BLACKWOOD SQUARE SHD

EIAR Volume 2

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A non-technical summary of the information contained within **Volume I**.

Volume 2: Environmental Impact Assessment Report

This is the main volume of the EIAR. It provides information on the location and scale of the proposed development, details on design and impacts on the environment (both positive and negative) as a result of the proposals.

Volume 3: Technical Appendices

Specialists' technical data and other related reports are contained within **Volume 3. Volume 3** comprises parts A and B. Part A includes 11 no. appendices associated with various specialisms. Part B includes verified views associated with Chapter 12 Landscape only.

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Glossary of Terms

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ABP	An Bord Pleanála
ADF	Average Daylight Factor
CDWMP	Construction and Demolition Waste Management Plan
CEMP	Construction Environmental Management Plan
CFRAMS	Catchment Flood Risk Assessment and Management Study
CGS	County Geological Sites
CIRIA	Construction Industry Research and Information Association
CJEU	Court of Justice of the European Union
CSO	Central Statistics Office
DAA	Dublin Airport Authority
DB	Decibel
DEHLG	Department of Environment, Heritage and Local Government
DMRB	Design Manual for Roads and Bridges
DMURs	Design Manual Urban Roads and Streets
DoELG	Department of Environment and Local Government
DTTAS	Department of Transport, Tourism and Sport
DPHLG	Department of Housing, Planning and Local Government
ED	Electoral Division
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
EU	European Union
FCC	Fingal County Council
FDP	Fingal Development Plan 2017 – 2023
FFL	Finished Floor Level

FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
GL	Ground Level
GSI	Geological Survey Ireland
HA	Hectares
HGV	Heavy Goods Vehicle
HNDA	Housing Need and Demand Assessment
HSE	Health Services Executive
IFI	Inland Fisheries Ireland
ILO	International Labour Organization
IROPI	Imperative Reasons Of Overriding Public Interest
ITM	*Irish Transverse Mercator,* geographic coordinate system for Ireland
KER	Key Ecological Receptors
L_{Aeq}	The continuous equivalent A-weighted sound pressure level. This is an "average" of the sound pressure level.
L_{Amax}	This is the maximum A-weighed sound level measured during a sample period.
L_{Amin}	This is the minimum A-weighted sound level measured during a sample period.
$L_{night, outside}$	Threshold of night noise exposure for the purposes of assessing overall annoyance.
MASP	Metropolitan Area Strategic Plan
MMP	Mobility Management Plan
NBDC	National Biodiversity Data Centre
