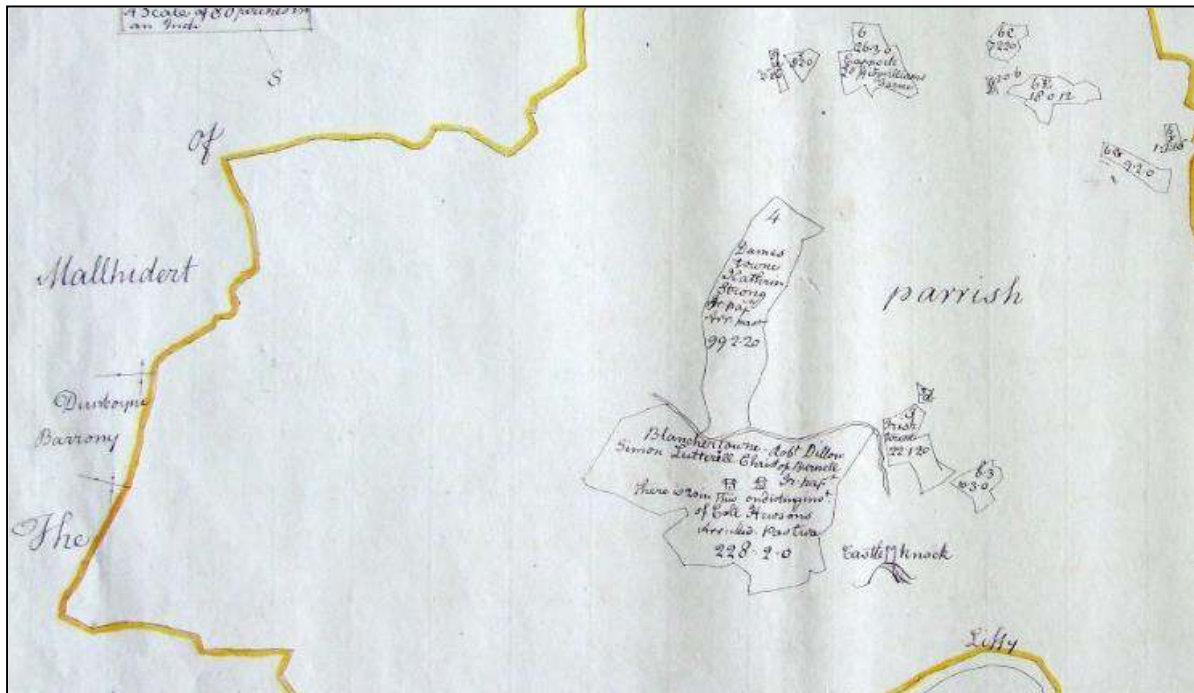


Figure 13.1 Down Survey map for the area

### The Rocque Map

The Rocque map of Co. Dublin was surveyed in the 1750's. This shows a more detailed layout of the city and country and includes field boundaries. The map for the study area shows the site in agricultural fields. It also shows the road network for the area.





Figure 13.2 Rocque Map for the area

**First edition of the 6-inch Ordnance Survey (OS) maps (surveyed c.1840)**

The 6" first edition OS map demonstrates the lands within the proposed development site as undeveloped pasture with a farm complex located to the northern boundary of the proposed development site. There is no indication of a residential building associated with this complex. The lands within the proposed development site are rectilinear fields which are bordered by regularly planted deciduous trees. Packenham Bridge is located and labelled to the east of the proposed development site. A bridge and weir are indicated to the direct west of the subject site along a tributary of the River Liffey which runs west to east across the southern portion of the site. The eastern portion of the site is bounded by regularly planted mixed woodland which appears to demarcate a defining wall feature. In this edition, the railway line has not yet been erected.





Figure 13.3 First edition OS Map with the Site Marked

#### The 25-inch OS map (surveyed c.1900)

By the 25" historic OS map edition, there have been several changes to the lands both within and surrounding the proposed development site. The previous farmyard buildings have been developed and are labelled as 'Barnhill'. There are now four outbuildings within the same location as was depicted on the first edition OS map with a further residential dwelling erected to its south, this is Barnhill house. A rectilinear field with regularly planted deciduous trees is also depicted which are also marked to the east of the house. This could represent a type of 'formal garden'. A further building has been erected to the east of Barnhill house which likely acted as an ancillary farmyard feature. The proposed development site continues to be enclosed on its eastern portion by regularly planted mixed woodland and an accompanying wall. The bridge which is located to the immediate west of the proposed development site is now named as 'Barnhill Bridge' and there are several buildings erected to its north. The Midland Great Western Railway has been erected in this edition and is labelled as 'M.G.W.R.' to the north of the proposed development site. With its erection, the townlands surrounding the proposed development site have developed in comparison to their depiction in the first edition 6" OS map.

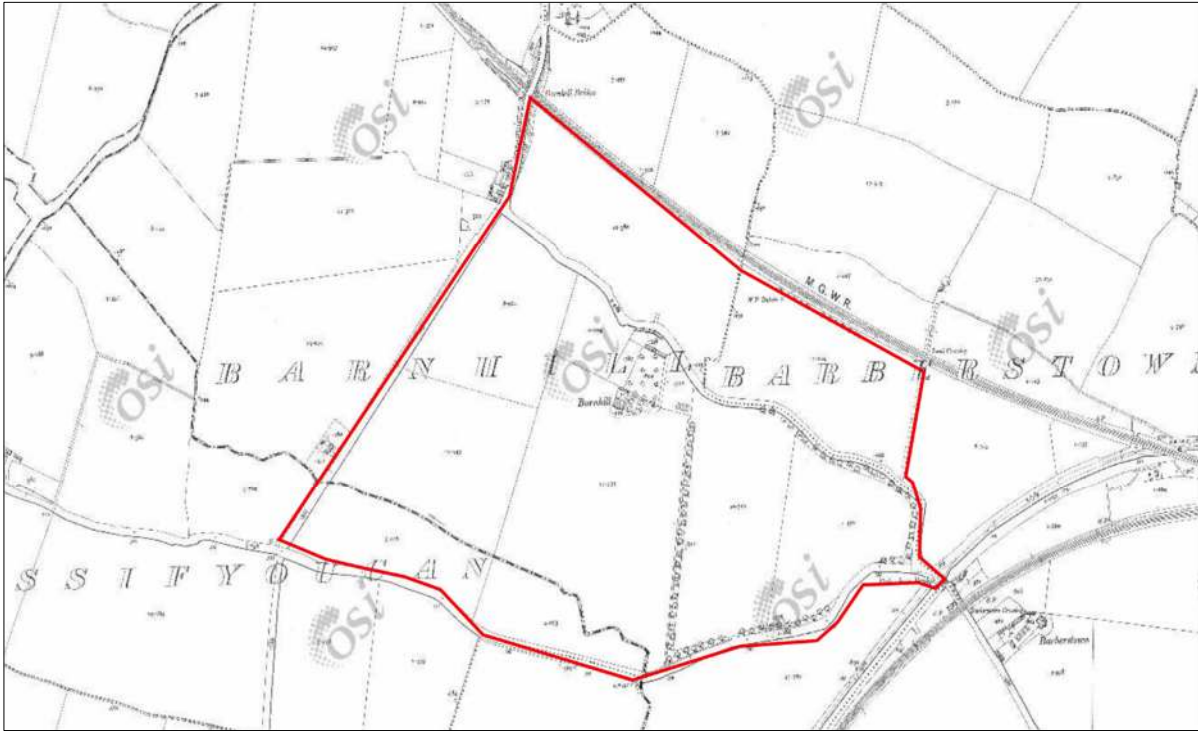


Figure 13.4 25-inch OS Map with the Site Marked

**The 6" Cassini OS map (surveyed 1940s)**

The 6" Cassini map edition shows few changes to the lands within the proposed development site. The farmyard outbuildings for Barnhill House have been further developed.

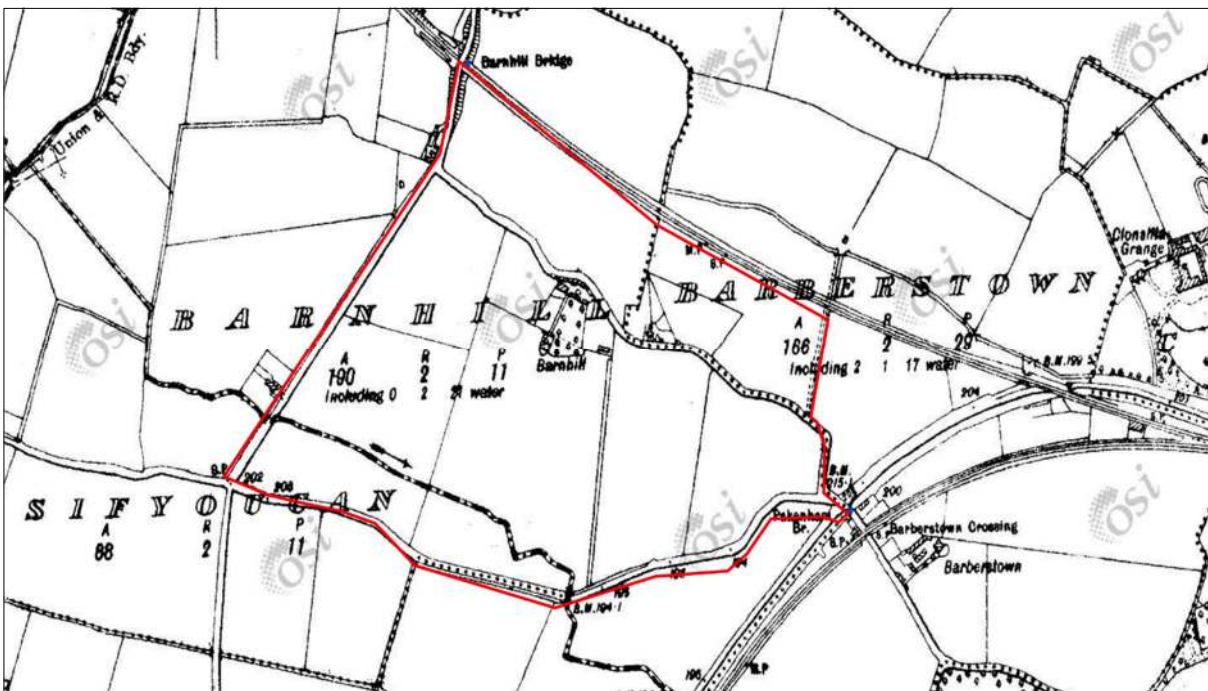


Figure 13.5 First edition OS Map with the Site Marked

## 13.7 Townland Names

Townland names can give an indication of previous activities at the area that have since been forgotten and leave no trace at ground level. They can contain information on previous ownership, land use or archaeological monuments such as churches or settlement sites. Townland boundaries may reflect ancient territories, and some have associated archaeological features. The townland Barnhill relates to the house located in the centre of the townland. Barberstown, first mentioned in a 1455 inquisition in which Christopher Luttrell was seized in the lands of Timolin and Barberstown (D'Alton 1838, 574). Pass-if-you-can was first cited in Hearth Money Rolls in 1664. Westmanstown was first referred to as Wespellistown in 1560.

## 13.8 Identification of Likely Significant Impacts

### 13.8.1 Construction Phase

A number of pits was identified during archaeological testing. These are located in the northern section of the site. In the absence of the mitigation measures described below, the impact on the pits and any associated features as a result of the construction phase would be profound. Should the development proceed as planned (and in the absence of mitigation measures), the impact on the identified archaeological features will be **permanent, negative and direct**; however, the significance of the impact will be **slight**.

The proposed development will not impact on any protected structures or NIAH-identified structures.

The development requires the demolition of a complex of farm buildings within the northern portion of the subject site. The farmyard consists of a former dwelling/cottage and two outbuildings; there is a roadside boundary and gateway. None of the extant buildings (see **Appendix 13.2**) are of architectural heritage significance and all are in a derelict and abandoned state.

The development will also involve the removal of the site of the former house (see **Plate 13.2.18** within **Appendix 13.2**): No upstanding remains of the former house or features of immediate attendant grounds exist.

Should the development proceed as planned (and in the absence of mitigation measures), the impact on the identified historical built features within the site will be **permanent, negative and direct**; however, the significance of the impact will be **slight**.

### 13.8.2 Operational Phase

There are no potential impacts on archaeological, architectural, or cultural heritage are expected as a result of the operational phase of the proposed development, as it is anticipated that issues of interest will have been resolved prior to or during the construction phase.

### 13.8.3 Cumulative Impact

For the purpose of the chapter, the developments within the Hansfield SDZ were reviewed to determine the potential for cumulative impact on cultural heritage resources. It is concluded that the proposed development will not act in combination with permitted development to result in any significant cumulative impacts.

### 13.8.4 Worst Case Scenario

Should the appropriate mitigation strategies not be implemented, and development proceed the archaeological landscape would be damaged.

## 13.9 Do Nothing Scenario

A 'Do Nothing Scenario' will see the continued preservation of recorded and potential cultural heritage features within the study area.

## 13.10 Mitigation Measures

### 13.10.1 Construction Phase Mitigation

A comprehensive programme of licenced archaeological investigations was undertaken as part of a previous assessment of the subject site and a number of archaeological features (including three pits) were identified within the proposed development site. The features are located with an area proposed for development at the site. **If development proceeds in this area, preservation by record, or archaeological excavation of these features, will be required.** These works will be undertaken under licence to the National Monuments Service at the Department of Housing, Local Government and Heritage. Notwithstanding the proposed programme of archaeological excavation of the previously-identified features, a suitably qualified archaeological consultant shall be appointed to undertake **licenced archaeological monitoring of all topsoil excavation during the construction phase** of the development. This will be under license from the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage. Should additional archaeological or architectural heritage features, deposits or structures be uncovered during archaeological monitoring the NMS should be contacted and a strategy for the resolution of these features be formulated. The appointed archaeologist will be required to obtain a licence from the NMS this will involve preparing an archaeological method statement to outline the required works.

Prior to commencement of development, it is recommended that a **building record of the derelict farm complex** be prepared by a suitably qualified historic building specialist. This record would be based on background research, annotated photographic record, and drawn survey of the upstanding features within the farmyard identified within **Appendix 13.2** of this EIAR. The resultant survey records will be submitted to Fingal County Council for archival purposes. Notwithstanding the lack of architectural heritage significance of the derelict buildings and other farmyard features, the proposed building record will allow for the full documenting of this much-altered complex of late-eighteenth or early-nineteenth-century origin.

### 13.10.2 Operational Phase Mitigation

Any archaeology features uncovered during the course of site development works will be resolved **before** the operational stage of the proposed development. There are no anticipated archaeological, built, or cultural heritage mitigation measures required during the operational phase.

## 13.11 Residual Impact Assessment

Anticipated archaeological impacts will be resolved prior to or during the construction stage of the proposed development through the application of the proposed mitigation measures. If the mitigation measures are implemented (i.e. archaeological excavation, archaeological monitoring and production of building records) then the residual impact on cultural heritage will be negligible.

## 13.12 Interactions Arising

There are no predicted interactions between the different environmental factors.

## 13.13 Monitoring

There are a number of obligatory processes to be undertaken as part of licence applications to the NMS for archaeological excavation and archaeological monitoring and these will allow for monitoring of the successful implementation of mitigation measures. In addition, the building records to be produced prior to commencement of development will be submitted to Fingal County Council for compliance purposes.

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Website of the National Monuments Service, accessible at: [www.archaeology.ie](http://www.archaeology.ie)





# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 14

### Population and Human Health

# Volume II

Environmental Impact Assessment Report



**AECOM**

**ALANNA**  
HOMES

**Alcove Ireland**  
Four Limited

**Clifton Scannell Emerson**  
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ARCHAEOLOGY | CONSERVATION | HERITAGE | PLANNING

**SLR**

July 2022

**McCutcheon Halley**  
CHARTERED PLANNING CONSULTANTS



## Chapter 14 Population and Human Health

### Contents

14	Population and Human Health .....	14-3
14.1	Introduction .....	14-3
14.2	Methodology .....	14-3
14.2.1	Data Sources .....	14-3
14.2.2	Study Area .....	14-4
14.2.3	Difficulties Encountered in Compiling Information .....	14-5
14.3	Baseline Scenario Receiving Environment .....	14-5
14.3.1	Site Location .....	14-5
14.3.2	Demography .....	14-5
14.3.3	Population .....	14-5
14.3.4	Household Size .....	14-6
14.3.5	Household Type .....	14-7
14.3.6	Travel Trends and Commuter Flows .....	14-8
14.3.7	Household Tenure .....	14-10
14.3.8	Employment .....	14-11
14.3.9	Health .....	14-12
14.4	Land Use and Local Amenity .....	14-12
14.4.1	Education Facilities .....	14-13
14.4.2	Childcare .....	14-15
14.4.3	Health Care .....	14-17
14.4.4	Social and Communities Centres/Libraries/Faith Groups .....	14-17
14.4.5	Sports and Recreation .....	14-17
14.4.6	Arts and Culture .....	14-18
14.4.7	Retail Provision .....	14-18
14.4.8	Other Services .....	14-18
14.5	Identification of Principal Potential Receptors .....	14-19
14.5.1	Do Nothing Scenario .....	14-19
14.6	Impact Assessment .....	14-19
14.6.1	Construction Phase .....	14-19
14.6.2	Operational Phase .....	14-23
14.7	Risk of Major Accidents and Disasters .....	14-31
14.8	Cumulative Impacts .....	14-31
14.8.1	Construction Phase .....	14-32
14.8.2	Operational Phase .....	14-32
14.9	Mitigation Measures .....	14-33
14.10	Residual Impact Assessment .....	14-34
14.11	Monitoring .....	14-34
14.12	Worst Case Scenario .....	14-34
14.13	References .....	14-34

## Tables

Table 14.1 Population Change (Source Census 2011 & 2016).....	14-6
Table 14.2 Household Size (Source Census 2011 & 2016) .....	14-7
Table 14.3 Household Type (Source Census 2016).....	14-8
Table 14.4 Travel Trends (Source Census 2016).....	14-9
Table 14.5 Household Tenure (Source Census 2016) .....	14-11
Table 14.6 Vacancy Levels (Source Census 2016).....	14-11
Table 14.7 General Health (Source Census 2016).....	14-12
Table 14.8 Primary Schools Located Within or Near to Study Area .....	14-14
Table 14.9 Post-Primary Schools located Within or Near to the Study Area.....	14-15
Table 14.10 Childcare Facilities Within or Near to the Study Area .....	14-16
Table 14.11 Construction Phasing.....	14-21
Table 14.12 Estimated Units Completed by Year End .....	14-21
Table 14.13 Potential Significant Impacts on Population and Human Health during the Construction Phase. 14-22	
Table 14.14 Estimate of Employment in Commercial and Medical Uses .....	14-25
Table 14.15 Estimate of Childcare and School Demands .....	14-26
Table 14.16 Estimated Childcare & School Demand by Year at Av. Household Size of 2.8 .....	14-27
Table 14.17 Estimated Childcare & School Demand by Year at Av. Household Size of 3.0 .....	14-27
Table 14.18 Potential Impacts & Effects on Population and Human Health during the Operational Phase 14-30	
Table 14.19 Review of Planning Applications With Permission Granted For Development Within Hansfield SDZ 2015 - 2022.....	14-31
Table 14.20 Cumulative Post Primary Population .....	14-32

## Figures

Figure 14.1 Location Of Proposed Development (Approximate Outline In Red) And Study Area Comprising Of The Blanchardstown/Blakestown ED And Adjacent Lucan North ED In Relation To Dublin City Centre. ....	14-4
Figure 14.2 Illustrates The High Age Dependency In Both EDs, Indicating A Young Population Cohort, i.e. Families With Children. ....	14-8
Figure 14.3 Commuter Flows in EIAR study area and beyond (Source Census 2016) .....	14-10
Figure 14.4 Barnhill Site and Study Area in Wider Context.....	14-13
Figure 14.5 Primary Schools Within 3 km Radius From Subject Site (Indicatively Outlined in Red) ..	14-14
Figure 14.6 Post-Primary Schools Located Within or Near to Study Area .....	14-15
Figure 14.7 Childcare Facilities Within or Near to the Study Area.....	14-17



# 14 Population and Human Health

## 14.1 Introduction

This chapter was prepared by Michelle O'Shea (BA Honours in Geography, MPlan Masters in Town Planning & Sustainable Development) of McCutcheon Halley Planning Consultants. The purpose of this chapter is to assess the potential impacts of the proposed development on population and human health.

The proposed development has the potential to impact upon population and human health as it will generate employment and housing areas, amenities, extended infrastructure utilisation and associated emissions. This can give rise to issues such as traffic, visual amenities, built and natural heritage, air quality, noise emissions and climate change. A number of these issues are assessed under other chapters within the EIAR including Landscape and Visual Impact (Chapter 4); Traffic and Transport (Chapter 5); Land (Chapter 7); Water (Chapter 8); Noise and Vibration (Chapter 10); Air Quality (Chapter 11); and Climate Change (Chapter 12). Chapter 14 considers those impacts which are not already addressed by the remaining chapters of the EIAR.

## 14.2 Methodology

### 14.2.1 Data Sources

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).
- Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency (EPA), draft August 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- Advice Notes for Preparing Environmental Impact Statements (Environmental Protection Agency (EPA), draft September 2015);

The EPA advice notes (EPA, 2015) state that the following issues may be examined when assessing the potential impacts and effects of a proposed development under the topic of 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 activity and landuse?
- 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?"

The assessment of the likely significant effects of the proposed development on population and human health was conducted by reviewing the current socio-economic environment of the environs of Barnhill, Clonsilla, Dublin 15. This included 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.

A Social Infrastructure Report which includes an audit of existing social and community facilities and assessment of the future needs of the proposed development has been undertaken by McCutcheon Halley Planning Consultants and accompanies the planning application. A Childcare Demand Report and School Demand Report have also been undertaken by McCutcheon Halley Planning Consultants. The findings of these reports inform this chapter.

Additional information was gathered with respect to the demographic and employment characteristics of the resident population within the study area/relevant catchment area sourced from 2011 and 2016 Census data. The data included information on population, structure, age profile and household size, travel patterns and employment.

This chapter is also informed by the Wind Micro-Climate Report, prepared by AECOM, which accompanies the planning application.

Publications and other data sources consulted include:

- National Planning Framework 2040 (NPF)
- National Planning Framework – Implementation Road Map 2018
- Eastern and Midlands Regional Spatial and Economic Strategy (RSES) 2019
- Fingal County Development Plan (FDP) 2017- 2023
- Draft Fingal County Development Plan (draft FDP) 2023 - 2029
- Barnhill Local Area Plan (LAP) 2019
- Central Statistics Office (CSO) website [www.cso.ie](http://www.cso.ie);
- Department of Education and Sciences (DES) website [www.education.ie](http://www.education.ie).
- TUSLA Childcare website <https://maps.pobal.ie/WebApps/TuslaInspectionReports/index.html>.
- Pobal website <https://maps.pobal.ie/WebApps/GeoprofilingReports/index.html>.

Consultations with statutory bodies were also undertaken to ensure that environmental issues, including socio-economic, recreational and amenity issues, relating to the proposed development were also addressed. Further information on the consultation process and responses received have been provided in Chapter 1 Introduction of the EIAR.

#### 14.2.2 Study Area

The EIAR study area incorporates the red-line development boundary of the site and the immediate environs incorporating the Electoral Divisions<sup>1</sup> (“EDs”) of Blanchardstown/Blakestown and Lucan North (refer to Fig 14.1). Information was gathered with respect to the demographic and employment characteristics of the resident population within the relevant study area, sourced from the 2016 Census and the 2011 Census. The data included information on population, household size, type and tenure, employment, and health.

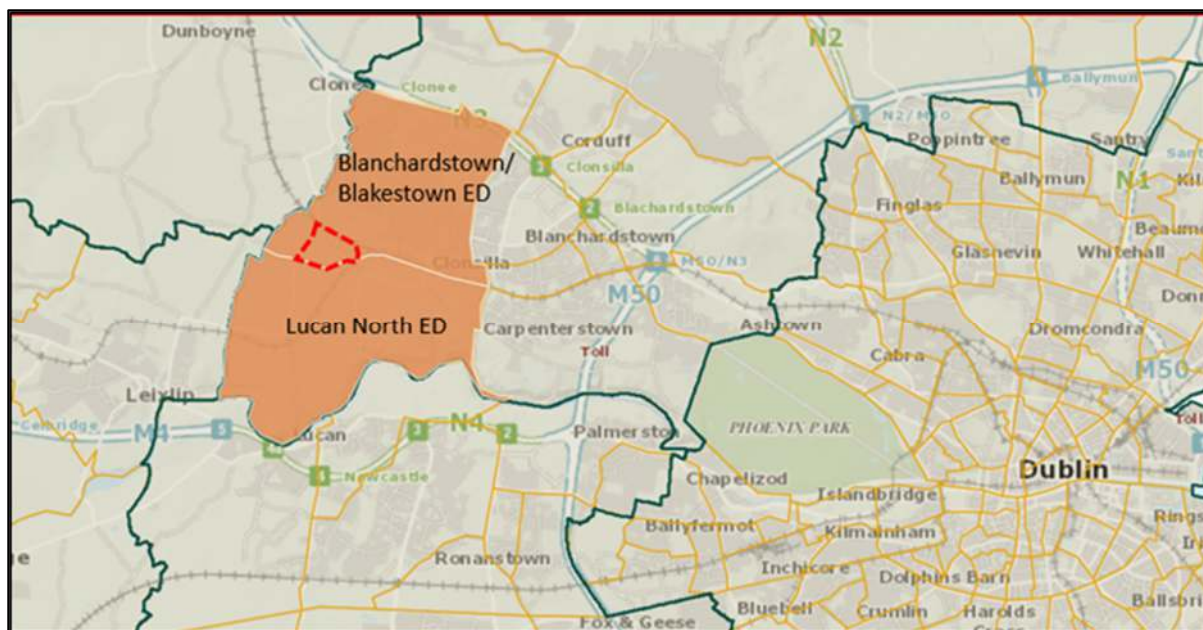


Figure 14.1 Location Of Proposed Development (Approximate Outline In Red) And Study Area Comprising Of The Blanchardstown/Blakestown ED And Adjacent Lucan North ED In Relation To Dublin City Centre.

<sup>1</sup> Electoral Divisions (EDs) are the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Census. There are 3,440 legally defined EDs in the Irish State. [www.cso.ie](http://www.cso.ie)



### 14.2.3 Difficulties Encountered in Compiling Information

The most recent small area statistics census data available is the 2016 Census. The census due to take place in 2021 was delayed due to the Covid-19 pandemic. This chapter was finalised prior to the release of preliminary results from the 2022 Census. The demographic information presented is therefore 6 years out of date. However, regard has been had in the analysis to general trends during the intercensal periods.

In the preparation of the Childcare and School Demand Reports, all local schools and childcare facilities were contacted to clarify their current enrolment and future capacity. The response rate from schools and childcare facilities was low, and statistics presented rely largely on information available from the Department of Education and Tusla datasets.

No other issues were encountered in accessing and compiling information for this Chapter of the EIAR.

## 14.3 Baseline Scenario Receiving Environment

### 14.3.1 Site Location

The application site is located in the townlands of Barberstown, Barnhill, and Passifyoucan, at Clonsilla, Dublin 15 and is situated approximately 3 km to the west of Blanchardstown Centre and approximately 12.4 km to O'Connell Street, Dublin. Further details of the site location and description are provided in Chapter 2.

### 14.3.2 Demography

Blanchardstown is designated as a Metropolitan Consolidation Town in the settlement hierarchy of the Fingal Development Plan 2017 (FDP 2017) and as a Consolidation Area for Dublin City and Suburbs in the draft Fingal County Development Plan 2023 -2029 (draft FDP). It is also designated as a Level 2 Major Town Centre in the retail hierarchy of the RSES. It is the largest commercial and residential centre within the Metropolitan Area of Fingal and will continue to be promoted as a key urban settlement within the County providing retail, social, cultural, leisure and administrative services catering for a population of circa 108,000 inhabitants.

The FDP 2017 states: *'The emphasis of this Plan is to continue to consolidate the existing zoned lands and to maximise the efficient use of existing and proposed infrastructure'*. This objective continues into the draft FDP where it is a specific policy (Policy CSP20) to *'consolidate the growth of Blanchardstown as set out in the Settlement Strategy for RSES by encouraging infill development and compact growth rather than greenfield development and by intensification at appropriately identified locations'*. The LAP will assist in delivering the strategic long-term growth of Blanchardstown.

The LAP emphasizes that the population of Fingal grew more than twice the growth rate of the State in the intercensal period 2011 to 2016. It notes that Fingal continues to have the youngest population; that the average number of persons per private household is higher than the national average; and that Fingal has a vacancy less than half that of the State. This is considered reflective of the number of young families in the area and the strong demand for housing.

### 14.3.3 Population

The subject site falls within the Blanchardstown-Blakestown Electoral Division (ED), which had a population of 38,894 in 2016. It is adjacent to the Lucan North ED, with a population of 1,436 persons (Census 2016). The data from the Census 2016 indicates that the total population for the Blanchardstown/Blakestown ED has increased by 7.3% (or 2,341 persons) since the previous census was undertaken in 2011. The population increase in Lucan North ED amounted to an increase of 5.7% (78 persons).

The population of Fingal County has grown by 7.4% (or 22,029 persons). The Blanchardstown/Blakestown ED can therefore be considered to be representative of the electoral districts or suburban areas within the administrative area of Fingal County Council. This rate of 7.3% is far more than the state and city level rates, at 3.6% and 4.9% respectively, as illustrated at Table 14.1. This demonstrates that the population of Fingal is rapidly increasing and highlights a strong demand for housing.

The Barnhill LAP envisages a total residential population of 3,500 for the LAP lands, based on the delivery of 900-1150 units. The FDP 2017 further identifies that the residential capacity for Blanchardstown up to the period 2023 is 11,757 residential units, 39,909 for the total metropolitan area of Fingal and 9,632 for the total hinterland of Fingal, equating to a total potential residential capacity of 49,541 for all of Fingal. The provision of 1,243 units as proposed in this development would meet 10.6% of the total housing demand for Blanchardstown set out in the FDP 2017.

**Table 14.1 Population Change (Source Census 2011 & 2016)**

<b>Area</b>	<b>Census 2011 Population</b>	<b>Census 2016 Population</b>	<b>% Population Change</b>
<b>Blanchardstown Blakestown ED</b>	36,057	38,894	7.3 %f
<b>Lucan North ED</b>	1,358	1,436	5.7%
<b>Fingal County Council Administrative Area</b>	273,991	296,020	7.4 %
<b>Dublin City</b>	527,612	554,554	4.9 %
<b>State</b>	4,588,252	4,761,865	3.6 %

The draft FDP was published in February 2022. The draft FDP has been prepared in the context of revised population figures provided by the EMRA RSES, which themselves were derived from the NPF Implementation Roadmap 2018. The draft FDP sets a revised housing demand for Blanchardstown of 5,742 to 2029. This represents a decrease of 51% in the target demand from the FDP 2017 figures. The draft FDP continues to identify Barnhill LAP as a key area in the delivery of housing during the lifetime of the forthcoming development plan.

#### 14.3.4 Household Size

As shown in Table 14.2, the 2016 Census recorded a total of 11,755 households in the Blanchardstown/Blakestown ED which housed 39,245 persons. This represented an average size of 3.3 persons per household. This is somewhat higher than the average size of 3 persons per household in Fingal County.

These figures are higher than the average household size for Dublin City and the State, at 2.5 and 2.75 respectively. The average household size at state level increased slightly from 2.7 in 2011 to 2.75 in 2016. This has been a similar trend for Dublin City and Fingal County where the average household size increased from 2.4 to 2.5 and 2.9 to 3.0 respectively. However, the Census data indicates that the average household size has increased from 3.1 to 3.3 persons per household for the Blanchardstown/Blakestown ED during the intercensal period. The rise in household size may be indicative of an influx of a larger number of starter households with young families into the area. It may also be indicative of a shortage of affordable housing supply in the area, constraining the formation of new households.

The Lucan North ED records an average household size of 3.6 persons in Census 2016 and is considered an outlier. Its low population number and rural nature do not reflect the prevalent characteristics of the Blanchardstown area north of the subject site, which will interconnect with the proposed development.

**Table 14.2 Household Size (Source Census 2011 & 2016)**

Area	Households 2011	2011 Theme 5 Private Households	Average Household Size 2011	Households 2016	2016 Theme 5 Private Households	Average Household Size 2016
<b>Blanchardstown Blakestown ED</b>	11,553	36,289	3.1	11,755	39,245	3.3
<b>Lucan North ED</b>	372	1,285	3.4	380	1,357	3.6
<b>Fingal County Council Administrative Area</b>	93,146	271,958	2.9	96,812	292,989	3.0
<b>Dublin City</b>	208,008	499,659	2.4	211,747	525,229	2.5
<b>State</b>	1,654,208	4,510,409	2.7	1,702,289	4,676,648	2.75

### 14.3.5 Household Type

The demographic breakdown of the age profile for Blanchardstown/Blakestown ED is provided at Table 14.3 and is sourced from the Census 2016 data. 22.5% of the population within the electoral district accounts for persons aged 19-34 and 40% account for persons aged 35-64. These figures would be similar to that of Fingal County and would broadly be representative of suburban areas across the County. A comparative analysis of the age cohorts 0-4, 5-12 and 13-18 would indicate that Blanchardstown/Blakestown ED has a higher rate of persons within these younger age brackets and is significantly higher than the state average. There is also a very low proportion of older people in the electoral district (3.5%), when compared to the state average of 13.4%. Furthermore, the average percentage of older persons for Fingal County is higher at 9.1%. Overall, these figures would be indicative of a population catchment comprising largely of a younger population and reflects Blanchardstown as a relatively new growth area, attractive to young households.

The Lucan North ED in contrast contains a more mature population and a higher percentage of persons aged 65+, however the high number of younger age cohorts also point to new families settling in this ED. Its small overall population number and more rural nature do not compare with the urban nature of the Blanchardstown/Blakestown ED and the potential population conformation of the subject site.

Table 14.3 Household Type (Source Census 2016)

Area	Age 0-4	Age 5-12	Age 13-18	Age 19-34	Age 35-64	Aged 65+	Total Population
State	331,515	548,693	371,588	990,618	1,881,884	637,567	4,761,865
As percentage of total population	7%	11.5%	7.8%	20.8%	39.5%	13.4%	N/A
Fingal County	24,899	39,349	22,892	63,345	118,500	27,035	296,020
As percentage of total population	8.4%	13.3%	7.7%	21.4%	40%	9.1%	N/A
Dublin City	30,683	42,603	31,884	171,064	205,965	72,355	554,554
As percentage of total population	5.5%	7.7%	5.7%	30.8%	37.1%	13%	N/A
Blanchardstown Blakestown ED	3,805	6,063	3,375	8,745	15,550	1,356	38,894
As percentage of total population	9.9%	15.6%	8.7%	22.5%	40%	3.5%	N/A

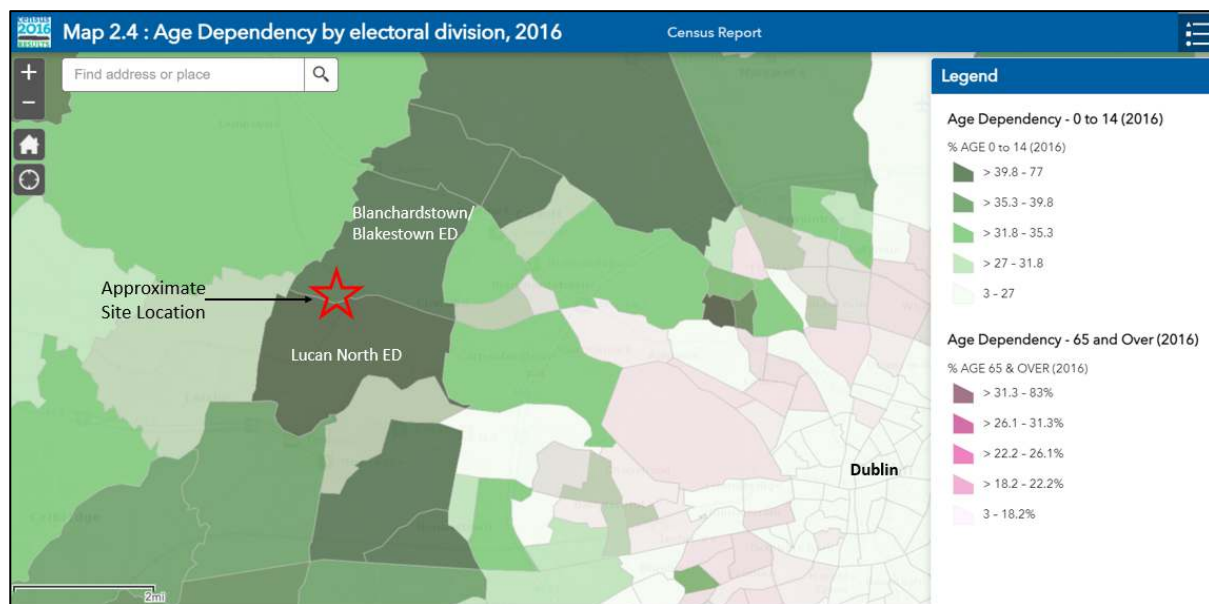


Figure 14.2 Illustrates The High Age Dependency In Both EDs, Indicating A Young Population Cohort, i.e. Families With Children.

### 14.3.6 Travel Trends and Commuter Flows

The Census Data for 2016 indicates that a significant proportion of the population (circa 50%) within the Blanchardstown/Blakestown ED have a commuting journey to work, school or college of less than half an hour. Approximately 20% have a commuting distance of 30-45 minutes. This would indicate that a significant percentage of the residential population work or attend school/college within the immediate area. It also suggests that there is a strong employment base in the local area (See Table 14.4)

In comparison, data from the Lucan North ED shows that approximately half the population (54%) also have a travel time of less than half an hour, however a much smaller percentage (15.7%) have a travel

time of under 15 minutes, indicating the overall longer journeys on account of the rural nature of the ED.

The Census 2016 findings, for the population aged 5 years and over, commuting to work, school, or college, indicate a higher level of active travel within Blanchardstown/Blakestown ED, than in Lucan North ED.

- Blanchardstown/Blakestown ED 20.2% travel to work, school, or college on foot or bicycle (4,780 on foot, 898 by bicycle from an overall no. of 28,147).
- In the Lucan North ED, 17.7% of the population travel to work, school, or college on foot or by bicycle (154 on foot, 28 by bicycle from an overall no. of 1,029).

The lower percentage of active travel means in the Lucan North ED is indicative of the more rural nature of the ED and the greater distances to work, school or college.

**Table 14.4 Travel Trends (Source Census 2016)**

<b>Journey Time taken to travel to work, school or college</b>	<b>Blanchardstown/Blakestown ED: Total Population Aged 5 years and over</b>		<b>Lucan North ED: Total Population Aged 5 years and over</b>	
<b>Under 15 mins</b>	7,189	25.8%	158	15.7%
<b>¼ Hour – under ½ hour</b>	7,075	25.4%	391	38.8%
<b>½ hour – under ¾ hour</b>	5,546	19.9%	206	20.5%
<b>¾ hour – under 1 hour</b>	2,325	8.3%	88	8.7%
<b>1 hour – under 1 ½ hours</b>	2,773	9.9%	109	10.8%
<b>1 ½ hours and over</b>	838	3%	20	2.0%
<b>Not stated</b>	2,152	7.7%	35	3.5%
<b>Total</b>	27,898	100%	1,007	100%

Census 2016 data shows that the Blanchardstown/Blakestown ED is characterised by high outward commuter flows, with adjacent EDs to the north and east, and additional areas of Dublin City Centre and its periphery identified with inward commuter flows, in line with the employment centres of Blanchardstown, the airport, Dublin Centre and others (See figure 14.3).

The Lucan North ED records an approximately similar outflow and inflow.

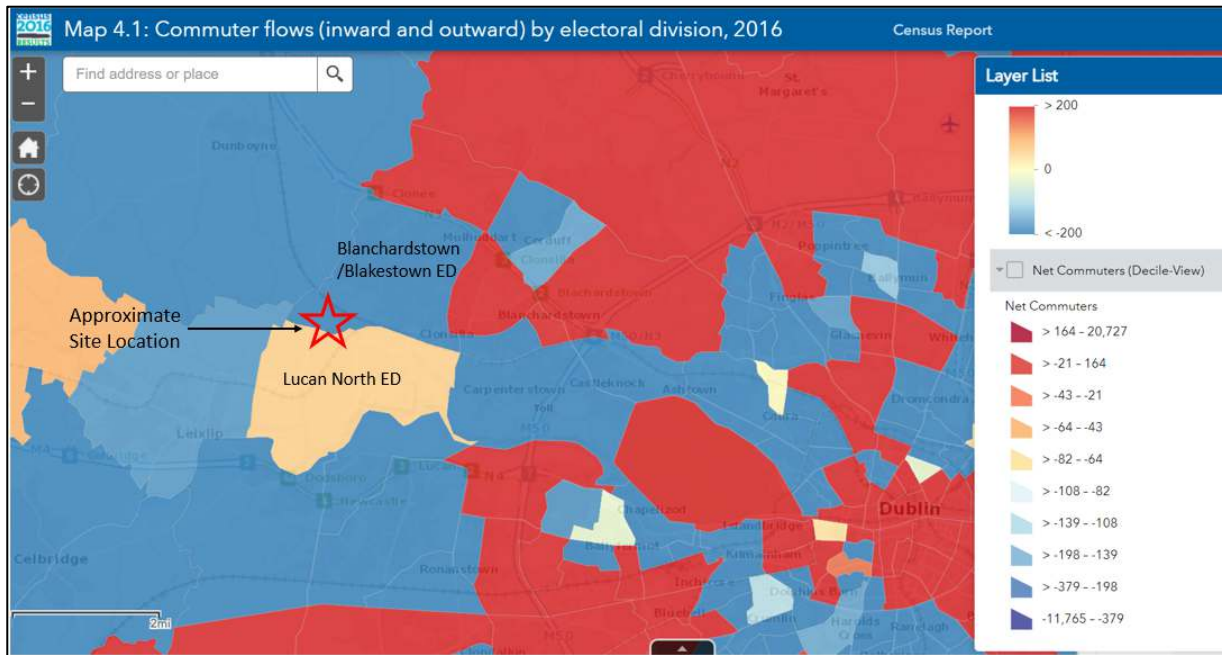


Figure 14.3 Commuter Flows in EIAR study area and beyond (Source Census 2016)

### 14.3.7 Household Tenure

The Census 2016 data as shown in table 14.5 demonstrates that the number of rented and owner-occupied households within the Blanchardstown/Blakestown Electoral District and Fingal County are generally consistent with the state average. 28% of the Electoral District population are in accommodation rented from a private landlord, local authority, or voluntary body; and 68.2% own their house (this figure includes persons with and without a mortgage).

The Lucan North ED has a high rate of approximately 83% of households which are Owner Occupied, while approximately 16% are in rented accommodation.

Dublin City has a higher percentage of rented accommodation (42.9%) and lower percentage of owner-occupied accommodation (67.7%).



**Table 14.5 Household Tenure (Source Census 2016)**

Area	Total Households	Rented Accommodation*	Owner Occupied**
State	1,697,665	469,671	1,147,552
As percentage of total population	100%	27.7%	67.6%
Fingal County	96,607	27,016	65,347
As percentage of total population	100%	28%	67.7%
Dublin City	211,591	90,793	105,273
As percentage of total population	100%	42.9%	49.6%
Blanchardstown Blakestown ED	11,752	3,287	8,016
As percentage of total population	100%	28%	68.2%
Lucan North ED	378	60	315
As percentage of total population	100%	15.9%	83.3%
State	1,697,665	469,671	1,147,552

\*This figure includes persons renting from Private Landlord, Local Authority, Voluntary Body

\*\*This figure includes persons with mortgage and no mortgage

Table 14.6 also demonstrates that the vacancy rate for Blanchardstown/Blakestown ED (3.3%) and Fingal County (4.7%) are significantly lower than the state average of 9.1%. This would suggest that there is a strong housing demand in Blanchardstown and constrained supply in the market.

The Lucan North ED records a vacancy rate of 5.6%. Due to its small population this percentage however does not provide for many additional dwellings.

**Table 14.6 Vacancy Levels (Source Census 2016)**

Area	Total Dwellings	Permanent	Vacant Dwellings	As Percentage of Total Permanent Dwellings
State	2,003,645		183,312	9.1%
Fingal County	104,851		4,944	4.7%
Dublin City	240,553		18,424	7.7%
Blanchardstown Blakestown ED	12,388		407	3.3%
Lucan North ED	413		23	5.6%

### 14.3.8 Employment

Persons within the 15–64-year age bracket are identified as the working age group in the population. Within the Blanchardstown/Blakestown ED Census 2016 data reveals that most of the population (67%) are within the working age cohort, while 11.18% of the male population and 12.8% of the female population is unemployed. This compares to an unemployment percentage of 3.78% for males and 4.49% for females in the North Lucan ED. The unemployment rate for Dublin City aligns approximately with the Blanchardstown/Blakestown ED figures, as in 2016, 12.56% of the male population and 10.86% of the female population were unemployed.

### 14.3.9 Health

The 2016 Census provides information on the perceived health of individuals, which can provide an indication of the health of the general population. Information on the health of the populations of the EDs of Blanchardstown/Blakestown and Lucan North is presented in Table 14.7. Data for the State, Dublin City and Fingal is provided for comparison.

**Table 14.7 General Health (Source Census 2016)**

General Health	State	Dublin City	Fingal County	Blanch/Blakes town ED	Lucan North ED
<b>Very good</b>	59.4%	55.6%	62.2%	62.1%	73.2%
<b>Good</b>	27.6%	27.2%	26.3%	27.3%	18.6%
<b>Fair</b>	8.0%	8.5%	6.2%	5.5%	5.5%
<b>Bad</b>	1.3%	1.7%	1.1%	0.9%	1.0%
<b>Very bad</b>	0.3%	0.4%	0.2%	0.2%	0.6%
<b>Not stated</b>	3.3%	6.7%	4.0%	4.1%	1.2%

In general, Blanchardstown/Blakestown ED and Fingal County show a higher percentage of people who have identified as having Very Good health in comparison to the State and Dublin City. The Blanchardstown/Blakestown ED also has the lowest percentage of people identified as having Bad or Very Bad Health out of the five areas examined. This corresponds with the younger age profile which is prevalent in Fingal County and the Blanchardstown/Blakestown ED in comparison to the State and Dublin City, particularly the lower percentage of those aged 65+.

Lucan North ED has an exceptionally high percentage of persons identifying with a Very Good health status. It also records a higher percentage in comparison to the other populations in regard to Very Bad health. The low population number and different locational characteristics of Lucan North are not reflective of the wider Blanchardstown area and therefore do not allow a comprehensive analysis.

## 14.4 Land Use and Local Amenity

The application site comprises predominantly of greenfield land used for agricultural purposes with a cluster of industrial buildings (originally a piggery) located in the northern section of the site. There are 7 residential dwellings to the north of Barberstown Lane North, which are not included within the application boundary. The study area concentrates on the adjacent land use, amenity provision and social infrastructure in a 1.5 km radius from the subject site as shown on Figure 14.4. The 500m radius is related to the 15-min neighbourhood concept and accessibility by active travel means. However, given the greenfield nature of the site, the extension of the study area to 1.5 km and further allows the capture of additional services within the existing built up area and provides a more comprehensive understanding of the overall area.



**Figure 14.4 Barnhill Site and Study Area in Wider Context**

The Hansfield strategic residential development scheme is located directly north of Barnhill and is under construction with a significant number of houses and associated services already delivered. The Hansfield railway station bounds the application site to the north. The proposed Ongar-Barnhill Road has been approved by the Planning Authority as part of a Part 8 application which will provide the opportunity to link the application site to the R149, improving accessibility and maximising public transport connectivity. Cycle and pedestrian connectivity will allow for active travel within the Barnhill site and will facilitate sustainable connectivity for adjoining residential areas.

The surrounding lands to the north of the site are predominantly residential in nature. Employment bases including the Dublin Enterprise Zone, Blanchardstown Centre, and the Coolmine Industrial area are accessible from the site. The site benefits from being located in proximity to a wide variety of strategic infrastructure services, commercial/retail services, and community/social facilities. There are several educational facilities in the area including primary schools, post primary and third level educational establishments.

**14.4.1 Education Facilities**

There are four primary schools within the immediate study area of 1.5km and a further 11 primary schools within a 3km radius, see Figure 14.5 and Table 14.8. The 2021/2022 enrolment of the 4 primary schools within the immediate study area is 2,288 and the enrolment of the other 11 schools is 5,202. The subject site sets aside land for a primary school. The Barnhill LAP suggests that there is a requirement for a 16-classroom school within the lands. The site that has been set-aside has capacity to accommodate a 16-classroom, or a 24-classroom school, depending on demand identified by the Department of Education.

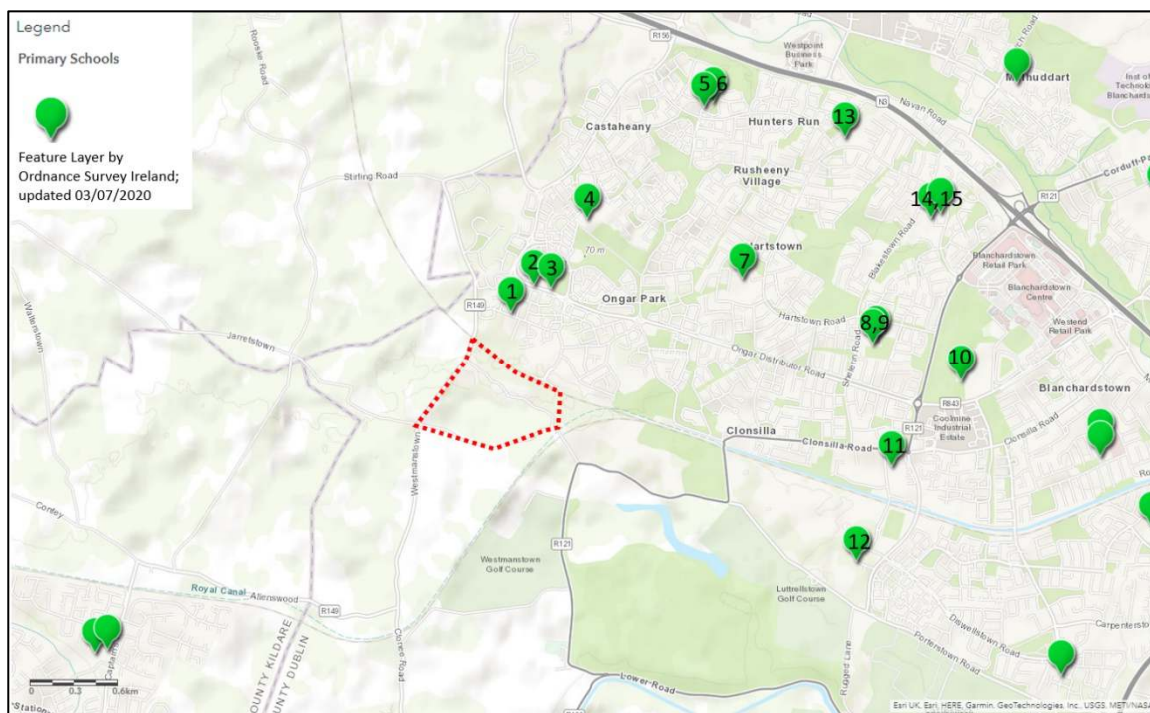


Figure 14.5 Primary Schools Within 3 km Radius From Subject Site (Indicatively Outlined in Red)

Table 14.8 Primary Schools Located Within or Near to Study Area

No.	Name	Distance from Site	Enrolment 2021/22
1	Hansfield Educate Together NS	0.5 km	611
2	Castaheany Educate Together National School	0.8 km	417
3	St Benedicts National School	0.8 km	628
4	Scoil Ghrainne	1.4 km	632
5	Mary Mother of Hope Junior NS	2.5 km	430
6	Mary Mother of Hope Senior NS	2.5 km	440
7	St Ciaran's NS	1.6 km	612
8	St Philip the Apostle Junior NS	2.5 km	231
9	St Philip Senior NS	2.5 km	285
10	SN Oilibheir	3.0 km	263
11	St Mochta's NS	2.6 km	860
12	Scoil Choilm Community National School	2.5 km	828
13	Sacred Heart National School	2.7 km	775
14	Scoil Nais Mhuire Sois	3.0 km	218
15	Scoil Mhuire Sin	3.0 km	260
<b>Total enrolment</b>			<b>7,490</b>

There are two post primary schools in the immediate study area of 1.5km and a further 4 post primary schools located within a 3km radius, see figure 14.6 and table 14.9. The 2021/2022 enrolment of the 2 post primary schools within the immediate study area is 1,823 and the enrolment of the other 4 post primary schools is 3,481. The School Demand Report identified a capacity of 74 post primary spaces in the academic year 2021 / 2022 and a projected capacity of 232 spaces during the academic year of



2022 / 2023. The Department of Education<sup>2</sup> has projected that enrolment in second level schools in the wider Dublin area will peak in 2024 and decline thereafter.

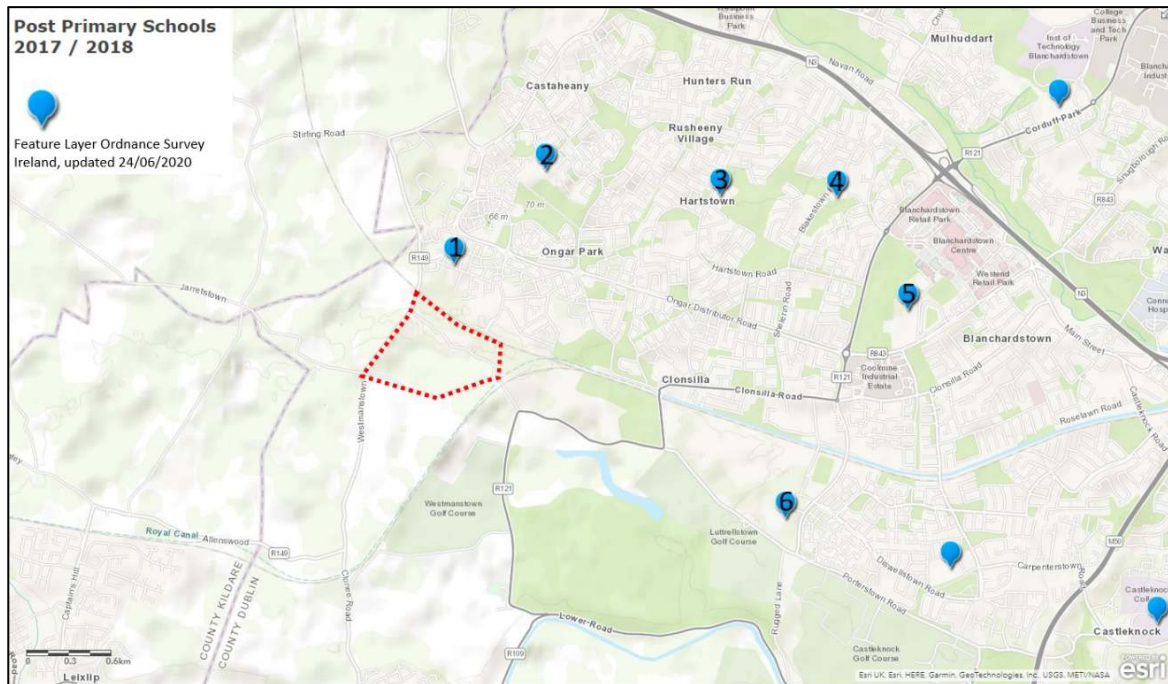


Figure 14.6 Post-Primary Schools Located Within or Near to Study Area

Table 14.9 Post-Primary Schools located Within or Near to the Study Area

No.	Name	Distance from Site	Enrolment 2021/2022
1	Hansfield Educate Together Secondary School	0.6 km	770
2	Coláiste Pobail Setanta College	1.4 km	1,053
3	Hartstown Community School	2.3 km	1,087
4	Blakestown Community School	2.9 km	443
5	Coolmine Community School	3.1 km	991
6	Luttrelstown Community College	2.5 km	960
	Total enrolment		<b>5,304</b>

Blanchardstown Community Training Centre and Technical University Dublin provide further education in approximately 3 km and 5 km distance respectively. Moreover, Dublin City provides a host of 3rd level facilities. Please refer to the School Demand Report, which accompanies this application, for more detailed information on existing educational facilities.

#### 14.4.2 Childcare

There are 9 childcare facilities which have been identified within the study area and a further 3 proximate to the study area, see Figure 14.7 and Table 14.10. Four crèches have been permitted within Hansfield SDZ, a crèche facility is also to be provided within the proposed development. Further analysis of childcare services is provided in the Childcare Demand Report, which accompanies this application.

<sup>2</sup> Projections of Full-time Enrolments – Primary and Second Level 2021 – 2036, Department of Education.

The Childcare Demand Report found that in 2021 / 2022 there was an estimated capacity of 6 spaces in crèche facilities in the wider area.

**Table 14.10 Childcare Facilities Within or Near to the Study Area**

<b>Id. No</b>	<b>Childcare Facility</b>	<b>Approximate Distance from Site Boundary<sup>3</sup></b>
1	Busy Bees Childcare Hansfield	0.5 km
2	Little Treasures Playgroup	0.9 km
3	Early Learners Montessori	0.9 km
4	Mother Hubbard's Crèche	1.1 km
5	Cocoon Childcare	1.3 km
6	Small Steps Preschool/Hayley Devlin Ltd	1.2 km
7	Sticky Fingers Crèche	1.1 km
8	Little Sparrows Preschool	1.5 km
9	Hartstown Montessori	1.5 km
10	Bee Smart Montessori	1.7 km
11	Eileen's Little Scholars	1.7 km
12	Treehouse Childcare/Daisybelle T/A	1.7 km

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<sup>3</sup> The measuring point is Hansfield train station as this is the site boundary of proposed phase 1 of development and ensures connectivity to the street network of the area. The distance is aerial distance, 500m compares to approximately 10min walking distance.





Figure 14.7 Childcare Facilities Within or Near to the Study Area

### Social Infrastructure

This section of the chapter summarises the social infrastructure facilities available in the environs of the proposed development. A Social Infrastructure Report, prepared by McCutcheon Halley Planning Consultants accompanies the planning application and provides further detail and mapping of the facilities referenced in this chapter.

#### 14.4.3 Health Care

In total, 16 Health Facilities were identified in the wider area. They are located beyond the 1.5 km radius from the Barnhill Site, in the general Blanchardstown area, except for the Meridian Clinic Ongar, which is situated in Ongar Village, less than 1 km from the site. Blanchardstown Primary Care Centre and Connolly Hospital provide a primary health care service for the wider community. St Joseph’s Centre provides nursing care for 60 residents. It is located within 1km east of the site.

#### 14.4.4 Social and Communities Centres/Libraries/Faith Groups

There are two existing community centres within 1.5 km of the application site (Ongar and Phibblestown Community Centre) and one planned Community Centre as part of the Hansfield Village Centre (Planning Ref. FW18A/0162). Hartstown Community Centre is approximately a 1.6km distance northeast of the subject site and Luttrellstown Community Centre is approximately a 2.6km distance from the site, south of Clonsilla. Libraries are in more than 2.5 km distance from the subject site. There are 13 Places of Worship in a 2.5km radius and permission granted for two places of worship in the Hansfield SDZ (Planning Ref. FW18A/0162 and Planning Ref. FW20A/0084).

Faith groups are dominated by the catholic ethos, with the nearest Catholic church, Church of St Ciaran, Hartstown approximately 1.5 km in distance. The parish Huntstown, Littlepace provides two places of worship approximately 2.5 km to the north. Church of Ireland is represented in Leixlip. A church for the Mormon faith is situated less than 2 km west of the site and an Evangelical Christian church (Dublin West Community Church) has its place of worship in the Hansfield Educate Together National School located less than 500 m distance from the site.

#### 14.4.5 Sports and Recreation

There are a number of open green spaces near the site including the banks of the Royal Canal to the east. There is also a Greenway planned to the east of the site along the canal which will provide the opportunity for the site to link up with this via a network of cycling and pedestrian trails and paths,

thereby increasing permeability of the site and connectivity to the wider area. St. Catherine's Park is located 3 km to the south-west, comprising approximately 80 ha, which includes a playground and BMX park. A playground and large area for allotments are provided on lands at Beechpark in Clonsilla to the east. The Liffey River is approximately 2 km south-east of Barnhill and the Liffey valley extends east towards the Phoenix Park and beyond.

Westmanstown Sports Centre is located 500 m south-east of the site. It is accessible via the level crossing of Barberstown Lane North and includes a swimming pool, several sports pitches with a variety of associated sports clubs and a golf club. Approximately 1 km further south is Fort Lucan, an outdoor adventure centre.

Golf clubs are prominent in the area. In addition to the Westmanstown Golf Club, the Luttrellstown Castle Golf Course and Liffey Valley Par 3 Golf Course are approximately 2 km from the site. Hermitage Golf Club and Castleknock Golf Club are further south-east in the Liffey Valley.

The wider area is well served with sport clubs ranging from GAA and soccer, rugby, gymnastics, and others, mainly located within the Blanchardstown area but also reaching south towards Lucan and Leixlip.

The eastern boundary of the Barnhill site is formed by the Royal Canal which, when fully developed as a Green/Blue Way, offers significant potential as an amenity, and will provide connectivity to Dublin City Centre and the Docklands to the east. It will also link up to Leixlip and Maynooth as far as the Shannon.

Development permitted as part of Hansfield SDZ provides for commercial floor space including potential use as a gym (Planning Ref. FW18A/0110), park of approximately 2-hectare (Planning Ref. FW17A/0078) and circa. 9,310 sq.m of public open space (Planning Ref. FW17A/0234). The subject application is to incorporate a range of outdoor recreation and amenity facilities, as detailed in the Landscape Design Statement.

#### 14.4.6 Arts and Culture

Cultural activities closest to the site are centred around Ongar Community Centre, at approximately 0.6 km from the site. With the support of Fingal County Council, it offers classes and activities for all age groups. A music school operates in Ongar Village and from Coolmine Industrial Estate. Blanchardstown Centre provides a cinema and Arts Centre, and many more cultural activities can be found in Dublin City centre.

The Royal Canal is central to the industrial heritage of the area. A number of historic buildings and associated surroundings add to this cultural landscape. These include Luttrellstown Castle and Demesne (adjacent to Luttrellstown Golf Course), a historic well in St Catherine's Park, Lucan Demesne and many more in the wider area.

#### 14.4.7 Retail Provision

The closest retail provision is in Ongar Village, which has a Dunnes Stores and several smaller retailers. A Eurospar retailer is located adjacent to the 1.5 km radius in north-east direction. Four discount supermarkets, 2 Spar shops and 1 SuperValu are located within a 4 km radius. A Tesco Superstore is the anchor store of Roselawn Shopping Centre; Westend and Blanchardstown Shopping centres offer a variety of shops and restaurants that are accessible by bus (from Castaheany, Delhurst Estate or Clonsilla, Windemere estate).

Hansfield SDZ will have 3 retail units as part of Planning Ref. FW18A/0110. Planning reference FW18A/0162 has provision for 4 retail units (1 of these is designed for a Supermarket type store).

#### 14.4.8 Other Services

Other services include 2 post offices in Hartstown, just outside the 1.5km radius and at Clonsilla (approx.) 2.2 km. Financial Services are located in Blanchardstown Shopping Centre and on Blanchardstown's Main Street. They include branches of AIB, Bank of Ireland, EBS, KBC, Permanent TSB and Ulster Bank. A Community Credit Union is located in the Blanchardstown Shopping Centre. ATM machines are available within some supermarkets. Blanchardstown has a Garda Station which is located near the main shopping centre. There are also Garda stations in Leixlip and Lucan.

## 14.5 Identification of Principal Potential Receptors

The principal potential receptors that will be affected by the proposed development include residential dwellings, education facilities, childcare services, commercial businesses and road and railroad infrastructure in the surrounding area. These have been identified as follows:

1. Existing residential dwellings along Barberstown Lane North and by the R149;
2. Surrounding residential estates and dwellings;
3. Community Facilities and Services including;
4. Existing educational facilities such as pre-schools, primary schools and post-primary schools,
5. Social amenity facilities such as banks, the post office, library, churches, medical centres, dental surgeries.
6. Local amenities including community groups, clubs, societies as well as sports facilities and amenity walks;
7. Owners and employees of commercial activities;
8. Adjacent owners of agricultural land;
9. Temporary receptors such as passing traffic or pedestrians on the R149; Barberstown Lane North; and Barberstown Lane South;
10. Hansfield Train Station.

### 14.5.1 Do Nothing Scenario

If the proposed development is not realised, it is anticipated that the subject site would remain a vacant green field site, in the short to medium term. The application area is part of a significant landbank and is recognised in the Barnhill Local Area Plan as critical to provide for much needed housing, a crèche, amenities, and local centre, including land set aside for a Primary School.

Given the fact that the lands are zoned for Residential Development and that there is a shortage of housing supply in County Fingal, should the proposed development not proceed it is likely that an alternative residential development proposal would be brought forward for consideration.

If no residential development proposal were to be brought forward, the lands would remain in agricultural use. The continued use of the lands for agriculture would be inconsistent with the policy objectives of the Fingal County Development Plan and the Barnhill LAP to deliver sustainable residential development on the lands. It would also result in lower patronage of the Hansfield Railway station and the Dunboyne to Clonsilla rail line, and would therefore be inconsistent with national, regional, and local policy objectives for enhanced use of sustainable transport modes.

## 14.6 Impact Assessment

This section of the assessment describes those effects that are likely to arise in the absence of mitigation.

Potential Impacts are considered under the Construction and Operational Phase for each of the following:

- Land Use
- Human Health Impacts
- Population and Economic Activity Impacts
- Local Amenity Impacts

### 14.6.1 Construction Phase

The potential impacts of the proposal during the construction phase of the development are outlined below.

#### 14.6.1.1 Land Use

During the construction phase the land use will change from agriculture to residential and commercial development.

The proposed development complies with the statutory land use zoning of the Barnhill Local Area Plan (LAP), with the exception of the material contraventions of the LAP and the Fingal Development Plan 2017, as identified in the Material Contraventions Statement, which accompanies this planning application.

The material contraventions do not affect the overall objective of providing high quality housing, amenities, and services as set out in the LAP, the Fingal Development Plan and all regional and national statutory plans and guidance.

The impact of the proposed development on land use is likely and will have a permanent significant positive effect that will achieve local and wider county, regional and national objectives.

#### 14.6.1.2 Human Health

During the construction process human health could potentially be impacted in a variety of ways and by several environmental receptors including water, biodiversity, climate, flooding, air, and major accidents, etc. Exposure to contaminants or pollutants can have serious implications for human health. Potential impacts on population and human health without mitigation measures include inadequate water and wastewater infrastructure, excessive noise, flooding due to non-control of surface water, poor air quality in areas where there are increased volumes of traffic and the health impacts associated with the storage of hazardous materials during the construction stage. These issues and appropriate mitigation measures are addressed within the relevant disciplines of the EIAR.

An Outline Construction and Environmental Management Plan has been prepared by Clifton Scannell Emerson Associates (CSEA) under separate cover, to accompany this planning application, including details of construction programme and timescales. Construction sites pose potential risks to the health and safety of the public and construction workers. However, all construction activities including demolition works will be carefully managed to comply with relevant operational health and safety, as well as environmental requirements, to prevent adverse impacts upon the public. The protection of public safety will also be achieved by the erection of hoarding and barriers at the site. In addition, access will be restricted, controlled, and monitored by security personnel to ensure there are no risks to the public associated with the construction works. In addition to the in-depth measures of protecting public safety, the construction phase will be carried out during normal working hours, i.e., from 08:00 – 19:00 Monday to Friday and from 8:00 – 14:00 on Saturdays.

Increased vehicular traffic on the local road network is a likely impact arising from the construction phase of the development. This can have a negative effect on human health by increasing dust levels in the air and enhancing the noise disturbance to other properties in the area. The above-mentioned impacts would have a short-term, neutral and imperceptible effect provided the mitigation measures set out in the Outline Construction and Environmental Management Plan prepared by CSEA are carried out.

The potential effects on human health with regards to construction noise, vibration, air quality and climate are described in detail in the relevant chapters and can be summarised as follows:

- The potential effects with regards to air quality during the construction phase are described in detail in Chapter 11 Air Quality. This chapter identifies that the greatest potential impact on air quality during the construction phase of the proposed development is likely to occur as a result of earthworks and construction dust emissions. This was considered to have a high risk of dust soiling but a low risk to human health. With mitigation measures implemented the impacts are considered 'not significant', short-term (i.e. for the duration of the construction phase only) and local in extent.
- The vulnerability of the project to Climate Hazards during the construction process ranges from low through to high, as detailed in Chapter 12 Climate Change.
- The potential effects with regards to noise and vibration are described in detail in Chapter 10 Noise and Vibration. It is inevitable with any project of this nature that some disturbance would be caused to those living and working nearby during the works should appropriate mitigation not be employed. However, the impact of disruption due to construction is considered a local, temporary and intermittent impact. Mitigation measures can be incorporated within a suitable Construction and Environmental Management Plan to be implemented during the construction phase.
- Potential visual impacts are assessed in Chapter 4 Landscape and Visual Impact. There are no known significant risks to human health which may occur in relation to the proposed development in landscape and visual terms.

With mitigation measures in place, any significant negative effect on human health from the construction process is unlikely.

### 14.6.1.3 Population and Economic Activity

A key characteristic of the proposed development in terms of its potential economic impact relates to its capital value, of which a significant portion will provide a boost for the local construction sector in terms of employment generation and capital spend on materials and construction labour costs. It is expected that during peak activities, approximately 150-200 people will be working directly on the construction site. The staff will comprise of managerial, technical, skilled, and unskilled workers. As far as practicable, local labour will be employed. It is, therefore, unlikely that the proposed development will result in any significant effect on the population of the area associated with construction employees.

In addition to direct employment, there will be substantial off-site employment and economic activity associated with the supply of construction materials and provision of services such as professional firms supplying financial, architectural, engineering, legal and a range of other professional services to the project.

It is anticipated that the construction of the proposed development will consist of enabling works, followed by 5 main phases, as detailed in Table 14.11.

**Table 14.11 Construction Phasing**

	Enabling	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
<b>Period</b>	Oct 24 to Aug 25	Feb 25 to Oct 29	March 25 to June 29	Sept 28 to Jan 30	March 29 to July 30	Sept 30 to July 32
<b>Duration</b>	11 months	56 months	51 months	17 months	17 months	23 months
<b>Projected units</b>	-	468	182	195	214	184

The total duration of the works is anticipated to run from October 2024 to July 2032, a total of 7 years and 10 months.

The residential unit output by year end is estimated in Table 14.12.

**Table 14.12 Estimated Units Completed by Year End**

Year End	2025	2026	2027	2028	2029	2030	2031	2032
<b>Units</b>	79	+117	+125	+268	+256	+214	+151	+33

Revenue generated during the construction phase will have an associated benefit for the local and county area with respect to expenditure on local goods and services.

The impact of the construction phase will have a likely, positive, moderate, short-term impact on Population and Economic Activity in a local and county wide context.

### 14.6.1.4 Local Amenities

Construction activities will occur in the context of a mainly green field site, however existing residential dwellings along Barberstown Lane North will experience disruptions to their access roads and private amenities in terms of increased activity, and construction traffic. The impacts of traffic, noise, and air quality during construction on the existing residential dwellings are discussed in greater detail in the relevant chapters in this EIAR. Potential impact relating to noise and air quality are also considered above under Human Health (Section 14.6.1.2).

For the duration of the construction works there will be an increase in the number of vehicular movements, including trucks along the local road network. However, access arrangements are such that construction traffic will be enabled by the new Barnhill-Ongar Distributor Road and Overbridge, facilitating construction access without significant impact on existing local amenity. Construction traffic will be managed in accordance with a Construction Traffic Management Plan (CTMP). An outline CTMP is incorporated within the Outline Construction and Environmental Management Plan (CEMP) which accompanies the planning application. The final CEMP and CTMP will be agreed with Fingal County

Council, prior to the commencement of development, following appointment of the construction contractor.

The Hansfield Educate Together National School and Secondary Schools are located north of the proposed development site, separated by the railway line. The construction and environmental management plan provides for details of the construction programme and timescales. The distance of the school from the proposed development, mitigation measures as outlined in the construction management plan and the phasing of the development will ensure that the amenity of students, staff and visitors are not adversely impacted by the construction phase.

The impact of the construction phase will have a likely negative, slight to moderate, short-term effect on residential amenities in the local area. Compliance with the CEMP and CTMP will avoid, reduce, or mitigate negative impacts.

#### 14.6.1.5 Summary

Based on analysis of the Population and Human Health discipline, the potential significant impacts from the Construction Phase, which are not addressed by other disciplines in the EIAR, are summarised in Table 14.10

**Table 14.13 Potential Significant Impacts on Population and Human Health during the Construction Phase.**

Possible Impact during Construction	Description of Effect
<b>Land Use</b>	
Change from Agriculture to Residential Area	Quality: Positive Significance: Significant Extent: Local to County Probability: Likely Duration: Permanent
<b>Human Health</b>	
Earthworks and construction dust emissions	Quality: Negative Significance: Slight Extent: Local Probability: Likely Duration: Short-term
Construction noise and vibration	Quality: Negative Significance: Imperceptible to Slight Extent: Local Probability: Likely Duration: Short-term
<b>Population and Economic Activity</b>	
Increased employment during construction phase	Quality: Positive Significance: Moderate Extent: Local to County Probability: Likely Duration: Short-term
Increased spending in local economy by construction workers (including convenience shops, filling stations)	Quality: Positive Significance: Moderate Extent: Local Probability: Likely Duration: Short-term



Possible Impact during Construction	Description of Effect
Requirement of labour, goods and services during construction phase	Quality: Positive Significance: Slight to Moderate Extent: Local to Region Probability: Likely Duration: Short-term
<b>Local Amenities</b>	
Potential disruptions to roads and access while scheme is being constructed	Quality: Negative Significance: Slight to Moderate Extent: Local Probability: Likely Duration: Short-term
Potential impact on residential amenity due to reduction in air quality and increase in noise as a result of increased traffic.	Quality: Negative Significance: Slight Extent: Local Probability: Likely Duration: Short-term

## 14.6.2 Operational Phase

### 14.6.2.1 Land Use

During the operational phase the proposed development will provide a new residential community. The proposed development complies with the statutory land use zoning. It will deliver 1,243 residential dwellings, including 805 apartments, 116 duplexes, 322 houses, of which 157 will be provided for the purposes of Part V social housing.

Given the existing housing crisis, it is anticipated that a high-density residential development at this location would result in a likely significant positive impact with a permanent duration as it would realise the aim of increased housing output, consistent with the objective of compact growth to be delivered within and close to the existing footprint of built-up areas, including higher residential densities along public transport corridors.

The proposal will achieve high-density residential development, being an efficient use of zoned and serviced landbank to provide *inter alia* much needed housing together with high quality amenities for future occupants.

The proposed development will therefore have a likely, positive, significant, permanent impact on land use in the context of Land Use in a local context.

### 14.6.2.2 Human Health

Due to the nature of the development, there will be few hazards associated with the operational phase of the development and therefore no potential significant negative impact in terms of health and safety. The Risk of Major Accident and Disaster is addressed in Chapter 15.

Chapter 11 Air Quality assesses the impact of the increase in vehicular movements as a result of the development. The impact on local air quality due to road traffic emissions from development generated traffic flows is predicted to be 'negligible' and not exceed the Limit Values set in the Air Quality Standards Regulations. As such, specific mitigation and monitoring is not considered to be required and impacts on human health are not considered likely.

Chapter 10 Noise and Vibration assesses the impact of the increase in local traffic noise levels and an assessment of noise during the operational phase of the proposed development. The impact was largely considered negligible and impacts on human health are considered unlikely.

The potential effects with regard to climate hazard during the operational phase are described in Chapter 12 Climate Change.

The Wind Microclimate Assessment prepared by Aecom concluded that the microclimate of the proposed development site is comfortable for its intended pedestrian uses and is acceptable according to the Lawson method.

The Daylight and Sunlight Assessment Report, prepared by 3D Design Bureau concluded that for a scheme of this size and level of density being targeted, the levels of daylength and sunlight achieved should be considered favourable. The report also concludes that the proposed scheme design is sympathetic on the existing neighbouring properties.

The human health impact not addressed by other chapters is access to recreation and amenity facilities. A lack of adequate recreation or amenity facilities has the potential to negatively impact human mental and / or physical health. The proposed layout provides for excellent public amenity and recreational facilities, including indoor communal amenity space, public open space, cycle/pedestrian priority route along Barberstown Lane North (L-7010-0) with vehicle use restricted to local access only, and a café. A park of 5.4 hectares will be provided along with a series of pocket parks distributed between character areas. Further recreational and amenity facilities to be provided include a playing pitch, multi-use games area, skateboard park, playgrounds, walking/jogging routes and a wetland area. The baseline data for the Blanchardstown/Blakestown ED indicates that the general population are in good health.

The operational phase of the proposed development will therefore have a likely positive, significant, permanent impact on Human Health in a local context.

#### 14.6.2.3 Population and Economic Activity

The proposed development will consist of 1,243 residential units as well as a crèche, medical centre, convenience retail, five independent retail units, a café, community space, office hub and land set aside for a school.

Once complete the development will house approximately 3,480<sup>4</sup> to 3,729<sup>5</sup> new residents on the site, in addition to accommodating approximately 161 employees throughout the commercial and medical use areas proposed, as estimated in Table 14.14.

The provision of various residential unit types within the development will help to address the latest housing demand in the area by providing additional high-quality accommodation for local residents and those working in the area. This represents a long-term positive impact on the local economy through the sustainable mix of uses within the proposed development and a significant increase in the local population which will avail of local goods and services.

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<sup>4</sup> Assuming an average household size of 2.8.

<sup>5</sup> Assuming an average household size of 3.0.

**Table 14.14 Estimate of Employment in Commercial and Medical Uses**

<b>Employment Use Category</b>	<b>Size</b>	<b>Assumption</b>	<b>Estimated Employees</b>
<b>Convenience Retail (a)</b>	370 sqm	1 employee per 17sqm	22
<b>'High Street' Retail (a)</b>	500 sqm	1 employee per 19 sqm	26
<b>Café (a)</b>	158 sqm	1 employee per 18 sqm	9
<b>Community Centre (b)</b>	359	1 employee per 65 sqm	6
<b>Medical Centre (c)</b>	8 rooms	2 employees per room	16
<b>crèche (d) – 942 m<sup>2</sup></b>	160 likely <sup>6</sup>	1 employee per 5 children	32
<b>Office Hub (a)</b>	501	Capacity for 1 worker per 10 sqm	50
<b>Total Estimate Employee in commercial and medical uses</b>			<b>161</b>

- a) In line with average employment densities detailed in Employment Density Guide, 2010 (2<sup>nd</sup> Edition), Offpat and Homes & Community Agency.
- b) Assumption that community centre is comparable with Sports Centre / Club as per Employment Density Guide.
- c) Assumption 1 practitioner and 1 support staff per room.
- d) Assumption, average of 1 worker per 5 children, in line with HSE staff ratio requirements.

The proposed development will have a positive, moderate, permanent impact on population and economic activity at a local level.

#### 14.6.2.4 Local Amenity and Services

##### **Recreation and Amenity**

The proposed layout provides for excellent public amenity and recreational facilities as noted in section 14.6.2.2. Human Health.

A detailed landscape plan and report has been prepared by Gannon and Associates and provides details of the proposed public realm and landscaping treatment for the site. The landscape plan includes proposals for a wetland area, playing pitch, multi-use games area, skateboard park, a series of active play zones and extensive walking / jogging paths.

The provision of these amenity facilities within the development will be of benefit to future residents and existing residents in the local environs. The new population is likely to result in an increase in the patronage of existing recreation and amenity facilities in the local area, which will help to sustain these facilities.

As the proposed development will provide a good level of recreation and amenity facilities for the future population, and the increased population will increase the patronage of existing amenities, the impact likely positive, moderate, permanent impact on Recreation and Amenity in a local context.

##### **Childcare Facilities**

The proposed development comprises 1,243 units, with a total of 153 units comprising one-bedroom apartments.

Utilising an average household size of 2.8 persons per unit the total population of the future development would be approximately 3,480.

The average household size in County Fingal in 2016 was 3.0. If this average household size were applied to the proposed development the future population would be approximately 3,729.

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<sup>6</sup> Floor area of 942 m<sup>2</sup> would facilitate up to 210 children, based on Childcare Guidelines 2001 requirements. However, the maximum capacity in terms of commercial operation is assumed to be 160 childcare spaces.

The proposed development consists of a mix of units with almost 60% sized 2-bed or less. Given the mix of units within the development it is considered likely that the future household size will be 2.8 or less. However, assessment of potential demand for childcare facilities are calculated on the basis of both ranges and with/without one-bedroom units, on a precautionary basis (refer to Table 14.15).

- Applying the Fingal County percentage of 8.4% in the 0-4 years age cohort, the number of pre-school children that will live in the completed development is projected to be approximately 256 to 313.
- Applying the Fingal County percentage of 13.3% in the 5-12 age cohort, the number of primary school age children that are likely to live in the completed development is projected to be approximately 406 to 496.
- Combined the number of children in the 0-12 year age cohort within the development is likely to be approximately in the range of 662 to 809.

Given the mix of unit types within the development, it is considered that the number of children will be to the lower level of the ranges.

The CSOs Quarterly National Household Survey (QNHS), Childcare, Quarter 3 2016 is the most current available published date on childcare statistics. It reports that nationally:

- 13% of children aged 0-12 years are cared for in a crèche/Montessori/playgroup/after-school facility, with the highest rate of use in Dublin at 17%.
- 19% of pre-school children (aged 0-4) are cared for in a crèche/Montessori/playgroup/after-school facility, with the highest rate of use in Dublin at 25%.

Applying the highest percentage of uptake (i.e., Dublin rates of 17% of children aged 0-12 years) to the development, then theoretically in the range of 113 to 138 childcare spaces (mix crèche / afterschool) would be required to meet the likely demand to be generated by the proposed development, see table 14.15.

**Table 14.15 Estimate of Childcare and School Demands**

		Average Household Size of 2.8	Average Household Size of 3.0
<b>Units excluding 1-bed units</b>	1,090	3,052 (a)	3,270 (c)
<b>All units in the scheme</b>	1,243	3,480 (b)	3,729 (d)
<b>Children aged 0-4</b>	8.4%	(a) 256 to (b) 292	(c) 275 to (d) 313
<b>Children aged 5-12</b>	13.3%	(a) 406 to (b) 463	(c) 435 to (d) 496
<b>Total Children aged 0-12</b>	21.7%	(a) 662 to (b) 755	(c) 710 to (d) 809
<b>Highest Likely Childcare Demand</b>	<b>@ 17% of all children aged 0-12.</b>	<b>(a) 113 to (b) 128</b>	<b>(c) 120 to (d) 138</b>
Children aged 13-18	7.7%	(a) 235 to (b) 268	(c) 252 to (d) 287

Table 14.16 provides an estimate of childcare and school demand per year, based on the estimated unit completions by year end, assuming a household size of 2.8. Table 14.17 provides the same analysis assuming a household size of 3.0.

**Table 14.16 Estimated Childcare & School Demand by Year at Av. Household Size of 2.8**

<b>Year End</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>
<b>Units / Cumulative Units</b>	79	+117 <b>196</b>	+ 125 <b>321</b>	+ 268 <b>589</b>	+ 256 <b>845</b>	+ 214 <b>1,059</b>	+ 151 <b>1,210</b>	+ 33 <b>1,243</b>
<b>Population @ 2.8 hshld size</b>	221	549	899	1,649	2,366	2,965	3,388	3,480
<b>Children aged 0-4 (8.4%)</b>	19	46	75	139	199	248	285	292
<b>Children aged 5-12<sup>7</sup> (13.3%)</b>	29	73	120	219	315	394	451	463
<b>Total Children 0-12</b>	48	119	195	358	514	642	736	755
<b>Highest likely childcare Demand<sup>8</sup></b>	8	20	33	61	87	109	125	128
<b>Children 13-18<sup>9</sup>(7.7%)</b>	17	42	69	127	182	228	261	268

**Table 14.17 Estimated Childcare & School Demand by Year at Av. Household Size of 3.0**

<b>Year End</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>
<b>Units / Cumulative Units</b>	79	+117 <b>196</b>	+ 125 <b>321</b>	+ 268 <b>589</b>	+ 256 <b>845</b>	+ 214 <b>1,059</b>	+ 151 <b>1,210</b>	+ 33 <b>1,243</b>
<b>Population @ 3.0 hshld size</b>	237	588	963	1,767	2,535	3,177	3,630	3,729
<b>Children aged 0-4 (8.4%)</b>	20	49	81	148	213	267	305	312
<b>Children aged 5-12<sup>10</sup> (13.3%)</b>	32	78	128	235	337	423	483	496
<b>Total Children 0-12</b>	52	127	209	383	550	690	788	808

<sup>7</sup> Primary School Demand

<sup>8</sup> @ 17% of all children aged 0 – 12.

<sup>9</sup> Secondary School Children Demand

<sup>10</sup> Primary School Demand

Year End	2025	2026	2027	2028	2029	2030	2031	2032
<b>Highest likely childcare Demand<sup>11</sup></b>	9	22	36	65	94	117	134	137
<b>Children 13-18<sup>12</sup>(7.7%)</b>	18	45	74	136	195	245	280	287

The proposed development provides for a crèche / afterschool facility of 942 m<sup>2</sup>, with a potential capacity to accommodate approximately 210 children<sup>13</sup>. However, it is considered likely that the creche will have an operational capacity of approximately 160 childcare spaces. The crèche is to be delivered within the first phase of the development by the end of year 2027. The crèche capacity therefore more than meets the likely demand to be generated by the future population of Barnhill Garden Village. It is considered unlikely that a higher demand for childcare spaces is likely to occur in the proposed development given:

- The mix of unit types within the development,
- The fact that precautionary assumptions in terms of likely population and maximum uptake of childcare spaces have been used.
- That no allowance has been made for childcare spaces provision associated with parents' place of work.

It is considered most likely that the childcare demand generated from the proposed development will be at the lower ranges estimated in Table 14.15.

During the first two years of the development, it is likely that there will be some demand for childcare facilities that will arise prior to completion of the proposed crèche on site. Tables 14.16 and 14.17 estimate that by 2027 there will be a demand for between 33 to 36 childcare places before the Barnhill Garden Village crèche is provided.

As detailed in section 14.4.2, there are 12 existing and future childcare facilities within or near to a 1.5km radius of the proposed development, with an estimated capacity of 6 spaces for the year 2021/2022. A further five facilities are permitted, and it is likely that at least some of these units will be complete prior to works commencing at Barnhill Garden Village. During the first two years of the proposed development there is likely to be a slight, short-term lack of capacity of childcare space within the proposed development. Research has indicated that there is currently sufficient capacity available in nearby existing and proposed facilities to meet this shortfall in demand, pending delivery of the on-site childcare facility.

The impact of the proposed development on childcare provision is likely to have a slight negative effect on local amenity in the area in the short-term due to the initial occupation of the proposed development prior to the construction of the crèche. However, once the crèche has been constructed it will be able to accommodate demand arising from the development and thus it is unlikely to have an effect on local amenity.

### School Provision

The proposed development will result in a demand for school places at both primary and post-primary level. Again, using data extrapolated from Census 2016 approximately 13.3% of children in Fingal County are between 5-12 years i.e., primary school age and 7.7% are aged between 13 and 18 i.e., post primary age. Applying these percentages, the scheme might generate a requirement of between

<sup>11</sup> @ 17% of all children aged 0 – 12.

<sup>12</sup> Secondary School Children Demand

<sup>13</sup> Based on Childcare Guideline 2001 requirements for a minimum floor space of 2.32 m<sup>2</sup> per child, excluding kitchen, bathroom, furniture or permanent fixtures.



409 to 496 primary school places and 235 to 287 post primary places when fully occupied (refer to Table 14.12).

There are existing schools in the locality including the Hansfield Educate Together National and Secondary Schools and Castaheany Educate Together School which have the capacity to support the proposed scheme in the early phases of the development, as outlined in the accompanying School Demand Assessment Report.

Land has been set-aside within the development to provide for a primary school, the site has capacity to accommodate a school of either 16-classrooms, or 24-classrooms if there was sufficient demand. At an average class size of 24 pupil, a 16-classroom school will have capacity to accommodate 384 children. A 24-class room school would have capacity to accommodate 576 children, at an average class size of 24 pupils. The Department of Education will determine the requirement for the school, based on its analysis of demographics.

The number of post primary school aged children likely to be living in the development is around 235 to 287. This number of children would not support an additional post-primary school within the development.

The accompanying School Demand Assessment Report concludes that capacity in existing post primary schools is in the region of 306 places by 2025 (when the first houses are likely to be occupied within the development).

The School Demand Assessment Report also notes that the Department of Education projects that enrolment in existing post-primary schools will decline between 2021 to 2036, resulting in a further increase in capacity. The Report estimates that by 2032, when Barnhill Garden Village development is projected to be complete, there will be a post-primary school capacity of approximately 524 places. This capacity is more than sufficient to meet any demands that would arise solely from the Barnhill Garden Village Development. Section 14.8.2 considers the potential cumulative demand, taking account of other developments permitted in the area.

As the proposed development includes the provision for a primary school to meet the demand generated by the development, and post-primary school demands can be met by schools in the local area, the impact of the proposed development on school provision is likely to be neutral to slight negative, the extent of the impact will be local, and the duration of the impact permanent.

### **Healthcare Provision**

In general, Blanchardstown/Blakestown ED and Fingal County show a higher percentage of people who have identified as having Very Good to Good health, and a very low percentage of having Bad or Very Bad Health, in comparison to the State and Dublin City. As the proposed development includes the provision for a medical centre to meet the neighbourhood health care demands generated by the development, the impact of the proposed development on healthcare provision is likely to be neutral, the significance imperceptible, extent of the impact will be local, and the duration of the impact permanent.

#### **14.6.2.5 Summary**

Based on analysis of the Population and Human Health discipline, the potential impacts and effects from the Operational Phase are those summarised in Table 14.18.

**Table 14.18 Potential Impacts & Effects on Population and Human Health during the Operational Phase**

Possible Impact during Operational Phase, without mitigation	Effect
<b>Land Use</b> <ul style="list-style-type: none"> <li>- New Residential community with commercial and local services.</li> </ul>	Quality: Positive Significance: Significant Extent: Local Probability: Likely Duration: Permanent
<b>Human Health</b> <ul style="list-style-type: none"> <li>- Provision of Recreation and Amenity Services</li> </ul>	Quality: Positive Significance: Significant Extent: Local Probability: Likely Duration: Permanent
<b>Population &amp; Economic Activity</b> <ul style="list-style-type: none"> <li>- New population of 3,480 to 3,729</li> <li>- Approximately 161 employees in commercial and medical areas.</li> <li>- Increased spend in local economy</li> <li>- Meeting Housing demand</li> </ul>	Quality: Positive Significance: Moderate Extent: Local Probability: Likely Duration: Permanent
<b>Local Amenities and Services</b>	
Recreation & Amenity	Quality: Positive Significance: Moderate Extent: Local Probability: Likely Duration: Permanent
Childcare Facilities <ul style="list-style-type: none"> <li>- Demand generated by first phase of development prior to crèche being developed.</li> </ul>	Quality: Negative Significance: Slight Extent: Local Probability: Likely Duration: Short-term
School Provision	Quality: Neutral to Negative Significance: Imperceptible to Slight Extent: Local Probability: Likely Duration: Permanent
Healthcare Provision	Quality: Neutral Significance: Imperceptible Extent: Local Probability: Likely Duration: Permanent

## 14.7 Risk of Major Accidents and Disasters

The potential of major accidents and disasters as a result of the proposed development has been assessed and the findings are presented in Chapter 15 of this EIA. Major accidents are by nature high consequence, low probability events and generally require a number of simultaneous failures to occur in order for an event to take place. Although the consequences of the findings set out in Chapter 15 appear significant, the likelihood of them occurring is low. The credible MA&D scenarios identified for the Proposed Development are well understood hazards which are managed via established Regulations and industry standards.

## 14.8 Cumulative Impacts

### Hansfield SDZ

The Hansfield SDZ is located to the north of the site. A planning scheme for the Hansfield SDZ was adopted by Fingal County Council in April 2006. This provides for a number of uses including residential, schools, rail halt, community and neighbourhood centres and health and childcare services. Table 14.19 provides an overview of the most recent planning applications within the Hansfield SDZ. There have been several earlier permitted developments within Hansfield SDZ, which now form the 'existing environment' and as such are considered unlikely to result in a significant cumulative impact.

**Table 14.19 Review of Planning Applications With Permission Granted For Development Within Hansfield SDZ 2015 - 2022**

Project	Applicant	Reference	Development
Hansfield SDZ	Mulberryglen Ltd.	FW15A/0161	206 units in Zone 2
	Mulberryglen Ltd.	FW16A/0117	47 units in zone 2
	Garlandbrook Ltd	FW16A/0123	219 units in zone 2 and zone 6
	Hansfield Investment Ltd	FW15A/0032	128 units in Zone 4
	Firth Development Unlimited Company	FW17A/0234	155 units, a childcare facility (c.198sq.m), public open space (c.9,310 sq.m) in Zone 6
	Garlandbrook Ltd	FW18A/0021	95 units in zone 6
	Hansfield Investment Ltd	FW18A/0161	247 units in Zone 7
	Hansfield Investment Ltd	FW18A/0162	62 Units, 2,470m <sup>2</sup> commercial development including crèche (209m <sup>2</sup> ), community space (897m <sup>2</sup> ), in Zone 1
	Hansfield Investment Ltd	FW18A/0197	200 units in Zone 7
	Garlandbrook Ltd	FW18A/0110	618 units in zone 7, crèche (334.84m <sup>2</sup> ), retail/commercial units (596.06m <sup>2</sup> )
	Hansfield Investment Ltd.	FW20A/0084	15 units, crèche (493) Place of Worship and a medical suite in Zone 1 and 7
	Garlandbrook Ltd.	FW20A/0059	83 units in Zone 7
	Firth Development UC	DAC/048/20	10 units in Zone 6
	Firth Development UC	DAC/047/20	22 units in Zone 6

	Firth Development UC	DAC/046/20	12 units in Zone 6
<b>Total Permitted Cumulative Units</b>			<b>2,119</b>

The total permitted units in Hansfield that were not occupied at the time of preparation of this chapter is estimated to be in the region of 2,119. This number of units is likely to give rise to a population increase in the wider area of between 5,933 (assuming a household size of 2.8) and 6,357 (assuming a household size of 3.0) people.

#### 14.8.1 Construction Phase

Subject to the appropriate permission, once the development commences the construction phase will take place in 5 phases over an estimated 7-year and 10-month period beginning in 2025. Construction traffic will be limited to certain routes and times of day, with the aim of keeping disruption to existing traffic and residents to a minimum. Given the timeframes associated with the proposed development and the existing permitted applications it is considered unlikely that there will be significant overlap in the construction periods.

In addition, access to the proposed development shall be from the 2 roundabouts on the realigned Barberstown Lane South Road. Both access roads from the 2 roundabouts are to be constructed as part of the Phase 1 infrastructure works. In order to segregate construction traffic from local/public traffic it is proposed that Access Road 1 will be used by construction traffic and Access Road 2 will be used for local access to the existing dwellings and new development. Once the proposed traffic management measures within the CEMP are put in place there will be no risk of significant construction phase cumulative impacts with other proposed developments. In general, any overlap of construction phases would result in short term effects.

#### 14.8.2 Operational Phase

Both Hansfield SDZ and the proposed development comply with the land-use objectives and national planning policy to deliver high-quality housing in areas that are serviced by public transport modes. Both projects will increase the patronage of Hansfield Station which will have a positive, permanent effect on local amenity.

The proposed development will provide facilities arising directly from the development to accommodate future demand associated with childcare (pre-school and afterschool), primary school and community services (such as recreation, meeting places and retail). In line with the Barnhill LAP, the proposed development does not provide for the development of a post-primary school. The post-primary demand arising from the development itself will be in the region of 268 to 287 pupils and would not be sufficient to support a new post-primary school.

Cumulative development in the area might result in an additional population of between 5,933 and 6,357 (over and above the Barnhill development). If all the permitted developments are fully built out, there is potentially an additional post-primary population in the region of 457 to 489 pupils, as calculated in Table 14.20. This assumes of 7.7% of the population falling within the post-primary age category.

**Table 14.20 Cumulative Post Primary Population**

<b>Development</b>	<b>Population Range (Household size 2.8 – 3.0)</b>	<b>Post Primary Population Range (7.7% of population)</b>
<b>Barnhill Garden Village (1,243 units)</b>	3,480 – 3,729	268- 287
<b>Other Permitted Developments (2,119 units)</b>	5,933 – 6,357	457 - 489
<b>Cumulative</b>	<b>9,413 - 10,086</b>	<b>725 - 776</b>

Cumulatively, between Barnhill and the other permitted developments in the Hansfield area, there is therefore potentially a demand for an additional 725 to 776 pupils of post-primary age children in the area. If no additional capacity is provided in the post-primary system, there is potential for a significant

negative cumulative effect in respect of post-primary provision. However, the School Demand Report, which accompanies this planning application notes that:

- There is an identified additional capacity within the existing system estimated at 306 post primary places by 2022/ 2025.
- Demand generated by Barnhill and cumulative projects will build gradually over a 10-year period. This will provide the opportunity for the Department of Education to assess the need to provide for additional capacity within existing facilities.
- The Department of Education's report 'Projections of Full-Time Enrolments – Primary and Second level, 2021-2036 estimates that enrolment numbers at second level will peak in 2024 and decline thereafter. It is estimated that between 2020 and 2036 the post-primary enrolments in the Dublin region will decline by around 5.3%. This would provide additional capacity in existing post-primary schools of around 297 places by 2036. Combined it is therefore estimated that by the time Barnhill Garden Village and other cumulative developments are fully built out there will be approximately 524<sup>14</sup> additional post-primary school places within existing schools.
- Cumulatively there remains a potential deficit of post-primary school places of 201 to 252 spaces in the Barnhill and Hansfield area, should additional capacity not be provided by the Department of Education.

The potential cumulative deficit of 201-252 post-primary places would have a moderate negative cumulative effect.

The potential cumulative deficit of 201-252 places would not be sufficient to support a stand alone post-primary school and it is most likely that this demand will be met through extending the capacity of existing schools in the area. As noted, demand generated by Barnhill and cumulative projects will build gradually over a 10-year period, providing time for the Department of Education to monitor demands and respond to the need to provide for additional capacity within existing facilities.

The operational phase of both projects is not considered to have any additional significant negative cumulative impacts on human health, population and economic activity or local amenity.

## 14.9 Mitigation Measures

Appropriate mitigation measures in regard to issues that may potentially impact on human health such as traffic, visual amenities, built and natural heritage, air quality, noise emissions and climate change have been addressed under other chapters within this report including Landscape and Visual Impact (Chapter 4); Traffic and Transport (Chapter 5); Land (Chapter 7); Water (Chapter 8); Noise and Vibration (Chapter 10); Air Quality (Chapter 11); and Climate Change (Chapter 12).

The proposed development design incorporates sufficient community, recreation, childcare, and primary education facilities to meet the needs of the future population of Barnhill Garden Village.

There is sufficient capacity in the existing post-primary education facilities to accommodate any demand that might arise solely from Barnhill Garden Village. Cumulatively there is potential for a deficit in post-primary education facilities if all the permitted developments are fully built out and additional capacity is not provided by the Department of Education.

The Department of Education has been a statutory consultee during the preparation of the Barnhill LAP and have been consulted by applicants during the development of the application. As a further mitigation measure it is proposed that, should permission be granted, the applicants will submit an updated report to the Department of Education detailing the proposed phasing and estimated primary and post-primary demands arising from the development to inform continuing Department investment decisions. The applicants will also provide an annual report of progress to the Department of Education noting number of completed units, estimates of primary and post-primary demands arising and projections for future demand when the development is complete.

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<sup>14</sup> Capacity by 2025 of 306, plus additional 5.3% of total enrolment (297) = 603 by 2036. Assume even decline in enrolment over the 15-year period between 2021 to 2036 = decline of 19 pupils per year on current enrolment. Barnhill due to be built out by 2032 = reduced enrolment over 11-year period = 218 pupils. Capacity by 2025 of 306, plus estimated additional capacity by 2032 of 218 places = 524 places.

No further significant negative impacts on Population and Human Health during the operational phase have been identified within this chapter and therefore no additional mitigation measures are proposed.

## 14.10 Residual Impact Assessment

The proposed mitigation measures will avoid, prevent, or reduce impacts on the human environment during the construction and operational phases of the proposed development. Residual impacts are those which remain following the implementation of the proposed mitigation measures, however no significant adverse residual impacts have been identified.

The land will have an urban character, rather than greenfield. However, this change is in accordance with the specific zoning of the site for new residential development and the provision of social and physical infrastructure. The impact is considered to have a positive effect when balanced with the other effects on amenity, such as the provision of active public amenity spaces, much needed housing in the County-wide context, employment, and local services.

There is a potential for a residual cumulative negative moderate effect on post-primary education facilities if additional capacity is not provided by the Department of Education. The applicant will seek to avoid this residual effect by providing annual reports of the progress of the development, and associated post-primary demands, to the Department of Education, to inform the Department's investment decisions.

## 14.11 Monitoring

Measures to avoid negative impacts on Population and Human Health have been integrated into the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development. Monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission.

Monitoring of compliance with Health and Safety requirements will be undertaken by the Project Supervisor for the Construction Process.

## 14.12 Worst Case Scenario

The worst-case scenario where mitigation measures failed for a development of the type proposed is considered to be the risk of an accident during the construction phase. This is considered highly unlikely and indeterminable.

## 14.13 References

- National Planning Framework 2040, Dept. of Housing, Planning and Local Government 2018
- National Planning Framework – Implementation Roadmap, Dept. of Housing, Planning and Local Government 2018
- Eastern and Midlands Regional Spatial and Economic Strategy 2019, Eastern Midlands Regional Assembly
- Fingal Development Plan (FDP) 2017 – 2023 Fingal County Council [www.fingal.ie](http://www.fingal.ie)
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- ,Barnhill School Demand Report 2022, McCutcheon Halley Planning Consultants
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- Wind Microclimate Assessment 2022, AECOM
- Daylight and Sunlight Assessment Report 2022, 3D Design Bureau



# Alanna Homes and Alcove Ireland Four Ltd.

Barnhill Garden Village Strategic Housing  
Development at Barberstown, Barnhill and  
Passifyoucan, Clonsilla, Dublin 15

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## CHAPTER 15

### Major Accidents and Disasters

# Volume II

Environmental Impact Assessment Report



**AECOM**

**ALANNA**  
HOMES

**Alcove Ireland**  
Four Limited

**Clifton Scannell Emerson**  
Associates

**Delphi Architects**

**JOHN CRONIN & ASSOCIATES**  
ARCHAEOLOGY | CONSERVATION | HERITAGE | PLANNING

**SLR**

July 2022

**McCutcheon Halley**  
CHARTERED PLANNING CONSULTANTS



# Chapter 15 Major Accidents and Disasters

## Contents

15	Major Accidents and Disasters .....	15-2
15.1	Introduction .....	15-2
15.1.1	Author Information and Competency .....	15-2
15.1.2	Legislation .....	15-3
15.1.3	Definitions .....	15-3
15.2	Methodology.....	15-4
15.3	Overview of Proposed Development .....	15-5
15.4	Environmental Receptors.....	15-6
15.5	Hazard Source and Pathway Screening .....	15-8
15.6	Predicted Impacts .....	15-13
15.6.1	Do Nothing .....	15-13
15.6.2	Construction Phase.....	15-13
15.6.3	Operational Phase .....	15-13
15.6.4	Demolition .....	15-14
15.6.5	Cumulative Impacts.....	15-14
15.7	Mitigation Measures .....	15-14
15.8	Emergency Management.....	15-15
15.9	Residual Impact .....	15-16
15.10	Conclusions.....	15-16
15.11	References.....	15-17

## Tables

Table 15.1	Descriptions of Impacts and Effects.....	15-5
Table 15.2	Receptors Within Study Area.....	15-6
Table 15.3	Hazard Source and Pathway Screening.....	15-9
Table 15.4	Credible Major Accident and Disaster Scenarios, Impacts and Mitigation measures ....	15-15



# 15 Major Accidents and Disasters

## 15.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers the likely significant adverse effects arising from potential major accidents and disasters (MA&D) which are pertinent to the Proposed Development. This includes the vulnerability of the Proposed Development to MA&D, and the potential for the Proposed Development to cause a MA&D.

MA&D are events which can result in immediate or delayed significant harm to human health and/or the environment and require the use of resources beyond those of the proposed developer or its contractors to manage.

In the context of this assessment, disasters are typically naturally occurring events, such as earthquakes, landslides and flooding. They can also be manmade or external hazards such as acts of terrorism.

Major accidents are typically anthropogenic in nature and include for example the accidental loss of containment of dangerous substances such as natural gas, which can lead to fires and/or explosions.

In this assessment, MA&D are identified and assessed to determine the potential impact on the following receptors:

- Population and human health.
- Biodiversity, with particular attention to species and habitats protected under The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations) (transposing the EU Council Directives on Birds and Habitats (Council Directive 92/43/EEC)).
- Land, soil, water, air and climate; and
- Property and material assets, cultural heritage, and the landscape.

In this chapter, the lifecycle of the Proposed Development is considered, from the construction phase, through use and habitation to eventual demolition.

The construction process will be outlined within the Outline Construction Environmental Management Plan (oCEMP) (included within the EIAR) which includes traffic management, accident and incident prevention methods and waste management. Similar environmental management plans will be developed for eventual demolition of the properties and other facilities included in the scope of the Proposed Development.

Where credible MA&D scenarios are identified, mitigation measures to reduce the impact and severity are described, along with the emergency management arrangements which would be initiated in the event of the scenario occurring. MA&D are low probability, high consequence events. As such it would not be appropriate to consider the cumulative impacts associated with similar simultaneous events where there is no direct connection.

### 15.1.1 Author Information and Competency

This chapter has been prepared by Claire Leng, a Principal Process Safety Consultant within the AECOM UK and Ireland Environmental and Sustainability Team. Claire has an MSc in Process Safety and Loss Prevention, and over 15 years' experience in Health and Safety Management including Process Safety Management for industrial operating companies.

A quality assurance review of this chapter has been carried out by Alison Couley BEng CEng MChemE, Associate Director in Process Safety at AECOM. Alison has over 25 years' experience in Process Safety consultancy and over 10 years' experience carrying out environmental risk assessments for a range of proposed development types including industrial, commercial, transport and residential.

In accordance with Article 5(3)(a) of the EU Directive<sup>1</sup>, by appointing AECOM the Applicant has ensured that this Chapter has been prepared by 'competent experts'.

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<sup>1</sup> Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

## 15.1.2 Legislation

The assessment of the vulnerability of the Proposed Development to MA&D is included within EIAR following changes to EU legislation now transposed into Irish law. The revised EIA Directive 2014/52/EU states the need to assess:

*“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 natural disasters which are relevant to the project concerned”.*

This section identifies the relevant policy and legislation informing the scope of the assessment and sets out the requirements stipulated within EIA Directive 2014/52/EU. Guidelines on MA&D assessment referenced in this assessment include those published by the Institute of Environmental Management and Assessment (IEMA) (2020) and Environmental Protection Agency (EPA) in 2022.

In accordance with the requirements of Planning Regulations Planning & Development Act 2000 (as amended), an assessment of the potential risks of MA&D relevant to the Proposed Development is required. In-line with the requirements of the control of major-accident hazards involving dangerous substances Council Directive 96/82/EC This assessment shall consider the measures envisaged to prevent or mitigate significant adverse effects on the environment associated with these incidents and provide details of the preparedness for a proposed emergency response should they occur.

As an emerging topic within EIA, the IEMA and EPA documents provide useful guidance on the assessment of MA&D via the application of a process involving hazard identification via the consideration of typical guidewords, assessment of consequences and the consideration of means to eliminate or mitigate credible scenarios.

## 15.1.3 Definitions

For the purpose of this assessment, the definition of a ‘Major Accident’ is taken from the guidelines on MA&Ds within EIA published by IEMA.

*“A major accident is an event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage.*

*Major accidents can be caused by disasters resulting from both man-made and natural hazards.*

*A disaster is a man-made/external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident.*

*In general, major accidents and/or disasters should be considered as part of an assessment where the development has the potential to cause the loss of life, permanent injury and/or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration”.*

The IEMA guidelines contain the following criteria for damage to the environment which could be considered to be a MA&D:

- Permanent or long-term damage to terrestrial habitats:
- 0.5 hectares (ha) or more of a habitat of environmental or conservation importance protected by legislation; or
- 10 or more hectares of more widespread habitat, including agricultural land.
- Significant or long-term damage to freshwater and marine habitats.
- 10km or more of river or canal.
- 1ha or more of a lake or pond.
- 2ha or more of delta; or
- 2ha or more of a coastline or open sea; or
- Significant damage to an aquifer or underground water: 1ha or more.



The IEMA guidelines do not contain criteria for harm to people which would constitute a MA&D, therefore this assessment takes into consideration those contained within the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances Regulations 2015 (Commonly referred to as the COMAH Regulations).

The COMAH Regulations apply to sites which store significant quantities of hazardous materials which will not be the case at the Proposed Development, which will comprise of predominantly residential use with commercial development.

Dangerous substances such as diesel fuel oil may be present during the construction phase however, the quantity would be significantly below the threshold at which the COMAH Regulations would apply.

The COMAH Regulations establish criteria for the consequences of an incident which would be classed as a major accident, therefore in the absence of more specific guidance, these criteria as listed in COMAH Schedule 6 (Regulation 19(2)) will be considered in this assessment.

A major accident meets the COMAH criteria if it has at least one of the consequences persons and/or damage to property described below:

- An injury which is fatal;
- Six persons injured within the establishment and hospitalised for at least 24 hours (hrs);
- One person outside the establishment hospitalised for at least 24 hrs;
- A dwelling outside the establishment which is damaged and unusable as a result of the accident;
- The evacuation or confinement of persons for more than 2 hrs where the value (persons × hrs) is at least 500;
- The interruption of drinking water, electricity, gas or telephone services for more than 2 hrs where the value (persons × hours) is at least 1,000;
- Damage to property in the establishment, to the value of at least EUR 2 million; or
- Damage to property outside the establishment, to the value of at least EUR 500,000.

## 15.2 Methodology

There is no currently established specific guidance which stipulates the approach for undertaking an assessment of MA&Ds within EIA. This assessment has been developed based on the application of established risk assessment methodology which aims to identify credible hazard scenarios which are pertinent to the Proposed Development and to document the precautionary measures which are deemed appropriate mitigation.

Based on the design and operational intent of the Proposed Development. A proportionate approach has been used in this assessment, based on the relative likelihood of any credible scenarios. A more focused approach will be taken for scenarios which are more likely to occur or those with greater consequences. This approach is as follows:

Major accident hazards:

- Identify any substances which could be present a hazard, particularly those with hazardous properties which includes:
  - Natural gas which will be supplied to premises via a new pipework network connecting to the distribution main. Natural gas systems will be connected following completion of construction prior to the properties being occupied.
  - Diesel fuel oil present in power generators used during construction/demolition activities. This substance will not be present following construction other than in domestic vehicles.
  - Cement, concrete and lime used during construction.
- Additional substances may be used during construction such as adhesives, however the quantities and hazardous properties would not be sufficient to result in a potential major accident.

- Identify the credible major hazard scenarios associated with these substances which are relevant to and can affect the Proposed Development.

**Disasters:**

- Assess the location and vulnerability of the Proposed Development to hazards as a result of infrastructure, climatic conditions, geological events and others.
- Where credible major accident or disaster scenarios are identified, describe the potential for any change in the relevant environmental and human health receptors in qualitative terms.
- Describe the mitigation measures which will be adopted during the design, construction and operation of the Proposed Development, to provide documented evidence to support and demonstrate that likely effects have been mitigated or managed to an acceptable level.

In general, credible MA&D scenarios will fall into one of three categories:

- Events that could not realistically occur, due to the substances present, the type of development or its geographic location.
- Events that could realistically occur, but for which the Proposed Development, and associated receptors, are no more vulnerable than any other development; and
- Events that could occur, and to which the Proposed Development is particularly vulnerable, or which the Proposed Development has a capacity to exacerbate.

The credible MA&D scenarios can be defined in accordance with methodology established by the EPA Draft Guidelines on EIA using the following descriptors.

**Table 15.1 Descriptions of Impacts and Effects**

Ref.	Category		Classifications (EPA EIA Primer Table 3.3)
1	Quality of Effects	Whether the effect is positive, negative or neutral	Positive, neutral, negative/adverse
2	Significance	The degree of change relative to existing environmental conditions	Imperceptible, not significant, slight effects, moderate effects, significant effects, very significant, profound effects.
3	Extent & Context	The area over which an effect occurs and if the effect is unique or, perhaps, commonly or increasingly experienced.	<b>Extent:</b> the size of the area, the number of sites, and the proportion of a population affected by an effect. <b>Context:</b> whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
4	Probability	The likelihood at which an effect could occur	Likely, unlikely.
5	Duration	The time for which the effect occurs	Momentary, brief, temporary, short-term, medium term, long term, permanent, reversible. Frequency (once / rarely / occasionally / frequently / constantly).
6	Types of Effects	Impacts on the environment	Direct, indirect, cumulative, 'do-nothing', worst case, indeterminable, irreversible, residual, synergistic.

### 15.3 Overview of Proposed Development

A comprehensive description of the Proposed Development is contained within Chapter 2 of this EIA, and the key features have been summarised in this Section.

The Proposed Development will be located at Barnhill, north west of Dublin and directly south of the Dunboyne to Clonsilla rail line, west of the Royal Canal and the Dublin-Maynooth railway line, and to the east of the R149 regional road.

Hansfield Train Station is located on the northern site boundary and to the south, the site is bound by Barberstown Lane South (L7005). Barberstown Lane North runs east west through the site, providing access to residential units.

A small stream runs in a west to east direction on the southern part of the lands and then into the River Liffey.

There are twin 110kV electrical distribution lines which cross the lands in the north-west corner, with two steel transmission towers located on the lands. The development will consist of predominately residential units (approx. 1,243), with some commercial and service provision. The masterplan layout is currently developed on the basis of 10 separate zones.

The current land use in the immediate vicinity of the Proposed Development comprises predominately greenfield and agricultural lands. A cluster of residential properties are in the northern portion of the site, accessed via a local road which dissects the proposed development from east to west. A single residential property is located along the western boundary, with private access to the R149. A series of sheds and outbuildings of various ages and condition are located within a yard area to the south of the local road which runs through the proposed development site.

The nearest major industrial sites to the proposed development are located in the Damastown Industrial Estate, to the north of the M3 / N3, approximately 5 km from the northern boundary of the development. There are three Upper Tier Seveso / COMAH sites and two Lower Tier sites in this area, involved with the manufacture and storage of chemicals and pharmaceutical materials.

## 15.4 Environmental Receptors

The study area will comprise the proposed development site and lands within a 2 km radius to allow an assessment of any potential impacts on the surrounding environment. Information contained in this section has been gathered from Chapters 7 (Land), 8 (Water) and 9 (Biodiversity) of the EIAR.

**Table 15.2 Receptors Within Study Area**

Reference	Receptor Type	Description	Distance
1	Population and Human Health	Construction workers and residential settlements. There is also the potential for vulnerable receptors such as schools and care homes.	Within Proposed Development boundary
2	Population and Human Health	Human population in surrounding area, including residential, commercial, Schools and colleges. Nearest are: Hansfield Housing Complex Hansfield Train Station Eriu Community Collage Hansfield ETSS School.	Within 1 km All are located to the north of the Proposed Development
4	Environmental Receptors – Proposed Natural Heritage Area (pNHA)	The Royal Canal.	Located 0.05km to the east of the Proposed Development boundary
5	Environmental Receptors – The Barnhill stream, discharges to the River Liffey 2.4 km to the southeast of the Proposed Development site.	The Barnhill stream flows through the southern portion of the Proposed Development site from west to east and discharges to the River Liffey 2.4 km to the southeast.	Within Proposed Development boundary

	Water Framework Directive (WFD) Status of 'unassigned'.		
6	Environmental Receptors - River Liffey (Discharges into Dublin Bay)	<p>There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within a 2 km radius of the proposed development site.</p> <p>River Liffey is a Proposed Natural Heritage Area (pNHA)</p> <p>It is noted that the River Liffey discharges into Dublin Bay. Parts of Dublin Bay are SAC, SPA and NHA</p>	<p>River Liffey 1.6 km south of the Proposed Development site.</p> <p>Dublin Bay Located 17 km from the proposed development</p>
7	Environmental Receptors - Groundwater	<p>Bedrock was encountered during previous site investigations in 2008 and 2018 at depths of between 1.5 m bgl and 5.1 m bgl.</p> <p>The bedrock is a locally important aquifer which is moderately productive in local zones. There are no gravel aquifers in the vicinity of the Proposed Development site.</p> <p>Groundwater vulnerability across the majority of the Proposed Development site is 'moderate' (M); this rises to 'high' (H) in the northwest and eastern corners, with a small portion of the north-western corner of the Proposed Development site is an area of 'extreme' (E) vulnerability, and rock at or near surface.</p> <p>Groundwater was generally encountered as a perched water table at the top of the stiff black clay or a perched water table at the bedrock surface</p> <p>Ten GSI unregistered wells are noted, all for domestic or agricultural use. The closest well (a dug well for domestic use) is located 0.9 km south of the boundary.</p> <p>Drainage ditches were identified along several of the field boundaries and along the road which defines the southeastern site boundary. No significant flow of water was observed in the ditches.</p>	<p>Within Proposed Development boundary</p> <p>Dug well for domestic use is located 0.9 km south of the boundary.</p>
8	Environmental Receptors - Controlled water: The River Liffey The Barnhill Stream	<p>The River Liffey is the principal surface water body in the area. At its closest point, it is located approximately 1.8 km south of the Proposed Development site.</p> <p>The Proposed Development site lies within the Liffey and Dublin Bay WFD catchment.</p> <p>The River Liffey originates in the Wicklow mountains, and flows first inland through County Wicklow, north and east through County Kildare, then eastwards through County Dublin to discharge into Dublin Bay.</p>	<p>1.8 km south of the Proposed Development site.</p>

9	Environmental Receptors - Geology and soils	There are no statutory or non-statutory designated sites of geological importance within the defined study area.	N/A
10	Environmental Receptors - Flooding	Onsite observations indicate that small areas on the site may be prone to surface water flooding following heavy rainfall events.  Fluvial flooding data from the OPW Catchment Flood Risk Assessment and Management (CFRAM) provide an indication of areas within the Proposed Development site that may be prone to flooding.  1% Annual Exceedance Probability (AEP) = None identified within the Proposed Development site.  0.1% Annual Exceedance Probability (AEP) = None identified within the Proposed Development site.	Within Proposed Development boundary
12	Environmental Receptors - Listed buildings	There are no statutory or non-statutory Listed buildings within the defined study area	N/A

## 15.5 Hazard Source and Pathway Screening

The threats associated with the Proposed Development are related to substances which will be present during the construction, operation and demolition phases, and the geographic location which informs potential adverse weather or geological events such as earthquakes. These threats are collectively referred to as hazard sources.

Table 15.3 contains a list of potential hazard scenarios which are subject to screening. Screening considers any potential impact on the surrounding environment, taking into consideration the proximity and sensitivity of local receptors. The aim of which is to identify credible MA&D scenarios which require more detailed assessment to determine the risk.

Criteria for excluding potential hazards are as follows:

- No credible hazard source, pathway or receptor exists.
  - The means by which the source of the hazard reaches a receptor(s) is referred to as the pathway. Examples of pathways include via air, land or water.
- The hazard could not occur due to the type of development or its location.
- The consequences of the hazard would be below the criteria established for a MA&D.

**Table 15.3 Hazard Source and Pathway Screening**

Haz Ref.	Hazard Category	Source	Screening and identification of potential Hazard(s) scenarios	Pathway(s)	Further assessment required (Yes/No)
1	Dangerous Substances	Natural gas	<p>New gas pipework will be installed to connect both residential and commercial units within the Proposed Development to the nearby existing natural gas supply mains, with the supply at domestic gas pressures.</p> <p>Damage to this pipework such as an accidental impact during installation of buried services could result in a release of highly flammable gas and if ignited, could cause a fire and/or explosion. Sources of ignition which will be present include electrical equipment.</p> <p>The potential impacts of a fire and/or explosion include:</p> <ul style="list-style-type: none"> <li>- An explosion and/or a major fire within the location of the Proposed Development which could affect multiple units. The release rate, duration and atmospheric stability at the time of the incident would determine the magnitude of the fire and explosion event, however there is the potential for a fatal accident to occur therefore this scenario is included in the potential MA&amp;D criteria listed in Section 15.3.</li> <li>- A fire/explosion could cause significant harm to persons and damage to properties.</li> </ul> <p>Firewater could be generated, with runoff containing a mixture of materials which could be harmful to the environment if released to ground and groundwater.</p>	Air - thermal radiation and explosion overpressure	Yes



2	Dangerous Substances	Diesel fuel oil for on-site power generation and fuel for construction vehicles	<p>Diesel is classified as a flammable substance which is also harmful to the environment.</p> <p>If a release of diesel were to occur, there is the potential for a fire which could result in harm to people and property and for harm to the environment if diesel were to reach receptors including soil, groundwater and local water courses.</p> <p>Diesel storage on construction sites is typically within road bowsers which have a storage capacity of 1,000 litre, sited in various locations close to the point of use. However delivery of diesel to site could be within bulk road tankers which can contain up to 23,000 litres.</p> <p>A single loss of containment from a bowser would not be a credible MA&amp;D scenario, as loss of containment or a fire event is likely to be for short duration requiring minimal remedial clean-up and unlikely to have an impact offsite.</p> <p>Loss of containment from a road tanker could result in diesel reaching groundwater and the local water course via overland flow. This is also unlikely to result in a credible MA&amp;D scenario as the area affected would not exceed the minimum affected area defined in Section 15.3 which is 1 ha (10,000 m<sup>2</sup>).</p>	Air and Ground	No
3	Dangerous Substances	Construction materials including cement and concrete	<p>Cement and liquid concrete are not classified as hazardous substances, however concrete paste is alkaline, therefore harmful to people if in contact with skin or eyes.</p> <p>In the event of an accidental release, concrete can increase the pH levels within water courses.</p> <p>In the event of a loss of containment of concrete/cement which occurred adjacent to the Barnhill stream located within the boundary of the Proposed Development, there is the potential for localised harm to this water course, however the area which could be affected would not be within the criteria for a major accident listed in Section 15.3 which is 10 km or more of a river.</p>	Ground Water and	No

4	Accident (during construction)	Electrical distribution equipment	<p>Damage to existing electrical infrastructure during construction, such as transmission towers and substations could result in harm to people as a direct result of contact with electricity or as a consequence of a fire. There is also the potential for damage to property.</p> <p>During construction activities, work may be undertaken near to overhead electrical transmission lines and excavations may be required where buried services such as electrical cables may be present. Accidental contact with electrical cables can result in harm to people including the potential for fatalities therefore this is a credible MA&amp;D scenario.</p> <p>A fire caused by an electrical malfunction is likely to be small and for short duration, consequently, this is not considered as a credible major accident and disaster scenarios</p>	Air – direct contact with electrical systems	Yes
5	Accident (during operation & following construction)	Electrical distribution equipment	<p>Following completion of construction activities and when properties are occupied, there is the potential for electrical powerlines to be brought down during storms with high winds.</p> <p>This scenario could result in fire and the potential for electric shock injuries causing harm to people and damage to property on site and is therefore a credible MA&amp;D scenario.</p>	Air – direct contact with electrical systems	Yes
6	Accident	Train derailment	<p>Due to the proximity to train lines, there is the potential that a train derailment could impact the Proposed Development causing harm to people, and damage to property.</p> <p>The Dunboyne to Clonsilla rail line and Hansfield train station runs alongside the northern boundary of the Proposed Development site. The risk of a derailment is low, and the landscaping and fencing installed alongside the track would reduce the potential impact therefore this not considered to be a credible MA&amp;D scenario.</p>	Ground	No
7	Natural Event	Surface water flooding	<p>The location of the Proposed Development is such that small areas on the site may be prone to surface water flooding following heavy rainfall. Flooding assessments have been undertaken for the Proposed Development as part of this EIAR.</p> <p>Fluvial flooding data from the OPW Catchment Flood Risk Assessment and Management (CFRAM) provides an indication of areas within the Proposed Development site that may be prone to flooding:</p>	Ground / Water	No

			<p>1% Annual Exceedance Probability (AEP) = None identified within the Proposed Development site.</p> <p>0.1% Annual Exceedance Probability (AEP) = None identified within the Proposed Development site.</p> <p>Consequently, flooding is not considered to be a potential MA&amp;D scenario.</p>		
8	Natural Event	Earthquakes and seismic events	<p>Seismic events occurring in the locality of the Proposed Development could cause harm to people and damage to property.</p> <p>The Irish National Seismic Network has historically recorded earthquakes on the island of Ireland, but these are low magnitude events, and none have been recorded in the vicinity of the Proposed Development. Consequently, seismic events are not considered to be a credible MA&amp;D scenario.</p>	Ground	No
9	Natural Event	Lightning strike	<p>A direct lightning strike to any of the units or infrastructure within the Proposed Development site could cause property damage and potential harm to people if struck by falling objects. There is also the potential that lightning may ignite combustible materials resulting in a fire.</p> <p>Where required, lightning mitigation requirements will be assessed in accordance with recognised building standards such as BS EN/IEC 62305, consequently, this is not considered as a credible MA&amp;D scenario.</p>	Air	No
10	Natural Event	Climate change / extreme weather events – high / low temperatures, high winds	<p>The potential impacts associated with climate change may include increasing atmospheric temperatures and the frequency of storms. The location is such that potential impacts such as rising sea levels are not a credible scenario.</p> <p>The structural design and engineering specifications of the Proposed Development will be in accordance with national codes and standards. For example, the structural design will withstand the expected range of windspeeds. Consequently, no credible major MA&amp;D scenarios have been identified associated with climate change.</p>	Air	No
11	Accident	Vandalism / arson / terrorism	<p>Acts of vandalism such as arson and / or terrorist activities could result in hazardous consequences, such as fire and/ or explosion.</p> <p>During construction, the CEMP states that the site will have security controls at access points and once occupied, the Proposed Development will be freely accessible to the public.</p> <p>The CEMP states that risks such as arson will be controlled in compliance with the Health and Safety Authority Construction Regulations 2013.</p>	Air	No

			Consequently, this is not considered as a credible MA&D scenario.		
12	Accident	Road impact	The accidental impact of a vehicle could cause damage to property and harm to people on site. The R149 runs along the west side of the Proposed Development roadway it is mainly edged by trees and hedge line shrubbery. It is unlikely that any vehicle leaving the road would cause significant damage which would constitute a MA&D. Consequently, this is not considered as a credible MA&Ds scenario.	Ground	No

## 15.6 Predicted Impacts

Screening of hazardous sources and pathways has identified two credible MA&D scenarios which are:

- Scenario 1: A fire and/or explosion caused by a loss of containment of highly flammable natural gas contained in distribution pipework to properties during the operational phase.
- Scenario 2: Failure of electrical transmission systems which could occur during all phases of the Proposed Development. This incorporates Scenarios 4 and 5 in Table 15.3.

This section describes the mitigation measures to reduce the risk of these scenarios and if they were to occur, reduce the severity of the impacts to people, the environment and property.

### 15.6.1 Do Nothing

In the absence of the Proposed Development and the site remaining in its current state without extensive development of gas distribution pipework, the scenario would no longer be deemed applicable however the benefits of the Proposed Development would not be achieved.

The MA&D scenario associated with damage to, or failure of the electricity transmission and distribution system including powerlines could still occur. However the absence of Proposed Development the likelihood of people being within the area is vastly reduced and hence the incident escalating to a major accident scenario are considered unlikely.

Given the zoning policy of the land for residential development, it is likely that another similar development proposal would be brought forward in the absence of this development.

### 15.6.2 Construction Phase

Section 15.5 identified potential MA&D scenarios which could occur during construction of the Proposed Development. These include the following impacts which could have a negative effect on receptors within the EIAR study area and environs:

- Accidental spills and leaks of substances such as diesel which have the potential to contaminate surface water discharge, soil and groundwater.
- The use of materials such as concrete and cement which have the potential to contaminate surface water run-off and watercourses.

In addition to the above, sedimentation (suspended solids) associated with surface water run-off from ground works along with culverting and drainage works could have a potential impact, however the level of impact associated with these hazards is not considered to be at the level which would correspond to a MA&D.

### 15.6.3 Operational Phase

During operation, the supplies of natural gas to properties and electrical distribution networks will be fully developed. The risks associated with these hazards are well understood and the associated mitigation measures are described in Section 15.7.

In addition to these, further operational effects include the following:

- Increased surface water run-off from the site due to development of land has the potential to increase the risk of flooding if surface water design does not limit the discharge from the site to greenfield discharge rates.
- Accidental spills and leaks from development use / leaking pipes has the potential to contaminate surface water run-off, if adequate interceptors are not incorporated within the proposed development.

Without mitigation measures in place, surface water flooding and leaks from pipework containing water and wastewater are a hazard, however the impacts are below the level at which would correspond to a MA&D.

#### 15.6.4 Demolition

The potential impacts associated with eventual demolition of the Proposed Development are considered to be of a similar nature to those arising from the construction process, such as the use of diesel to generate power for equipment and vehicles. Consequently, no further analysis is considered necessary within this Chapter. These operations will be carried out in accordance with the appropriate Regulations at the time. At present, this would be the Health and Safety Authority Construction Regulations 2013. These Regulations require duty holders to identify risks, consult and engage with others about the risks and how they are being managed throughout these activities.

#### 15.6.5 Cumulative Impacts

Major accidents and disasters are by their nature very low probability events. As such it would not be appropriate to consider the cumulative impacts associated with simultaneous hazards occurring such as a major fire during a storm or earthquake.

### 15.7 Mitigation Measures

Table 15.4 describes the specific prevention and mitigation measures associated with the two credible MA&D scenarios identified in this assessment. These measures comprise the associated regulations, infrastructure, systems, processes, and procedures which will be in place for the Proposed Development.

In addition to these, the design of the Proposed Development will be in accordance with all relevant building standards. Compliance with these standards is monitored by Building Control Ireland and includes requirements for fire safety as well as health, structural stability, energy conservation and accessibility. The Proposed Development will be designed in accordance with Building Regulations 2017, Technical Guidance Document - Fire Safety Volume 2, Dwelling Houses.

Hazards identified during the construction phase of the project should be managed via the appropriate risk assessments for compliance with the Health and Safety Authority Construction Regulations 2013. These will be described in the CEMP.

**Table 15.4 Credible Major Accident and Disaster Scenarios, Impacts and Mitigation measures**

Ref.	Major Accident and Disaster Scenario	Description of impact	Description of Mitigation Measures
1	<p>Fire / explosion during installation or maintenance of natural gas supply for Proposed Development.</p> <p>Damage to this pipework could result in a release of highly flammable gas which if ignited, could cause a fire and/or explosion causing significant harm to persons in the area and damage to property.</p>	<p><b>Impact Type:</b> Direct</p> <p><b>Significance:</b> Significant</p> <p><b>Extent:</b> Significant harm to persons in area and damage to property.</p> <p><b>Probability:</b> Unlikely</p> <p><b>Duration:</b> Momentary</p>	<p>Following installation, the mains supply of natural gas at defined conditions (composition, temperature, and pressure) currently managed by Gas Networks Ireland (GNI) who provide continuous monitoring and would respond in the event of supply issues.</p> <p>Gas mains and service pipes are designed and installed in accordance with the requirements of The NSAI Gas transmission Pipelines and pipeline installations I.S328: 2021. These Regulations are supported by guidance published by the Health and Safety Executive.</p> <p>In addition to Regulatory standards, the design and installation of gas pipework is in accordance with industry codes and technical standards, such as those produced by the Institution of Gas Engineers and Managers (IGEM).</p> <p>Valves will be installed at appropriate locations in the gas pipework to enable gas engineers to isolate the supply in an emergency and for maintenance purposes.</p> <p>Installing gas pipework below ground reduces the potential for accidental damage. The depth and location is carefully controlled to maintain a constant temperature, protecting the pipework against thermal effects.</p> <p>All combustion installations within buildings must be accommodated in ways that meet the requirements of Building Standards. Gas installations also have to comply with the Gas Safety Regulatory Framework for Ireland 2018, which require professional work to be undertaken by competent, registered and accredited Gas Safe engineers.</p>
2	<p>Accidental damage or failure of electrical systems including 110kV powerlines which cross the lands in the north-west corner of the Proposed Development.</p> <p>Failure of electrical transmission and distribution systems could lead to significant harm to persons in area and damage to property.</p>	<p><b>Impact Type:</b> Direct</p> <p><b>Significance:</b> Significant</p> <p><b>Extent:</b> Significant harm to persons in area and damage to property.</p> <p><b>Probability:</b> Unlikely</p> <p><b>Duration:</b> Momentary</p>	<p>Electrical power lines are designed, installed, and maintained in accordance with industry standards and guidance.</p> <p>A CEMP will be produced for the Proposed Development which will consider the risks associated with overhead powerlines during construction. These will be managed in compliance with the Health and Safety Authority Construction Regulations 2013 and the Health and Safety Authority Code of Practice for Avoiding Danger from Overhead Electricity Lines May 2019.</p> <p>Construction management plan will consider hazard zones, exclusion zones and plant and machinery minimum safe distances from the powerlines.</p>

## 15.8 Emergency Management

During the construction phase, emergency management will be included as required by the general safety provisions listed in Part 4 of the Safety, Health and Welfare at Work (Construction) Regulations 2013. These measures are the responsibility of the contractor who is in control of the site and include providing emergency routes and exits and ensuring a sufficient number and size are available.



Controlling underground works which will be required for the installation of services such as gas and electricity are described in these Regulations, which include the requirement to take all appropriate steps to ensure there is no danger to persons from electric cables and gas pipes.

The emergency plans developed by the contractor will include access routes to the nearest hospital with accident and emergency facilities, Connelly Hospital in Blanchardstown. The nearest fire station and Garda station is also located in Blanchardstown.

## 15.9 Residual Impact

The implementation of mitigation measures will not eliminate the hazards associated with natural gas and electrical systems but will manage the risks and reduce these to a level as low as reasonably practicable (ALARP).

## 15.10 Conclusions

The identification and assessment of MA&D documented in this chapter has identified two credible scenarios which could be categorised as a MA&D. These are:

1. Loss of containment from natural gas supply distribution to Proposed Development as a result of accidental damage or failure resulting in a fire and / or explosion causing significant harm to people and damage to properties. The emergency services may order an evacuation of properties and gas supplies could be interrupted for a prolonged period of time.

Design, installation and maintenance of gas distribution networks is well controlled via industry standards and regulation of the competence of engineers and technicians. Pipework is run below ground to minimise the potential for accidental damage and locations are documented in service drawings which are made available to anyone carrying out work in the area following construction.

2. Failure, malfunction, accidental damage or contact with electrical transmission and distribution systems including two 110kV powerlines which cross the lands in the north-west corner of the Proposed Development. Naturally occurring events such as extreme weather with storms and high winds can also damage electrical infrastructure.

Contact with high voltage electricity can result in significant harm to people and potentially result in a fire and / or explosion. There are 110kV power lines which run across the Proposed Development and electrical distribution cables will be installed below ground during construction to connect new premises to the supply network. Similarly to gas distribution, service drawings will be produced to document the location of cables.

The hazards associated with HV electrical systems will be included within the CEMP to manage to risks during the construction phase.

Communication with the electric power transmission operator in Ireland, EIRGRID will ensure that all appropriate and proportionate controls are implemented in accordance with the Health and Safety Authority (HSA) Code of Practice for Avoiding Danger from Overhead Electricity Lines.

Major accidents are by nature high consequence, low probability events and generally require a number of simultaneous failures to occur in order for an event to take place. Although the consequences of these findings appear significant, the likelihood of them occurring is low.

The credible MA&D scenarios identified for the Proposed Development are well understood hazards which are managed via established Regulations and industry standards.

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Development at Barberstown, Barnhill and  
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## CHAPTER 16

### Significant Interactions of Impacts

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 16 Significant Interactions of Impacts

### Contents

16	Significant Interactions of Impacts .....	16-2
16.1	Introduction .....	16-2
16.1.1	Author Information and Competency .....	16-2
16.1.2	Assessment Methodology.....	16-2
16.2	Description of Significant Interactions.....	16-2
16.2.1	Landscape and Visual Impact.....	16-2
16.2.2	Material Assets – Traffic and Transport.....	16-3
16.2.3	Material Assets: Services and Infrastructure .....	16-3
16.2.4	Land .....	16-4
16.2.5	Water (Hydrology).....	16-4
16.2.6	Biodiversity.....	16-4
16.2.7	Noise and Vibration.....	16-4
16.2.8	Air Quality .....	16-5
16.2.9	Climate Change .....	16-5
16.2.10	Cultural Heritage and Archaeology.....	16-5
16.2.11	Population and Human Health.....	16-5
16.2.12	Major Accidents & Disasters .....	16-5

### Tables

Table 16.1 Potential Interaction of Effects Matrix (Con = Construction, Op = Operational. If there is no identified potential interaction the box is left blank.....	16-6
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## 16 Significant Interactions 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 the significant interactions of impacts identified in the previous chapters.

#### 16.1.1 Author Information and Competency

This chapter was prepared by Mairi Henderson BA (Hons) Housing, MRTPI, MIH, of McCutcheon Halley Planning Consultants.

#### 16.1.2 Assessment Methodology

##### 16.1.2.1 Legislative Requirements

The EIAR has considered and assessed the interactive effects and cumulative impacts arising from the construction and operation of the proposed development based on review of the impacts arising from each discipline and consultation with experts involved in the preparation of specialist discipline chapters.

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”*

The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in Table 16.1.

### 16.2 Description of Significant Interactions

#### 16.2.1 Landscape and Visual Impact

Chapter 4 assesses the likely impacts on landscape, and the visual impacts arising from the proposed development. During the construction phase, the following aspects would interact with Landscape and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** Potential effects to visual amenity within the locality or the wider study area as a result of the visibility of construction activities such as demolition works, the construction / restoration of buildings, associated scaffolding, site traffic and construction compounds.

During operation the potential interactions are:

- **Population and Human Health:** Potential effects of the development on views and visual amenity such as the potential for the development to alter (beneficial or adverse) the composition of the view from a viewpoint.

The potential significant impacts of Landscape have been considered within the relevant discipline and mitigation measures outlined where required. The architectural and landscape design of the proposed development will reduce the negative effects of the change in view from rural to urban landscape.

With mitigation measures in place, no significant residual negative impacts are predicted.

### 16.2.2 Material Assets – Traffic and Transport

Chapter 5 assesses the likely impacts on Traffic and Transportation arising from the proposed development. During the construction phase, the following aspects would interact with Traffic and Transport and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** Construction traffic has the potential to negatively impact local residents through delays and potential impacts on health and safety.
- **Noise and vibration:** Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents
- **Air Quality and Climate Change:** Emissions from construction traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from construction traffic may contribute to climate change.
- **Water (Hydrology):** Construction vehicles at the site may give rise to hydrocarbon spills.

During operation the potential interactions are:

- **Population and Human Health:** Increased traffic once each phase of the development is occupied has the potential to negatively impact local residents through increased delays and potential impacts on health and safety.
- **Noise and vibration:** Construction traffic may give rise to local noise and vibration which may have an impact on the amenity of local residents
- **Air Quality and Climate Change:** Emissions from traffic may result in a decrease in local air quality. Increased greenhouse gas emissions from traffic may contribute to climate change.
- **Water (Hydrology):** Increased traffic and parking at the site may give rise to hydrocarbon spills from vehicles

The potential significant impacts of Traffic and Transport have been considered within the relevant discipline and mitigation measures outlined where required. The Construction Traffic Management Plan proposes a series of measures to mitigate the impact of construction traffic. For the operational phase, the development has been designed to promote a high use of public transport and active modes of travel. The surface water layout has also been designed with use of hydrocarbon interceptors as appropriate.

With mitigation measures in place, no significant residual negative impacts are predicted.

### 16.2.3 Material Assets: Services and Infrastructure

Chapter 6 assesses the likely impacts on Services and Infrastructure arising from the proposed development. During the construction phase, the following aspects would interact with Services and Infrastructure and in the absence of mitigation may give rise to likely significant effects.

- **Population and human health:** there may be interruptions to existing services, including water, electricity, communications, as connections are provided between the proposed development and existing services.
- **Water (Hydrology):** works to provide connections to utilities and services, such as foul and surface water sewer, may have negative impacts on groundwater if spills of fuels or other contaminants occur. Stockpiling of materials or works to drainage system may lead to temporary localised flooding if drains become blocked.

During operation, the potential interactions are:

- **Water (Hydrology);** There will be an increased demand on potable water and on the municipal drainage infrastructure.
- **Biodiversity:** disturbance to bats arising from artificial light spillage into the environment from the associated lighting scheme.

The potential significant impacts to Services and Infrastructure have been considered within the relevant discipline and mitigation measures outlined where required. The Construction Environmental Management Plan will put in place measures to mitigate interruptions to services and utilities during the construction process, and to avoid impacts on groundwater. Irish Water have advised that there is sufficient capacity of potable water to service the proposed development. The lighting scheme has been designed to limit artificial lighting in areas where bats may be present.

With mitigation measures in place, no significant residual negative impacts are predicted.

## 16.2.4 Land

Chapter 7 assesses the likely impacts on Land arising from the proposed development. During the construction phase, the following aspects would interact with Land and in the absence of mitigation may give rise to likely significant effects.

- **Population and human health:** Site clearance and demolition 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.
- **Water (Hydrology):** Construction activities may result in discharge of contaminated run-off to surface water, or result in contamination of groundwater
- **Cultural Heritage and Archaeology:** There may be an impact to Cultural Heritage and Archaeology if previously undiscovered sub-surface remains are damaged or destroyed during site clearance and/or construction.

There are considered to be no potential significant interaction of impacts with Land during the operational phase of the development.

Overall, the potential significant impacts to Land have been considered within the relevant discipline and mitigation measures outlined where required. The Construction Environmental Management Plan will put in place measure to mitigate negative impacts during site clearance and demolition works, and to avoid contaminated run-off to surface water. Any construction works are to be monitored by a qualified archaeologist to mitigate risk of destruction / damage to undiscovered sub-surface remains.

With mitigation measures in place, no significant residual negative impacts are predicted.

## 16.2.5 Water (Hydrology)

Chapter 8 assesses the likely impacts on Water (Hydrology) arising from the proposed development. During the construction phase, the following aspects would interact with Water (Hydrology) and in the absence of mitigation may give rise to likely significant effects.

- **Biodiversity:** any negative impacts on water quality such as increased discharge of silt or sediment to surface water may result in impacts to biodiversity downstream of the site.
- **Climate Change and Population and Human Health:** there is a potential for interaction between climate change (increased rainfall), water (flooding) and Population & Human Health (effects of flooding).

The potential significant impacts to Water (Hydrology) have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan will put in place measure to ensure that there is no increased discharge of silt or sediment to surface water. The Flood Risk Assessment has taken account of the projected effects of climate change and the development is designed to be outside of any flood risk associated with climate change effects.

With mitigation measures in place, no significant residual negative impacts are predicted.

## 16.2.6 Biodiversity

Chapter 9 assesses the likely impacts on Biodiversity arising from the proposed development.

No other potential significant interactions have been identified other than those already described in section 16.2.3 and 16.2.5.

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.

## 16.2.7 Noise and Vibration

Chapter 10 assesses the likely impacts on Noise and Vibration arising from the proposed development. During the construction phase, the following aspects would interact with Noise and Vibration and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** increased levels of noise and vibration during construction activities may result in negative impacts to the amenity of local residents.

During operation, the potential interactions are:

- **Population and Human Health:** Once the development is fully occupied increased levels of noise due to increased traffic and activity may result in negative impacts to the amenity of local residents.

No other potential significant interactions have been identified other than those already described. The potential significant impacts of Noise and Vibration have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan will include measure to mitigate the impact of noise and vibration during construction activities. For the operational phase, the development has been designed to promote a high use of public transport and active modes of travel, mitigating potential impacts of increased traffic noise.

With mitigation measures in place, no significant residual negative impacts are predicted.

### 16.2.8 Air Quality

Chapter 11 assesses the likely impacts on Air Quality arising from the proposed development. During the construction phase, the following aspects would interact with Air Quality and in the absence of mitigation may give rise to likely significant effects.

- **Population and Human Health:** Construction activities may result in a decrease in local air quality which has the potential to negatively impact on human health.

No potential operational interactions were identified, and no other potential significant interactions have been identified other than those already described.

The potential significant impacts to Air Quality have been considered within the relevant discipline and mitigation measures outlined where required. The Construction and Environmental Management Plan will include measure to mitigate the impact on air and climate during construction activities.

With mitigation measures in place, no significant residual negative impacts are predicted.

### 16.2.9 Climate Change

Chapter 12 assesses the likely impact to Climate Change arising from the proposed development.

No other significant interactions have been identified, other than those discussed within sections 16.2.2 and 16.2.5.

### 16.2.10 Cultural Heritage and Archaeology

Chapter 13 assesses the likely impacts to Cultural Heritage and Archaeology arising from the proposed development.

No other significant interactions have been identified, other than those discussed within section 16.2.4.

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.

### 16.2.11 Population and Human Health

Chapter 14 assesses the likely impacts to Population and Human Health arising from the proposed development.

No other significant interactions have been identified, other than those discussed within sections 16.2.1, 16.2.2, 16.2.3, 16.2.4, 16.2.7 and 16.2.8.

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.

### 16.2.12 Major Accidents & Disasters

Chapter 15 assesses the Risk of Major Accidents and Disasters arising from the proposed development.

No other significant interactions have been identified, other than those discussed within section 16.2.3.

With mitigation measures in place, no significant residual negative impacts are predicted

Table 16.1 Potential Interaction of Effects Matrix (Con = Construction, Op = Operational. If there is no identified potential interaction the box is left blank.

Interaction	Landscape		Traffic		Infrastructure		Land		Water		Biodiversity		Noise		Air		Climate		Cultural Heritage		Population & Human Health		Major Accidents		
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	
Landscape																									
Traffic														✓	✓										
Infrastructure									✓			✓													✓
Land									✓			✓													
Water																		✓							
Biodiversity																									
Noise																									
Air																									
Climate																									
Culture																									
Population & Human Health																									✓
Major Accidents																									





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## CHAPTER 17

### Schedule of Mitigation Measures and Monitoring

# Volume II

Environmental Impact Assessment Report



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July 2022

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## Chapter 17 Schedule of Mitigation and Monitoring

### Contents

17	Schedule of Mitigation Measures and Monitoring .....	17-2
17.1	Introduction .....	17-2
17.1.1	Mitigation .....	17-2

### Tables

Table 17.1	Mitigation and Monitoring Table .....	17-3
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## 17 Schedule of Mitigation Measures and Monitoring

### 17.1 Introduction

This chapter includes the full schedule of mitigation measures and monitoring where proposed in respect of the Strategic Housing Development within the townlands of Barberstown, Barnhill and Passifyoucan at Clonsilla, Dublin 15.

#### 17.1.1 Mitigation

The EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, May 2022) identifies that there are four established strategies for the mitigation of effects; avoidance, prevention, reduction and offsetting.

**Mitigation by Avoidance:** Avoidance usually refers to strategic issues, such as site selection, site configuration or selection of process technology. This may be the fastest, cheapest and most effective form of effect mitigation. In many situations, mitigation by avoidance may be viewed as part of the “consideration of alternatives”.

**Mitigation by Prevention:** This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level.

**Mitigation by Reduction:** This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. This is regarded as a less sustainable, though still effective, approach, implemented through reducing the effect and/or reducing exposure to the effects.

**Mitigation by Offsetting:** This is a strategy used for dealing with adverse effects which cannot be avoided, prevented or reduced. It includes measures to compensate for adverse effects. Examples include restoration of buildings, walls or features to compensate for loss of similar features; planting of new vegetation elsewhere to replace unavoidable loss of similar vegetation; or the provision of a new amenity area to replace amenity lost as a result of a project.

##### 17.1.1.1 Monitoring

Some disciplines have proposed monitoring following their assessment of impacts and implementation of proposed mitigation measures. Monitoring will take place after consent is granted in order to check that the project in practice conforms to the predictions made during the EIA process. Monitoring checks that proposed systems are operating as intended. This allows adjustments of operations to be made to ensure compliance with consent conditions such as emission limit values, conditions of operation, performance criteria indicators and detection of unexpected mitigation failures.

The EPA Guidelines also state that undertakings to mitigate are specific parts of the project that must be complied with. Therefore, it is in the applicant’s interest to ensure that all undertakings to mitigate are fully understood and accepted and the resources will be available to ensure compliance with such commitments.

The following mitigation and monitoring measures set out in Table 17.1 have been proposed by the specialist consultants during preparation of the EIAR.

**Table 17.1 Mitigation and Monitoring Table**

Potential Impact	Construction	Operation
<b>EIAR Topic: Chapter 2 Project Description</b>		
<p><b>Potential impacts during construction and operation</b></p>	<p>Chapter 2 provides a description of the proposed development, phasing and construction activities and provides a summary of the outline Construction and Environmental Management Plan (CEMP) which accompanies the planning application.</p> <p>All construction activities will be managed and directed by a Construction Traffic Management Plan (CTMP) prepared by the main contractor. Details of the final CTMP are to be agreed with Fingal County Council prior to the commencement of construction activities on site.</p> <p>Measures will be put in place to minimise the volume of construction traffic generated by the development. These measures will include the storage of all excavated topsoil on site for re-use within the completed development. Similar efforts will be made to re-use excavated subsoil where possible.</p> <p>The construction of the proposed development will be in accordance with the Outline Construction and Environmental Management Plan (CEMP) which accompanies this planning application (and will take into account the Schedule of Environmental Commitments presented within this EIAR document). The CEMP will be a live document and is to be further developed by the appointed works contractor in advance of the commencement of the construction of the development. The CEMP will be fully implemented on site for the entire duration of the project construction phase. Environmental monitoring will be carried out during the construction phase as detailed within the Schedule of Environmental Commitments presented in Chapter 17.</p> <p>The outline CEMP details the appropriate measures that will be implemented during construction of the proposed development to avoid, reduce or mitigate against the following:</p> <ul style="list-style-type: none"> <li>• Excess Removal of Existing Trees, Hedgerows and Vegetation.</li> <li>• Noise Pollution.</li> <li>• Air Quality and Dust Pollution.</li> <li>• Excess Surface Water Runoff from Site to adjacent watercourses and Water Pollution.</li> <li>• Litter and Organic Waste Pollution.</li> </ul> <p>The construction of the proposed development will be carried out in adherence with the Outline Construction and Demolition (C&amp;D) Waste Management Plan (WMP) which is incorporated into the CEMP which accompanies the application. The C&amp;D WMP has been prepared in accordance with the relevant guidance, in particular the “Best Practice Guidelines</p>	<p>The significant impacts and appropriate mitigation measures associated with the proposed development are detailed in the relevant discipline chapters throughout the EIAR.</p>



	<p>for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects”, published in 2021, by the Environmental Protection Agency (EPA).</p> <p>The Outline C&amp;D WMP will assist in providing a method for monitoring and auditing waste management performance and compliance for the duration of the construction of the development.</p> <p>An outline Operational Waste Management Plan (OWMP) has been prepared and accompanies the planning application. The OWMP aims to provide a strategy to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible.</p>	
<p><b>EIAR Topic: Chapter 3 Alternatives Considered</b></p>		
<p><b>Potential impacts have been mitigated by design, as set out in Chapter 2</b></p>	<p>Alternatives may be described at six levels: do-nothing alternative, alternative locations, alternative layouts, alternative design, alternative processes and alternative mitigation measures.</p> <p>The consideration of the main alternatives in respect of the development of the subject land was undertaken by the Design Team. The proposed final strategy is the most appropriate scheme and was chosen as it was considered to respond most effectively to:</p> <ul style="list-style-type: none"> <li>▪ Policy objectives for Barnhill LAP,</li> <li>▪ Topography and constraints of the site,</li> <li>▪ Opportunities to provide sustainable development focused on active and public transport modes,</li> <li>▪ Issues raised through pre-consultation with Fingal County Council, An Bord Pleanála, and</li> <li>▪ Issues raised during the EIAR consultation process.</li> </ul> <p>The significant impacts and appropriate mitigation measures associated with the proposed development are detailed in the relevant discipline chapters throughout the EIAR.</p>	<p>The significant impacts and appropriate mitigation measures associated with the proposed development are detailed in the relevant discipline chapters throughout the EIAR.</p>
<p><b>EIAR Topic: Chapter 4 Landscape and Visual Impact</b></p>		
<p><b>Visual effects</b></p>	<p>During the construction stage the effects on visual amenity would be minimised, by the full implementation of the proposed outline Construction &amp; Environmental Management Plan (CEMP), submitted with the planning application. The CEMP is based on mitigation measures contained in the chapters of the EIAR including measures resulting in reduction of landscape and visual effects, such as:</p> <ul style="list-style-type: none"> <li>▪ the early establishment of tree/hedgerow protection zones, as part of each of the construction phases;</li> </ul>	<p>During the operational phase the main mitigation measure would be the high-quality design of the Proposed Development. For that matter, the proposed architectural layout and associated landscape design strategy aim to create a sustainable community, balancing the needs of the people that would live in the area with a biodiversity centred landscape treatment.</p> <p>The finishes of the proposed buildings would utilise high-quality materials, in a muted colour palette which both tie in with the buildings in the Hansfield SDZ and respect the surrounding agricultural landscape, consisting of numerous shades of green but with few contrasting colour elements.</p>

	<ul style="list-style-type: none"> <li>▪ keeping the number and height of stockpiles to a minimum;</li> <li>▪ using perimeter hoarding, and</li> <li>▪ minimizing the number of tower cranes present within the site.</li> </ul>	<p>The proposed landscape design would create a connection between the different architectural character areas, bringing the whole development together as one neighbourhood, by proposing</p> <ul style="list-style-type: none"> <li>▪ distinctive placemaking tools, such as the red path and moon gates throughout the Site;</li> <li>▪ numerous walking/cycling paths for easy access between the different areas;</li> <li>▪ similarly designed pocket parks and play areas throughout the Site;</li> <li>▪ the retention of and ecological enhancement of some of the existing landscape elements, such as the hedgerows and associated mature trees and the Barnhill stream; and</li> <li>▪ ample tree and shrub planting areas throughout the development, along streets, along the site boundaries and within all public open spaces and public plaza areas, based on a development wide planting palette, which includes many native and/or pollinator friendly species.</li> </ul> <p>Assuming that all of the proposed architectural and landscape features would be implemented in full and to a high standard, it is not considered that additional landscape or visual mitigation measures are required.</p>
<b>Monitoring</b>	None Proposed.	None Proposed.
<b>EIAR Topic: Chapter 5 Material Assets: Traffic and Transportation</b>		
<b>Increased traffic</b>	<p>During the construction phase of the development, the following measures will be put in place to reduce the impact on the surrounding environment:</p> <ul style="list-style-type: none"> <li>▪ The contractor will be required to provide wheel cleaning facilities, and regular cleaning site access will be carried out.</li> <li>▪ Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads.</li> <li>▪ Monitoring and control of construction traffic will be ongoing during construction works.</li> <li>▪ Construction traffic routes shall be use strategically by construction vehicles to minimise traffic impact to surrounding properties.</li> </ul> <p>Note: Further details of the mitigation measures to be put in place at construction stage can be found in the Outline Construction and Environmental Management Plan submitted with this application.</p>	<p>None Proposed.</p> <p>As discussed in preceding sections, the traffic modelling undertaken demonstrated that the junction under study will continue to operate successfully with the proposed development in place.</p> <p>Based on the modelling results obtained for all junctions, it can be concluded that the local road network will operate within capacity and at satisfactory levels during peak hours for all assessment years with the proposed development in place. Therefore, the potential traffic impact associated with the development was found to be long-term, neutral and imperceptible.</p> <p>The proposal has been designed to be a walking/cycling friendly scheme, very well served by public transport and with plenty of amenities available at a short walk distance. A Mobility Strategy has been created for the development, submitted as a separate document, to promote active travel and to minimising the potential car trips in the local area.</p>
<b>Monitoring</b>	None Proposed.	None Proposed.

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EIAR Topic: Chapter 6 Material Assets, Service Infrastructure and Utilities		
<b>Potential impacts to services</b>	<p>Appropriate environmental controls will be put in place during construction of the development to ensure that negative impacts on existing watercourses from construction processes are mitigated against. The contractor will be obliged to put temporary measures in place to limit the rate of surface runoff from the site. The contractor will also be obliged to manage the quality of surface water runoff and ensure run-off from the site does not result in excessive siltation of the receiving drainage channels.</p> <p>The construction compound will include adequate temporary welfare facilities including toilets and cleaning facilities and shall be supplied with a potable water supply. Foul drainage discharge from the compound will be removed, and disposed of, off site to an appropriately licensed facility for disposal until a connection to the public internal development foul sewer network has been established.</p> <p>The existing 4" ø uPVC watermain, installed in 1965, that travels through the site along the Barberstown Lane North Road is to be fully protected during construction of the development so that water supply to the existing properties within and surrounding the development is not disturbed as a result of construction activities. Irish Water are to be notified in advance of any construction works on, or adjacent to, any existing watermains within the development area so as to mitigate against the potential disruption of water supply.</p> <p>Extensive liaison with ESB Networks shall be made to fully ascertain the extent of the overhead ESB infrastructure that will require to be undergrounded. Implementation of the undergrounding works will be adequately planned so as to reduce impacts to power supply to the existing dwellings in the development area.</p> <p>The aforementioned mitigation measures have been included in the Outline Construction and Environmental Management Plan (CEMP), which accompanies the planning application, and should be included in the final CEMP issued at construction stage.</p>	<p>A suitable SuDS network system shall be constructed as part of the development to ensure that all surface water runoff generated by the proposed development is appropriately stored, and treated, during heavy rainfall events. Treated runoff shall be subsequently discharged to the existing watercourses at a controlled rate. To ensure that all surface water network and SuDS measures are operating to optimum efficiency during the operational stage of the development, all SuDS features, petrol interceptors and silt trap manholes shall be regularly, maintained, cleaned of litter and debris, and checked that all inlets and outlets where water enters or leaves a SuDS feature are clear of obstructions. Maintenance of planting, such as grass cutting, within and adjacent to the SuDS features is to be undertaken at regular intervals. The proposed SuDS features are to be regularly inspected for damage and remedial works carried out when necessary. Maintenance of the Surface Water Network and SuDS features proposed as part of the scheme will be carried out in accordance with the Taking in Charge strategy for the development.</p> <p>The proposed development internal foul sewer network and its associated foul pumping station and rising main shall be constructed in line with Irish Water's Code of Practice and Standard Details for Wastewater Infrastructure. Adherence to these Irish Water Guidelines will allow for provision of a modern, high quality, foul sewer network, something which does not currently exist within the site area and its surrounds. The upgrade of the existing foul sewer on Ongar Road, to be completed prior to the commencement of the Barnhill SHD shall increase the capacity of the existing network. Therefore, the additional wastewater generated by the development shall be fully catered as part of this upgrade. Connection agreements will be made with Irish water regarding wastewater discharge off site.</p> <p>The proposed development internal water infrastructure network shall be constructed in accordance with Irish Water's Code of Practice and Standard Details for Water Infrastructure. This will allow for the provision of a modern, high quality, watermain that will have sufficient capacity to meet the water demand requirements of the development and its existing adjacent properties.</p> <p>The provision of enhanced watermains infrastructure as part of the proposed development is anticipated to have slight, long-term positive impacts for the site area and its surrounds as it will allow for increased water supply and has the potential to allow for the removal / upgrade of the older existing watermains passing through the site.</p>

		As utility operators predominately upgrade their networks in anticipation of future opportunities, it is anticipated surrounding businesses and residents are likely to benefit from the provision of utilities without any requirement for long-term mitigation measures. As noted previously, this will positively impact the local community with strengthening of the existing utilities in the locality although there may be slight short-term negative impacts such as local outages as the utilities tie into these existing networks.
<b>Monitoring</b>	Visual monitoring will be undertaken as part of the regular site audits during the construction of the proposed development and liaison with the ESB, gas, water, foul and utility providers will be controlled by the main contractor to the construction of the development. All respective utility / service providers shall be notified, in a timely manner, when construction activities are undertaken in close proximity to existing services within the development area.	<p>All utilities will be monitored and metered in accordance with the service agreements made with each utility provider.</p> <p>In an effort to monitor the effectiveness of the SuDS measures proposed for the Barnhill SHD Fingal County Council (FCC) have requested that monitoring devices be installed at appropriate locations along the "SuDS train". This will allow for rates of flow to be measured and compared with previous measurements, thus giving an indication as to the overall effectiveness of the SuDS system within the site. The installation of a number of flow monitoring devices at focal locations along the SuDS network would allow for problem areas to be pinpointed with less difficulty and, as such, allow for greater ease of maintenance.</p> <p>Sampling by an appointed ecologist of the water discharging from the wetland pond to the existing stream will be undertaken and documented in a SuDS maintenance report that will be updated annually as per FCC requirements.</p>
<b>EIAR Topic: Chapter 7 Land</b>		
<b>Accidental spills and leaks</b>	<p>In order to prevent spillages to ground of fuels, and to prevent any consequent soil or groundwater quality impacts, it will be necessary to adopt mitigation measures during the construction phase, which include:</p> <ul style="list-style-type: none"> <li>▪ Secondary containment will be constructed of chemically resistant, impervious material designed to withstand exposure to the elements and hazardous substances contained. These storage areas will be at least 50 m from the Barnhill Stream. A dedicated bunded area will be present onsite for the supply of fuel. The bunded area will be fitted with a locking penstock valve that will be opened only to allow stormwater to discharge to interceptor;</li> <li>▪ Tracked machines and static equipment may be refuelled locally by an onsite mobile bowser over secondary containment;</li> <li>▪ Drip trays are to be used during refuelling operations if performed</li> </ul>	None Proposed.

	<p>outside of a contained area and spill kits will be carried in the fuel bowser vehicle;</p> <ul style="list-style-type: none"> <li>▪ Refuelling of rubber tyre vehicles will only to be carried out at designated areas using appropriate funnels or fuel nozzles. All mobile equipment which is either fuelled or uses hydraulic power shall be placed on suitably sized drip trays;</li> <li>▪ If spills occur within the drip trays, these will be cleaned up immediately using a spill kit. Drip trays should always be kept free of rainwater;</li> <li>▪ No flammable liquids will be stored within the enclosures and all plant operating within the enclosures will be refuelled in designated refuelling areas;</li> <li>▪ Spill kit stations will be established at a number of key locations on the site and staging area and will be regularly checked and restocked; and</li> <li>▪ An emergency response plan will be developed and implemented throughout the duration of the Proposed Development, which will detail the measures to be taken in the event of spills and leaks.</li> </ul>	
<p><b>Use of Concrete and Lime</b></p>	<p>Ready-mixed concrete will be brought to the Proposed Development site by a suitable 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 water to the underlying subsoil and groundwater.</p> <p>The pouring of concrete will take place within a designated area protected to prevent concrete runoff into the soil/groundwater media. Washout of concrete transporting vehicles will take place at an appropriate facility, offsite where possible, alternatively, where wash out takes place on-site, it will be carried out in carefully managed on-site wash out areas.</p>	<p>None Proposed as Not Applicable.</p>
<p><b>Soil Excavation and Filling</b></p>	<p>Temporary storage of soil will be carefully managed in such a way as to prevent potential negative impact on the receiving environment. Spoil and temporary stockpiles including stone stockpile areas will be positioned in locations which are distant from drainage systems and the Barnhill Stream and away from areas subject to flooding so as not to cause potential run off to soil and groundwater. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. To help shed rainwater and prevent ponding and infiltration, the sides and top of the stockpiles will be regraded to form</p>	<p>None Proposed as Not Applicable.</p>

	<p>a smooth gradient with compacted sides reducing infiltration and silt runoff.</p> <p>Soil requiring off-site disposal will be managed in accordance with relevant waste legislation.</p> <p>The imported fill materials will be brought to the site on the public road network, prior to being distributed throughout the Proposed Development Site via the internal site haul routes. Any hard core required along the haul routes during construction stage will be reused where possible and subject to testing for suitability.</p> <p>Temporary drainage during construction stage will be managed so as to reduce the direct runoff to ground and water. Surface water runoff from the Proposed Development site may impact the surrounding soils and groundwater introducing silts and increased chemical concentrations to the existing environment.</p>	
<b>Use of natural resources</b>	<p>It is considered from the site Investigation that topsoil from the Proposed Development site will be suitable for re-use within the Proposed Development. The source of the remaining fill material requirement will be sourced where possible from local quarries. Prior to construction, these shall be reviewed and only those quarries that conform to all necessary statutory consents will be used in the construction phase. Soils/fill material to be brought to the Proposed Development site will be vetted with chemical soil testing if necessary, in order to check that it is of a reputable origin and that it is 'clean' (i.e. will not introduce contamination to the environment; soil and groundwater). All potential suppliers will be vetted for the following criteria:</p> <ul style="list-style-type: none"> <li>▪ Environmental management status; and</li> <li>▪ Regulatory and legal compliance status of the company.</li> </ul> <p>'Clean' fill material will be sourced from suppliers which comply with the above requirements. If recycled aggregate is used as imported fill, chemical testing will be undertaken to confirm that it is 'clean' (i.e. will not introduce contamination to the environment).</p>	None Proposed as Not Applicable.
<b>Land take</b>	None Proposed.	None Proposed as Not Applicable.
<b>Discharge to ground</b>	None Proposed as Not Applicable.	None Proposed.
<b>Water balance changes</b>	None Proposed as Not Applicable.	None Proposed.
<b>Please Note:</b>	An outline CEMP (OCEMP) for the Proposed Development accompanies the planning application. The OCEMP incorporates relevant environmental avoidance or mitigation measures to reduce potential environmental impact, to include all mitigation measures set out in this chapter. Prior to construction,	



	<p>the Contractor will further refine and develop the OCEMP into a detailed site-specific CEMP. The CEMP will include a Construction, Erosion and Sediment Control Plan (CESCP) and a Resource and Waste Management Plan (RWMP), to be prepared in accordance with Department of Environment, Community &amp; Local Government guidelines<sup>1</sup> and any construction related requirements imposed as conditions of any planning permission granted. It will also include details of proposed environmental monitoring for the duration of the construction works, be this good practice or as a planning condition requirement.</p>	
<b>Monitoring</b>	<p>The proposed CEMP will include requirements for monitoring during the construction phase.</p>	<p>None Proposed - It is not anticipated any monitoring will be required during the operational phase with respect to soil, geology or hydrogeology.</p>
<b>EIAR Topic: Chapter 8 Water</b>		
<b>Sedimentation</b>	<p>During the construction phase, the mitigation measures below, as included in the outline construction and environmental management plan (OCEMP, see Section 8.4.1.4 of Chapter 8 of the EIAR), will ensure that no sediment contamination, contaminated runoff or untreated wastewater will enter watercourses on or near the site.</p> <ul style="list-style-type: none"> <li>▪ Excavations will only remain open for the shortest possible time to reduce groundwater ingress. Silt traps will be placed around the site to reduce silt loss and these will be inspected and cleaned or replaced regularly.</li> <li>▪ Runoff from spoil heaps will be prevented from entering watercourses by diverting it through the on-site settlement ponds and removing material off-site as soon as possible to designated storage areas.</li> <li>▪ Silt traps will be placed at crossing points to avoid siltation of watercourses and, if the need arises, silt fences shall be used within nearby watercourses during the course of works in order to reduce the potential for pollution of watercourses. These will be maintained and cleaned regularly throughout the construction phase.</li> <li>▪ Good construction practices will also be used during the construction phase, such as wheel washers and dust suppression on site roads and at site access points, as well as road sweepers.</li> <li>▪ A Construction, Erosion and Sediment Control Plan (CESCP) and a Water Quality Management Plan will be implemented during the construction phase.</li> </ul>	<p>None Proposed as Not Applicable.</p>

<sup>1</sup> Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects. EPA, 2021.

	<ul style="list-style-type: none"> <li>▪ Drains carrying high sediment load will be diverted through settlement ponds. Surface water runoff from working areas will not be allowed to discharge directly to the local watercourses. To achieve this, the drainage system and settlement ponds should be constructed prior to the commencement of major site works. All design and construction will be carried out in accordance with CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.</li> </ul>	
<p><b>Accidental spills and leaks</b></p>	<p>Due to the presence of a locally important aquifer beneath the site and the presence of surface water drainage, it will be necessary to adopt the following mitigation measures at the construction site in order to prevent spillages to ground and drains of fuels, and to prevent any consequent surface water impacts.</p> <ul style="list-style-type: none"> <li>▪ Designate a bunded storage area at the contractor's compound(s) and away from surface water gullies or drains for oils, solvents and paints used during construction. The fuel storage tanks shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area.</li> <li>▪ Drainage from the bunded area shall be diverted for collection and safe disposal. All containers within the storage area will be clearly labelled so that appropriate remedial action can be taken in the event of a spillage. When moving drums from the bunded storage area to locations within the site plot, a suitably sized spill pallet will be used for containing any spillages during transit.</li> <li>▪ Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in designated impermeable refuelling areas isolated from surface water drains. Spill kit facilities shall be provided at the fuelling area in order to provide for any accidental releases or spillages in and around the area. Any used spill kit materials should be disposed of using a hazardous waste contractor.</li> <li>▪ Where mobile fuel bowzers are used on the site in the event of a machine requiring refuelling outside of the designated area, fuel will be transported in a mobile double skinned tank. Any flexible pipe, tap or valve must be fitted with a safety lock where it leaves the container and locked shut when not in use. Each bowser should carry a spill kit and each bowser operator must have spill response training. No refuelling will be allowed within 50 m of a stream.</li> </ul>	<p>None Proposed -.Interceptors will be included in the drainage system, at all of the discharge points to the detention basins and the infiltration area, to mitigate against potential pollution of surface water features from spills/leaks of oils/fuels from parked vehicles.</p>

	<ul style="list-style-type: none"> <li>Adequate stocks of hydrocarbon absorbent materials (e.g. spill-kits and/or booms) shall be held on-site in order to facilitate response to accidental spills. Spill response materials shall also be stored on all construction vehicles.</li> </ul>	
<b>Use of concrete and lime</b>	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 washwater to the surface water drainage system or to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate bunded area and direct discharge of wash water to surface waters will be strictly prohibited.	None Proposed as Not Applicable.
<b>Culverting and drainage works and Flood Risk</b>	None Proposed.	<p><b>Watercourse Maintenance</b></p> <p>The ultimate owner / occupier(s) of the site shall be required to include general watercourse / culvert maintenance which will reduce the risk of blockage at downstream culverts and screens and maintain the capacity of the channels. The following measures are intended to inform any future maintenance programme for watercourses and culverts:</p> <ul style="list-style-type: none"> <li>Maintenance should consist of removal of any items within the channel that can impede its flow including (small) trees, excess vegetation etc.</li> <li>Riverbanks should be due adequate attention which would normally consist of removal of brambles, bushes, and stiff vegetation; these reduce flow capacity and can encourage collection of debris increasing the risk of blockages. Grass and nettles do not always need removing as they will lay flat during high flows.</li> <li>Weed growth should be removed from the centre of the channel as this will impede the flow and increase water levels up stream. Hand picking is best but cutting off under the water level is acceptable if it is done on an annual basis.</li> <li>Build-up of silt in watercourse channels and at culvert inlets should be removed and disposed of appropriately.</li> <li>Cyclical (min. annual) visual inspection of culvert inlets and screens and removal of debris as required, ensuring debris removed is not deposited in an area likely to fall back into the channel.</li> </ul>
	None Proposed.	<p><b>Drainage System Maintenance</b></p> <p>The owner / occupier(s) will be responsible for the maintenance of site drainage systems. Where drainage assets have not been taken in charge,</p>

		<p>provision for the maintenance of these assets should be made as part of the overall site management plan. The detailed drainage layout for the site should ensure that key SUDS features requiring maintenance are situated in accessible locations.</p> <p>Maintenance plans for drainage assets should, where applicable, include:</p> <ul style="list-style-type: none"> <li>▪ Cyclical (min. annual) check of all surface water drainage features (in particular, clearing of debris).</li> <li>▪ Cyclical (min. annual) visual inspection of any surface or underground features (blockages and obstructions should be removed by jetting as required).</li> </ul>
<b>Please Note:</b>	<p>The mitigation measures set out in this chapter have been included in an OCEMP for the Proposed Development, which accompanies the planning application. Prior to construction, the Contractor will further refine and develop the OCEMP into a detailed site-specific CEMP. The final CEMP will include a CEMCP, a Water Quality Management Plan and any construction related requirements imposed as conditions of any planning permission granted. It will also include details of proposed environmental monitoring for the duration of the construction works, be this good practice or as a planning condition requirement.</p>	
Monitoring	No Monitoring Proposed.	No Monitoring Proposed.

**EIAR Topic: Chapter 9 Biodiversity**

<b>Embedded Mitigation Measures</b>	<p>Several aspects of the Proposed Development constitute embedded ecological mitigation that is part of the design and has been taken into account during the initial impact assessment. These are listed below and in Table 9.12 of Chapter 9, which notes compliance with key biodiversity objectives in local policy (either the Barnhill LAP or the Fingal Development Plan (FDP)). Refer to Table 9.12 for further details on local biodiversity policy compliance.</p> <ul style="list-style-type: none"> <li>▪ Retention of significant lengths of existing hedgerows/tree lines, including the majority of the north-south hedgerows with numerous mature trees and significant sections of hedgerow and trees along Barberstown Lane North; the total retained hedge length is 2.1 km (see Landscape Design Report, Sections 1 and 4, provided by Gannon Associates and accompanying the planning application – retained hedges are green).</li> <li>▪ Provision of 5 m width or more of buffering grassland beside much of the length of the retained north-south hedges/tree lines, sown with suitable meadow mix incorporating locally-native species advised by an ecologist (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).</li> <li>▪ Retention of a 10 m riparian strip along both sides of the Barnhill Stream (discounting small footpaths and footbridges), widened to incorporate substantial parts of the flood zone within the proposed park area, sown with suitable meadow mix incorporating locally-native species advised by an ecologist (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).</li> <li>▪ Provision of a substantial wetland feature in the main risk flood zone in the proposed park area, functioning both as a Sustainable Drainage System (SuDS) feature and significant biodiversity feature including open water and wetland vegetation of high ecological value, planted with suitable locally-native species advised by an ecologist (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).</li> <li>▪ Design of the lighting scheme so that there is negligible light spill on the wetland in the park area, along the Barnhill Stream and along the retained north-south hedgerow through the proposed park.</li> </ul>
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	<p>This will maximise benefit to nocturnal protected species such as otter and bats. See Landscape Design Report, Section 4, provided by Gannon Associates and accompanying the planning application – in the lighting figure, the purple line indicates a light level of 1 lux, i.e. all land beyond this line receives less than 1 lux).</p> <ul style="list-style-type: none"> <li>▪ Incorporation of herbs and shrubs providing foraging opportunity for pollinating invertebrates, which will include the provided meadow areas in the proposed park and various shrubs in general planting throughout the Proposed Development (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).</li> <li>▪ Retention of the Barnhill Stream in its current alignment and improvement of its ecological function by removal of covering shrubs and sowing of adjacent meadow (as well as the incidental removal of adverse livestock impacts), and connection to the proposed wetland (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).</li> <li>▪ Maintenance of passage for otter along the Barnhill Stream, through absence of culverts within the Proposed Development along the stream, and use of bridges (comprising foot bridges in the proposed park, and one road bridge at the west end of the park) that do not involve in-stream or immediate stream-bank works, and leave vegetated strips on both banks.</li> <li>▪ Provision of native tree planting forming woodland blocks within the proposed park, near the proposed wetland (see Landscape Design Report, Section 5, provided by Gannon Associates and accompanying the planning application).</li> <li>▪ Design is in accordance with a) the flood risk assessment (McCloy Consulting, 2022), avoiding inappropriate construction in flood risk areas, and b) the SuDS Strategy Report (Clifton Scannel Emerson Associates, 2021), ensuring that there is no untreated run-off into watercourses in or beyond the Proposed Development. As stated in the Appropriate Assessment screening of the Barnhill LAP (Fingal County Council, 2019), discharge is to be limited to that of a greenfield site. Incorporated run-off control measures include the above hedge retention, retention of many of the small ditches beside hedges, the above provision of a wetland feature in the flood risk area in the proposed park, and urban controls including permeable paving, rainwater butts, underground stormwater system and infiltration trenches, and monitoring of the effectiveness of these measures. This contributes to ensuring the prevention of operational waterborne pollution.</li> <li>▪ Design of the foul water discharge to feed into the extra capacity of the upgraded Ringsend Waste Water Treatment Plant and upgraded sewer network, which are expected to be completed by 2023, contributing to ensuring prevention of operational waterborne pollution. Note that the Barnhill LAP requires adequate capacity for waste water treatment to be in place for new development at Barnhill (protecting downstream European sites).</li> <li>▪ Taking of clean water ultimately from Leixlip Water Treatment Plant, with no abstraction of the water from the Study Area or adjacent areas. This avoids hydrological effects by abstraction on habitats in or near the Study Area.</li> </ul>	
<p><b>Potential impacts to Designated European Sites</b></p>	<p>None Proposed.</p> <p>The NIS for the Proposed Development (AECOM, 2021) determined that there were no Likely Significant Effects on European sites for all construction impacts. This included construction disturbance of the qualifying features of European sites, construction waterborne and airborne pollution, and construction hydrological effects, and was primarily due to separation distances. The overall conclusion of the NIS was that there would be no adverse effect on the integrity of European sites as a result of the Proposed Development, either alone or in-combination with other plans/projects. Refer to NIS for further details.</p>	<p>None Proposed.</p> <p>The NIS for the Proposed Development (AECOM, 2021) determined that there were no Likely Significant Effects on European sites for most possible impacts. It investigated in further detail the possible effects of waterborne pollution during the operational phase and recreational pressure during the operational phase on European site habitats or their qualifying species. It concluded there would be no adverse effects on the integrity of European sites from operational waterborne pollution and there would be no adverse effects on the integrity of European sites or their qualifying species through recreational pressure. Refer to NIS for further details.</p>
<p><b>Waterborne pollution</b></p>	<p>Pollution prevention is important in reducing the risk of damage to ecological features, particularly those that are aquatic. The CEMP shall include the following pollution prevention measures that are of particular importance for protection of biodiversity, that will be</p>	<p>No mitigations proposed.</p>

	<p>implemented throughout all construction of the Proposed Development:</p> <ul style="list-style-type: none"> <li>▪ controls and contingency measures will be provided to manage run-off from construction areas and to manage sediment, including silt fencing if necessary, with monitoring of silt ponds etc.;</li> <li>▪ all oils, lubricants or other chemicals will be stored in appropriate secure containers in suitable bunded storage areas, with spill kits provided at the storage locations;</li> <li>▪ all refuelling and servicing of vehicles and plant will be carried out in a designated area; and,</li> <li>▪ dust suppression measures including wheel-washing and if necessary water-based dust suppression.</li> </ul>	
<b>Airborne pollution</b>	No mitigations proposed.	No mitigations proposed.
<b>Potential impacts to Terrestrial Habitats</b>	The final CEMP shall include measures for the protection of biodiversity including retained trees and hedgerows, which will be protected from damage during construction activity using suitable barriers and in accordance with BS 3398 2010.	No mitigations proposed.
<b>Potential impacts to Habitats and Fauna: Bats, Otter, Badger, Other Protected Mammals, Amphibians, Reptiles, Breeding and Wintering Birds, Lake Orb Mussel.</b>	<ul style="list-style-type: none"> <li>▪ An Ecological Clerk of Works (ECoW) will be appointed for the duration of each phase of construction. The ECoW will advise on and monitor implementation of ecological mitigation measures and compliance with legislative requirements concerning ecological features. The ECoW will also carry out pre-commencement checks for protected and/or notable species and provide other ecological advice as necessary. Note that the ECoW should ideally be qualified and licensed to handle bats, in case bats are found during supervised removal of any trees (and the one building) with Low bat roost suitability.</li> <li>▪ The earliest enabling works will not take place until late 2024 at the earliest. The ECoW will therefore carry out a survey for protected or notable species to check for any changes to the baseline conditions described in this Chapter, in particular any changes to the locations of resting sites used by protected species. The ECoW will be provided with details of the works, so that distances can be determined from the known badger sett and any other protected species resting sites that the ECoW might find. The pre-commencement survey will be completed two to six months prior to the commencement of enabling works (such as site clearance), giving time for derogation</li> </ul>	<p><u>Provision of bat boxes:</u></p> <p>The Proposed Development will result in loss of 16 trees with Low bat roost suitability, and one building with Low bat roost suitability. There will therefore be a reduction in the number of potential roost features in the Site. This will be compensated by the provision of 20 bat boxes, ideally constructed from woodcrete so as to be long-lasting, positioned in appropriate mature trees along retained hedgerows. The positioning of the bat boxes will be advised by the ECoW. Unlit sections of the hedgerow through the proposed park area near the wetland feature would be appropriate locations.</p> <p>Note that the bat boxes will need to be provided shortly before any works (including clearance/demolition works) so that they are also available for use by the ECoW in the unlikely event that bats are found during sectional soft-felling of trees with Low bat roost suitability and demolition of the one building with Low bat roost suitability.</p>



	<p>licensing if found necessary. The results will be reported and communicated to the appointed principal contractor, and where necessary proportionate avoidance/mitigation measures will be implemented.</p> <ul style="list-style-type: none"> <li>▪ Given the different phases of the Development, the ECoW may need to carry out pre-commencement surveys in consecutive years or to carry them out in areas relevant to particular phase(s). This shall be arranged by due communication between the principal contractor(s) and the ECoW.</li> <li>▪ The above pre-commencement survey will include inspection of the buildings in the industrial yard just south of Barberstown Lane North to check for signs of nesting or roosting barn owl, since the industrial yard (it is assumed) would be vacant for a period before demolition and could therefore become used by barn owl(s) if accessible to them. Barn owl is protected under the Wildlife Acts, with slightly stricter protection afforded by inclusion on the Fourth Schedule.</li> <li>▪ In the event that barn owl is found to have occupied the vacant buildings, which is considered possible but unlikely, the ECoW will communicate this to relevant stakeholders and carry out any necessary actions to ensure barn owls are not harmed and relevant legislation is complied with, including obtaining any derogation licensing that may be necessary. If a barn owl nest site or roost site will subsequently be lost as a result of the works, a replacement barn owl box will be installed in an appropriate location on a retained hedgerow under the guidance of the ECoW.</li> <li>▪ Works will be carried out near an existing small single-hole badger sett (described above). The sett will be retained in central retained hedgerow in the proposed park area, but could be subject to disturbance by works. Prior to carrying out any works which could cause disturbance of the sett, the ECoW or other suitably qualified ecologist shall apply for a licence from NPWS. This would be likely to be received if NPWS is satisfied with the proposed mitigation (such as an exclusion zone of appropriate size/shape from which plant, machinery and materials will be excluded, to avoid damaging the sett).</li> <li>▪ As noted above, in the unlikely event that barn owl colonises one or more of the (then) vacant buildings in the industrial area, the ECoW would need to obtain a derogation</li> </ul>	
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	<p>licence to permit disturbance of the nest/roost site, with appropriate mitigation.</p> <ul style="list-style-type: none"> <li>▪ No other licensing is currently considered necessary. However, if the ECoW should subsequently find new resting places of protected species (such as bat roosts) during pre-commencement surveys, that will be destroyed or disturbed by works, then derogation licence(s) may be required for those works to proceed. The ECoW shall advise accordingly if this situation arises.</li> <li>▪ The two trees with Moderate bat roost suitability will be retained (see Figure 9.4 and Arbor-Care, 2022). Those identified with Low bat roost suitability do not require survey under BCT guidelines (Collins, 2016). However, where Low bat roost suitability trees require to be removed, sectional soft-felling will be used as necessary for the affected tree parts (those with dense ivy) under the supervision of the ECoW or other ecologist qualified and licensed to handle bats. In the unlikely event that the supervising ecologist find bats during removal of such trees, they shall be placed in a pre-existing bat box on a retained tree in a suitable location nearby.</li> <li>▪ For the small derelict slate-roofed building with Low bat roost suitability on the immediate south edge of Barberstown Lane North, the following shall be carried out. The pre-commencement surveys shall include dusk or dawn survey of this building, and the ECoW or other ecologist qualified and licensed to handle bats shall inspect the building externally and, if safe to do so, internally. In the unlikely event that bats or bat evidence are found, the supervising ecologist shall advise accordingly and obtain a derogation licence, and in this case mitigation (in addition to supply of compensatory roost box(es)) would likely require careful demolition in a piece-meal fashion rather than bulldozing (with slates, as far as possible, removed individually under supervision of the supervising ecologist, and other parts also carefully removed to the extent considered necessary by the supervising ecologist). If, as is more likely, no bats are found during the inspections/survey, the manner of demolition of the building shall be at the discretion of the ECoW.</li> <li>▪ As discussed above, there is considered to be limited opportunity in the baseline Study Area for amphibians and reptiles. Heavily-grazed pasture is unfavourable habitat for both as it provides no shelter. However, if at the time of commencing vegetation clearance the grass has grown and no</li> </ul>	
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	<p>longer comprises tightly-grazed short swards, then the ECoW shall inspect any grassland prior to its clearance, if necessary prescribing and supervising cutting of the grass to a low height with an intermediate cut if considered appropriate, to discourage amphibian and reptile presence. Similarly, lengths of hedgerow with adjacent small ditches that require to be removed shall be inspected by the ECoW to check for amphibian or reptile presence before their removal.</p> <ul style="list-style-type: none"> <li>▪ If any amphibians or reptiles are found by the ECoW, they shall be returned to sections of retained small ditch beside retained hedgerows (such as the central north-south hedgerow through the proposed park area). If the proposed wetland feature with pond and surrounding habitat in the park has been constructed and is established, with reasonably developed aquatic vegetation, any found amphibians shall be transferred there, at the discretion of the ECoW.</li> <li>▪ As far as possible, works directly impacting vegetation that could be used by nesting birds (including all hedgerows, shrubs and trees) will be undertaken outside the breeding season (taken to be March to August, inclusive). Should vegetation clearance be required during the breeding season, a pre-works check for active nests will be carried out by the ECoW or other suitably experienced ornithologist no more than 72 hours in advance of the clearance works taking place (since nests can be quickly established). Where any active nests are identified, suitable species-specific exclusion zones will be implemented and maintained until the breeding attempt has concluded.</li> <li>▪ The following measures will be included to minimise risk of disturbance or harm to protected species: <ul style="list-style-type: none"> <li>○ any excavations will be left with a method of escape (such as a battered slope or plank of wood) for any animals that may enter overnight, and will be checked at the start of each working day to ensure no animals are trapped;</li> <li>○ any exposed pipes will be capped or otherwise blocked at the end of each working day or if left for extended periods of time, to ensure no animals are trapped;</li> <li>○ as far as possible, works will be carried out in daylight to avoid adverse artificial lighting effects on protected species such as</li> </ul> </li> </ul>	
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	<ul style="list-style-type: none"> <li>foraging/commuting bats and badger;</li> <li>○ any artificial lighting required for construction works will be strongly directional, directed only at the works area(s) and turned off when not required, to avoid adverse artificial light effects on nocturnal wildlife; and</li> <li>○ sightings or evidence of protected species during construction will be recorded, and if found within 30 m of works then those works will stop immediately and the ECoW will be contacted for further advice.</li> </ul>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>▪ Construction pollution controls will be monitored by the ECoW or other person(s) stipulated in the CEMP. In the event of any issue with construction pollution control, the ECoW or other responsible person(s) will notify the principal contractor and any other relevant parties, and will verify when remedial action has been taken and record this.</li> <li>▪ Monitoring will be carried out of the effectiveness of the permanent SuDS measures to control operational pollution.</li> <li>▪ On-going monitoring for protected species will be carried out by the ECoW, as required, for the duration of the construction phases. If this identifies a need for additional avoidance or mitigation measures, these will be communicated to the principal contractor and will be implemented with ECoW guidance as necessary, to ensure legislative and planning policy compliance on protected species and biodiversity preservation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The embedded measures for habitat creation and enhancement (including provision of the proposed wetland feature, meadows and woodland, and removal of overshading shrubs from the Barnhill Stream) will be monitored as set out in the Landscape Design Report (provided by Gannon Associated and accompanying the planning application) and the period of time set out therein or as subsequently agreed with the planning authority. Monitoring of sown habitat shall ensure, where applicable, that management follows seed supplier guidance. Where necessary, remedial action will be taken should monitoring identify failures or problems with the establishment of planted or sown vegetation. This will ensure that the desired species and proposed habitats establish successfully.</li> </ul>

**Natura Impact Statement (Standalone Report)**

Likely significant effects were eliminated at the screening stage for most impacts. Two impacts (operational waterborne pollution and disturbance of SCI/QI species, habitats or supporting habitats) were taken forward to Appropriate Assessment for more detailed consideration, however, there was found to be no adverse effect on the integrity of European sites and no mitigation was required. See the NIS for further details

**EIAR Topic: Chapter 10 Noise and Vibration**

<p><b>Impacts to receptors from noise and vibration during construction and operation</b></p>	<p>Mitigation measures that may be implemented to reduce construction noise and vibration levels are set out in Appendix 10.1. The majority of these mitigation measures can be incorporated within a suitable Construction Environmental Management Plan ('CEMP') to be implemented during the construction phase.</p> <p>In general, construction methods adjacent to existing residents will be like those adopted where construction works in basements take place. The basement is set back a minimum of 2.4m from the Barbarstown lane north and approximately 15m from existing houses. However, if piling is required bored</p>	<p><b>Operational Phase Mitigation - External</b></p> <p>At a small number of plots the amenity space is within an area of Moderate or High Impact. At these plots mitigation will be required.</p> <p>At these plots mitigation will be included in the Site design as follows:</p> <ul style="list-style-type: none"> <li>▪ 1.8m high solid wooden fences at the boundary of the effected plots. The effected plots are those directly adjacent to the road network that have gardens parallel to the</li> </ul>
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	<p>secant piles will be used to minimise vibration. Full dilapidation surveys will be carried out on existing houses in advance of construction. Noise and vibration monitors will be installed with real time alarms set to minimum thresholds to ensure damage will not occur to existing houses.</p> <p>Several safeguards exist to minimise the effects of construction and demolition noise and include:</p> <ul style="list-style-type: none"> <li>▪ the various EC Directives that limit noise emissions of a variety of construction plant;</li> <li>▪ guidance set out in BS5228-1:2009+A1:2014, that covers noise control on construction and open sites; and</li> <li>▪ the powers that exist for local authorities under The Environment Protection Agency Act 1992.</li> <li>▪ It is recommended that the precise mitigation measures to control noise from the works are agreed with the local authority prior to the works starting. Generic measures below are given to illustrate the range of techniques available.</li> <li>▪ The adoption of Best Practicable Means, as defined in The Environment Protection Agency Act 1992, is usually the most effective means of controlling noise from sites. Within the constraints of efficient site operations and the requirements of the relevant Standards, the following is advisable: <ul style="list-style-type: none"> <li>▪ limit the use of particularly noisy plant, i.e. do not use particularly noisy plant early in the morning;</li> <li>▪ limit the number of plant items in use at any one time;</li> <li>▪ plant maintenance operations should be undertaken as far away from noise-sensitive receptors as possible;</li> <li>▪ phasing the works to maximise the benefit from perimeter structures;</li> <li>▪ any compressors brought on to site should be silenced or sound reduced models fitted with acoustic enclosures;</li> <li>▪ reduce the speed of vehicle movements;</li> <li>▪ all pneumatic tools should be fitted with silencers or mufflers;</li> <li>▪ ensure that operations are designed to be undertaken with any directional noise emissions pointing away from noise-sensitive receptors where practicable;</li> <li>▪ when replacing older plant, ensure that the quietest plant available is considered wherever possible; any deliveries/spoil removal vehicles should be programmed to arrive and depart during daytime hours only.</li> <li>▪ drop heights must be minimised when loading vehicles with rubble.</li> <li>▪ care should be taken when loading vehicles to minimise disturbance to local residents.</li> </ul> </li> </ul>	<p>road, i.e. with no building between the amenity space and the adjacent road.</p> <p><b>Operational Phase Mitigation - Internal</b></p> <p>With regards to acceptable internal noise levels BS8233:2014 has the following three limits:</p> <ul style="list-style-type: none"> <li>▪ Bedrooms 30 dB L<sub>Aeq</sub> (15 Minutes) (2300 hrs – 0700 hrs).</li> <li>▪ Living/Bedrooms 35 dB L<sub>Aeq</sub> (15 Minutes) (0700 hrs – 2300 hrs).</li> <li>▪ All Other Habitable Rooms 40 dB L<sub>Aeq</sub> (15 Minutes) (0700 hrs – 2300 hrs).</li> </ul> <p>With regards to the maximum internal noise level limit of 45dB(A) in a bedroom, at this stage this cannot be tested as maximum noise levels across the Site cannot be determined from the traffic flow data provided for 2030. It is recommended that if permitted consideration is given to further modelling of maximum noise levels across the Site to determine an appropriate glazing specification.</p> <p>Windows do not reduce noise equally across the entire frequency spectrum, so the frequency content of the sound will influence the overall sound reduction performance of a given window and by extension, the resulting noise levels within the receiving room.</p> <p>However, many glazing manufacturers test their products under laboratory conditions using a typical road traffic noise frequency spectrum source. The resultant measured noise attenuation, in dB, gives a very useful guide to in-situ sound reduction performance of the window for situations where road traffic noise dominates. This performance index is known as the R<sub>TRA</sub>, and the sound reduction requirement set out above should be considered as an R<sub>TRA</sub> noise level.</p> <p>From an analysis of the data, it has been determined that the highest glazing specification is decided by the daytime limit except for facades facing (with a clear line of sight) the northern railway line where an intensification of use has been factored into the model. The glazing required to meet the daytime and the night-time ambient limits is presented for each plot in Appendix 10.2. At those facades facing the northern railway line it is indicated that the required glazing specification is 5dB higher than the number shown.</p> <p>With regards to the ventilation strategy to be adopted, at this stage the exact design is not known, the design will however have due regard to internal noise levels, i.e., should overheating require an open window, an open window would not be the primary means for mitigation, with for example MVHR provided. With reference to overheating, the apartment buildings that are located close to the boundary with the railway are designed with dual aspect apartment units that are orientated both north toward the train line and either east, west or south onto an adjacent open space. This</p>
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	<p>Vehicles should be prohibited from waiting within the site with their engines running;</p> <ul style="list-style-type: none"> <li>▪ all plant items should be properly maintained and operated according to the manufacturers' recommendations in such a manner as to avoid causing excessive noise. All plant should be sited so that the noise impact at nearby noise-sensitive properties is minimised;</li> <li>▪ local hoarding, screens or barriers should be erected as necessary to shield particularly noisy activities; and</li> <li>▪ any problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents. Works should not be undertaken outside of the hours agreed with the local authority</li> </ul> <p>Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can be reduced by 5dB(A) or more.</p> <p>Further best practice means are set-out at Appendix 10.1 of the EIAR to further reduce the possibility of adverse noise impacts from construction activities. These relate to training, maintenance, public relations and the preparation of an action plan setting out actions to undertake following a complaint being received. Refer to Appendix 10.1 of the EIAR for further details.</p>	<p>orientation enables these units to be ventilated to the east, west or south accordingly. As the train line lies directly to the north of the proposed development, there will be no anticipated overheating to any of the facades facing onto the train line – which are exclusively north facing facades.</p>
<p><b>Monitoring</b></p>	<p>The noise limit is met during all assessed activities at each Receptor assessed. However, construction noise levels may be reduced.</p> <p>Whilst the mitigated limits are expected to be met, at the request of the Council the applicant would undertake attended short term monitoring at nearby noise sensitive receptors to validate the predicted construction noise levels in this Report.</p> <p>With regards to construction vibration, it is anticipated that with good site management, and communication with residents should impacts be encountered, the Impact would be at worst Minor, a Minor level of Effect. As it is anticipated that there may be an impact, at the request of the Council the applicant would undertake attended short term monitoring at nearby noise sensitive receptors to validate the predicted construction vibration levels in this Report.</p> <p>It is anticipated that short term noise and vibration monitoring may be completed on a minimum of four occasions to coincide with the beginning of each phase of construction. If the limit is exceeded, SLR would recommend that further provision is made for additional monitoring.</p>	<p>None Proposed.</p>
<p><b>EIAR Topic: Chapter 11 Air Quality</b></p>		



**Emissions of dust and particulate matter**

Communications:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the indicative site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.

Construction:

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

Demolition:

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Bag and remove any biological debris or damp down such material before demolition.

Earthworks:

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or tackifiers 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.

Operating Vehicle / Machinery and Sustainable Travel:

The road traffic emissions assessment predicts a 'negligible' impact on annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations, a 'negligible' impact on 24-hour mean PM<sub>10</sub> concentrations at all considered receptors in each of the 2025, 2030 and 2040 assessment scenario years. Exceedences of the 1-hour mean NO<sub>2</sub> AQAL are unlikely to occur, and there is no predicted risk of exceedence of the 24-hour mean AQAL. Predicted absolute annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations indicate large headroom with the AQALs. As such, specific mitigation are not considered to be necessary.

- 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 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations:

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

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 indicative site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are

being re-used on-site cover as described below.

Site Management:

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.

Track-out:

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10m from receptors where possible.

Waste Management:

- Avoid bonfires and burning of waste materials.
- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).

<p><b>Monitoring</b></p>	<ul style="list-style-type: none"> <li>▪ Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of indicative site boundary, with cleaning to be provided if necessary.</li> <li>▪ Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.</li> <li>▪ 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.</li> <li>▪ Agree dust deposition, dust flux, or real-time PM<sub>10</sub> continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.</li> </ul>	<p>The impact on local air quality as a result of road traffic emissions from development generated traffic flows is predicted to be 'negligible' and not exceed the Limit Values set in the Air Quality Standards Regulations. As such, specific mitigation and monitoring is not considered to be required and residual impacts are considered to be negligible.</p>
<p><b>EIAR Topic: Chapter 12 Climate Change</b></p>		
<p><b>Climate Change Effects</b></p>	<p><u>Extreme Rainfall, Flash Flood:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will consider changes / flexibility in construction / operations that allow for rising water levels and groundwater levels based on the masterplan design.</li> <li>▪ Mitigation measure will consider design of adequate surface water drainage during construction phase based on the masterplan design.</li> </ul> <p><u>Risk Reduction Mechanism:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will consider secure insurance for damage of assets / site incidents based on the masterplan design.</li> </ul> <p><u>Storms and Winds:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will ensure construction activities can withstand increases in high winds and storms based on the masterplan design.</li> <li>▪ Mitigation measure will ensure the choice of equipment is weather efficient based on the masterplan design.</li> </ul> <p><u>Other concerns based on the design:</u></p> <ul style="list-style-type: none"> <li>▪ In this section the mitigation measures will be considered on the design in the masterplan layout.</li> </ul>	<p><u>Extreme Rainfall, Flash Flood:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will consider changes / flexibility in construction / operations that allow for rising water levels and groundwater levels based on the masterplan design.</li> <li>▪ Mitigation measure will consider design of provide adequate surface water drainage during construction phase based on the masterplan design.</li> </ul> <p><u>Storms and Winds:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will ensure design can withstand increases in high winds and storms based on the masterplan design.</li> </ul> <p><u>Heat:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will ensure building design for ventilation and cooling based on the masterplan design.</li> <li>▪ Mitigation measure will ensure design of outdoor spaces to reduce urban heat island effect based on the masterplan design.</li> </ul> <p><u>Drought:</u></p> <ul style="list-style-type: none"> <li>▪ Mitigation measure will ensure design for droughts emergency based on the masterplan design.</li> </ul> <p><u>Other concerns based on the design:</u></p>

		<ul style="list-style-type: none"> <li>▪ In this section the mitigation measures will be considered on the design in the masterplan layout.</li> </ul>
<p><b>Reduction of GHG Emissions</b></p>	<p>The construction and occupation of any new development at the scale proposed will inevitably result in increased Greenhouse Gas Emissions. Whilst current technologies and construction techniques can deliver properties that are effective carbon sinks when associated with environmentally friendly lifestyles, it is not currently possible to deliver such properties in a commercially viable way at the scales required to meet current housing demands.</p> <p>However, the construction of new build properties provides the greatest opportunity for the reduction of energy demand as it is considerably easier, cheaper and more effective to build in energy reduction strategies than it is to retro-fit them to existing housing stock. The proposed development will adopt a 'fabric first' approach to the reduction of energy demand, seeking to reduce energy demand through the materials, development design and layout, and the mechanical and electrical specification.</p> <p>In addition to the buildings themselves, the proposed development is also being designed to be efficient and sustainable at a masterplan landscape scale. This level of large-scale planning results in significant benefits for sustainability as the use of land, infrastructure and transport links can be planned to a greater degree, at the community scale, and the development overall has a greater weight with regards to the creation of new public transport links etc. which would not be feasible for a smaller, independent development.</p> <p>In particular, the development layout has been designed to reduce reliance on private travel by motorcar for the future residents. A local centre has been incorporated to provide the services most used by residents on a regular basis, including a primary school (with secondary education facilities 150m to the north of the application site), units designed to provide a range of shops/cafes, play areas, and access to open green space. This will be served by a network of dedicated car-free pedestrian and cycle paths assisting in the reduction of CO<sub>2</sub> emissions arising from transport by providing a safe and pleasant alternative to private vehicle use.</p> <p>Greenhouse gas emissions from transport will further be reduced by the location of the existing Hansfield railway station on the northern boundary of the application site. Direct pedestrian access to the station will be possible from the application site, with all residential properties being located within approximately 850m of the station via safe dedicated pedestrian routes, and the majority lying within approximately 500m. Hansfield Station gives direct access to Dublin and a range of other major employment centres.</p>	<p>None Proposed.</p>

**Energy Demand Reduction**

- As described above, the construction of new build properties provides the greatest opportunity for the reduction of energy demand as it is considerably easier, cheaper and more effective to build in energy reduction strategies than it is to retro-fit them to existing housing stock. The proposed development would adopt a 'fabric first' approach to the reduction of energy demand, seeking to reduce energy demand through the materials, development design and layout, and the mechanical and electrical specification.
- At the macro-scale the development seeks to reduce energy demand by incorporating the dwellings into blocks and terraces where possible, as this has notable benefits for energy reduction.
- Combining the dwellings into blocks, rather than having numerous smaller individual properties, enables the buildings to take advantage of better surface area to volume ratios. Larger buildings with multiple residences have less surface area for a given internal volume/floor area and as heat loss through the building envelope is one of the key sources of wasted energy for residential developments, reducing the proportional area through which energy can dissipate can significantly increase the energy efficiency of the building and dwellings within. Larger buildings typically also have a greater thermal mass, this makes them slower to overheat in summer and slower to cool down in winter, as the building fabric can store more thermal energy. In turn this results in less energy being expended to cool the buildings in summer and warm them in winter.
- The orientation of the buildings has been carefully designed to balance the risk of over-heating through thermal gain, whilst still seeking energy efficiencies available from positioning habitable rooms on south-facing aspects. This is particularly important with respect to the larger buildings where whilst the size of the buildings has benefits for energy efficiency, as described above, this can result in a greater risk of large buildings overheating in the sun, particularly as they frequently have a proportionally larger glazed surface area than smaller dwellings. By orienting the apartment buildings along a north/south alignment wherever possible, and presenting the majority of the windows to the east and west, the risk of over-heating through solar gain is minimised, and with it the energy

Once the dwellings are occupied, their energy demand is partially a function of the habits of the occupants. However, measures will be taken to encourage energy efficient living:

- All lighting installed within the development will be highly efficient, being fitted with lamps which must have a luminous efficiency greater than 40 lumens per circuit-watt and a total output greater than 400 lamp lumens.
- It is proposed to fit Energy Display Devices to the electricity supply of each dwelling. These will display (amongst other information): current mains energy consumption, current emissions, the current tariff and the current cost of the energy bill. This will encourage occupants to minimise wastage and improve energy efficiency.
- Information on the EU Energy Efficiency Labelling Scheme would be provided to each dwelling, educating occupants about the benefits of efficient white goods (washing machines, tumble driers, dishwashers etc.) and encouraging their purchase. Additionally, each dwelling will be provided with a secure drying space (internal or external) for drying laundry without the requirement of a tumble drier. Internal drying spaces will be adequately ventilated to prevent damp related issues. The ability to dry washing without recourse to electric machinery can significantly reduce non-regulated energy demands.
- Motor vehicle movement throughout the development is minimised, being limited to short spurs from the perimeter road giving access to the residential buildings. The development has been designed to be pleasant and easily traversable on foot and by cycle, with car-free pedestrian and cycle routes throughout, which are green and safe, being overlooked by adjacent properties. The development will have a pedestrianised, green and leafy character that encourages walking and cycling over transport by car.
- The proposed development has excellent public transport links, with the positioning of the railway station on the northern boundary and accessible by safe walking and cycling routes. It is proposed to investigate the extension of bus routes into the residential development areas once occupation of the properties reaches the critical weight required to support the services, reducing the distance to the nearest bus stops (currently 600m to the north of the boundary on Ongar Road). Combining the excellent access to public transport with the



	<p>demand for cooling is also consequently minimised.</p> <ul style="list-style-type: none"> <li>▪ Each dwelling will be constructed with high levels of insulation, air tightness and fabric energy efficiency and high quality double glazed uPVC window systems will be provided to all openings, manufactured and installed by manufacturers with a U-value to comply with TGD Part L 2011 or subsequent improved standards.</li> <li>▪ Air leakage will be limited in the building fabric by sealing all external door and window frames, and service penetrations to walls, floors, joists and ceilings will be sealed both internally and externally with proprietary sealing products such as mastic sealants, expanding foam and approved tape. It would be proposed to conduct pressure testing in compliance with Part L 2011. As a minimum, the thermal resistivity of the walls will be in compliance with TGD Part L 2011. The roofs will be similarly thermally insulated and compliant with TGD Part L 2011 as a minimum standard.</li> <li>▪ Space and hot water heating methods have not yet been confirmed but will be specified by the mechanical and electrical engineer to achieve at least a minimum efficiency to comply with TGD Part L of the Building Regulations. It is proposed that the systems shall be provided with automatic time and zone control for space heating, to minimise energy wastage resulting from heating being on when not required or heating zones of the dwelling unnecessarily. All hot water cylinders will be insulated with a minimum of 50mm factory applied PU foam and likewise connected to time control systems.</li> </ul>	<p>pedestrian and cyclist focussed design, the requirement for private vehicle transport will be minimised.</p> <ul style="list-style-type: none"> <li>▪ Where private transport is required, the development will have excellent access to the M3 via the L302.</li> </ul>
<p><b>Monitoring</b></p>	<p>None Proposed.</p>	<p>A set of indicators shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This can be carried out by the property management company or resident association. This process shall include regular feedback and/or updates from the implementation efforts.</p>
<p><b>EIAR Topic: Chapter 13 Cultural Heritage</b></p>		
<p><b>Archaeological features</b></p>	<p>A comprehensive programme of licenced archaeological investigations was undertaken as part of a previous assessment of the subject site and a number of archaeological features (including three pits) were identified within the proposed development site. The features are located with an area proposed for development at the site. <b>If development proceeds in this area, preservation by record, or</b></p>	<p>None Proposed.</p> <p>Any archaeology features uncovered during the course of site development works will be resolved <b>before</b> the operational stage of the proposed development. There are no anticipated archaeological,</p>

	<p><b>archaeological excavation of these features, will be required.</b> These works will be undertaken under licence to the National Monuments Service at the Department of Housing, Local Government and Heritage. Notwithstanding the proposed programme of archaeological excavation of the previously-identified features, a suitably qualified archaeological consultant shall be appointed to undertake <b>licenced archaeological monitoring of all topsoil excavation during the construction phase</b> of the development. This will be under license from the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage. Should additional archaeological or architectural heritage features, deposits or structures be uncovered during archaeological monitoring the NMS should be contacted and a strategy for the resolution of these features be formulated. The appointed archaeologist will be required to obtain a licence from the NMS this will involve preparing an archaeological method statement to outline the required works.</p> <p>Prior to commencement of development, it is recommended that a building record of the derelict farm complex be prepared by a suitably qualified historic building specialist. This record would be based on background research, annotated photographic record, and drawn survey of the upstanding features within the farmyard identified within Appendix 13.2 of this EIAR. The resultant survey records will be submitted to Fingal County Council for archival purposes. Notwithstanding the lack of architectural heritage significance of the derelict buildings and other farmyard features, the proposed building record will allow for the full documenting of this much-altered complex of late-eighteenth or early-nineteenth-century origin.</p>	<p>built, or cultural heritage mitigation measures required during the operational phase.</p>
<p><b>Monitoring</b></p>	<p>There are a number of obligatory processes to be undertaken as part of licence applications to the NMS for archaeological excavation and archaeological monitoring and these will allow for monitoring of the successful implementation of mitigation measures. In addition, the building records to be produced prior to commencement of development will be submitted to Fingal County Council for compliance purposes.</p>	<p>None Proposed.</p>
<p><b>EIAR Topic: Chapter 14 Population and Human Health</b></p>		
<p><b>Impact on Population and Human Health</b></p>	<p>Appropriate mitigation measures in regard to issues that may potentially impact on human health such as traffic, visual amenities, built and natural heritage, air quality, noise emissions and climate change have been addressed under other chapters within this report including Landscape and Visual Impact (Chapter 4); Traffic and Transport (Chapter 5); Land (Chapter 7); Water (Chapter 8); Noise and Vibration (Chapter 10); Air Quality (Chapter 11); and Climate Change (Chapter 12).</p>	<p>Appropriate mitigation measures in regard to issues that may potentially impact on human health such as traffic, visual amenities, built and natural heritage, air quality, noise emissions and climate change have been addressed under other chapters within this report including Landscape and Visual Impact (Chapter 4); Traffic and Transport (Chapter 5); Land (Chapter 7); Water (Chapter 8); Noise and Vibration (Chapter 10); Air Quality (Chapter 11); and Climate Change (Chapter 12).</p>

	<p>The proposed development design incorporates sufficient community, recreation, childcare, and education facilities to meet the needs of the future population of Barnhill Garden Village.</p>	<p>The proposed development design incorporates sufficient community, recreation, childcare, and education facilities to meet the needs of the future population of Barnhill Garden Village.</p> <p>There is sufficient capacity in the existing post-primary education facilities to accommodate any demand that might arise from Barnhill Garden Village. Cumulatively there is potential for a deficit in post-primary education facilities if all the permitted developments are fully built out and additional capacity is not provided by the Department of Education.</p> <p>The Department of Education has been a statutory consultee during the preparation of the Barnhill LAP and have been consulted by applicants during the development of the application. As a further mitigation measure it is proposed that, should permission be granted, the applicants will submit an updated report to the Department of Education detailing the proposed phasing and estimated primary and post-primary demands arising from the development to inform continuing Department investment decisions. The applicants will also provide an annual report of progress to the Department of Education noting number of completed units, estimates of primary and post-primary demands arising and projections for future demand when the development is complete.</p> <p>No further significant negative impacts on Population and Human Health during the operational phase have been identified within this chapter and therefore no additional mitigation measures are proposed.</p>
<b>Monitoring</b>	<p>Measures to avoid negative impacts on Population and Human Health have been integrated into the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development. Monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission.</p> <p>Monitoring of compliance with Health and Safety requirements will be undertaken by the Project Supervisor for the Construction Process.</p>	<p>Measures to avoid negative impacts on Population and Human Health have been integrated into the design and layout of the proposed development. Compliance with the design and layout will be a condition of any permitted development. Monitoring will be undertaken by the Building Regulations certification process and by the requirements of specific conditions of a planning permission.</p>
<b>Wind Microclimate Assessment (Standalone Report)</b>		
<b>Embedded Mitigation Measures</b>	<p>Figure 1.3.12, Figure 1.3.13, Figure 1.3.14, Figure 1.3.15, Figure 1.3.16, Figure 1.3.17, Figure 1.3.18, and Figure 1.3.19 in this report shows plan views of character areas in the proposed development with mitigation features highlighted according to the colours in Table 4 of this report. These embedded mitigation features in Table 4 include fence, screen, railing, planter, hedge, extra hedge, pergola, banners, extra trees, bike shelter.</p> <p>Please refer to Wind Microclimate Assessment for further details.</p>	
<b>Impact on wind microclimate</b>	<p>No specific off-site mitigation measures are modelled or proposed as part of this assessment. On-site mitigation, if required, is likely to be in the form of evergreen planting, porous screens or awnings. Alternatively, this may involve closing pedestrian access to breached areas during high winds if an alternative route around an unacceptable region is not available.</p>	
<b>Monitoring</b>	<p>None Proposed.</p>	

	<p>This investigation shows that the wind microclimate of the proposed development site is safe for able bodied pedestrians according to the Lawson method.</p> <p>Comparisons of the baseline and proposed scenarios show that the proposed development does not negatively impact the wind microclimate of the development site in terms of 20 m/s Lawson Distress.</p> <p>The investigation shows that the wind microclimate of the proposed development site is almost entirely safe for frail/elderly pedestrians and cyclists according to the Lawson method.</p> <p>One small region within the south-eastern most point of the development site boundary and some tiny regions on the corners of balconies indicate 15 m/s Lawson Distress.</p> <p>Comparisons of the baseline and proposed scenarios show that the proposed development positively impacts the wind microclimate of the development site and its surroundings to the northeast according to the Lawson method.</p> <p>The investigation shows that the wind microclimate of the proposed development site is comfortable for its intended pedestrian uses and is acceptable according to the Lawson method.</p> <p>Comparisons of the baseline and proposed scenarios show that the proposed development positively impacts the wind microclimate of the development site and its surroundings to the northeast according to the Lawson method.</p>
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**EIAR Topic: Chapter 15 Major Accidents and Disasters**

<p><b>Fire / explosion during instillation or maintenance of natural gas supply for Proposed Development.</b></p>	<p>None Proposed.</p> <p>Following installation, the mains supply of natural gas at defined conditions (composition, temperature, and pressure) currently managed by Gas Networks Ireland (GNI) who provide continuous monitoring and would respond in the event of supply issues.</p> <p>Gas mains and service pipes are designed and installed in accordance with the requirements of The NSAI Gas transmission Pipelines and pipeline installations I.S328: 2021. These Regulations are supported by guidance published by the Health and Safety Executive.</p> <p>In addition to Regulatory standards, the design and installation of gas pipework is in accordance with industry codes and technical standards, such as those produced by the Institution of Gas Engineers and Managers (IGEM).</p> <p>Valves will be installed at appropriate locations in the gas pipework to enable gas engineers to isolate the supply in an emergency and for maintenance purposes.</p> <p>Installing gas pipework below ground reduces the potential for accidental damage. The depth and location is carefully controlled to maintain a constant temperature, protecting the pipework against thermal effects.</p> <p>All combustion installations within buildings must be accommodated in ways that meet the requirements of Building Standards. Gas installations also have to comply with the Gas Safety Regulatory Framework for Ireland 2018, which require professional work to be undertaken by competent, registered and accredited Gas Safe engineers.</p>
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<p><b>Accidental damage or failure of electrical systems including 110kV powerlines which cross the lands in the north-west corner of the Proposed Development.</b></p>	<p>A CEMP will be produced for the Proposed Development which will consider the risks associated with overhead powerlines during construction. These will be managed in compliance with the Health and Safety Authority Construction Regulations 2013 and the Health and Safety Authority Code of Practice for Avoiding Danger from Overhead Electricity Lines May 2019.</p> <p>Construction management plan will consider hazard zones, exclusion zones and plant and machinery minimum safe distances from the powerlines.</p>	<p>Electrical power lines are designed, installed, and maintained in accordance with industry standards and guidance.</p>
<p><b>Monitoring</b></p>	<p>In addition to the mitigation measures, the design of the Proposed Development will be in accordance with all relevant building standards. Compliance with these standards is monitored by Building Control Ireland and includes requirements for fire safety as well as health, structural stability, energy conservation and accessibility. The Proposed Development will be designed in accordance with Building Regulations 2017, Technical Guidance Document - Fire Safety Volume 2, Dwelling Houses</p> <p>Chapter 15 notes that Hazards identified during the construction phase of the project should be managed via the appropriate risk assessments for compliance with the Health and Safety Authority Construction Regulations 2013. These will be described in the CEMP.</p>	<p>In addition to the mitigation measures, the design of the Proposed Development will be in accordance with all relevant building standards. Compliance with these standards is monitored by Building Control Ireland and includes requirements for fire safety as well as health, structural stability, energy conservation and accessibility. The Proposed Development will be designed in accordance with Building Regulations 2017, Technical Guidance Document - Fire Safety Volume 2, Dwelling Houses.</p>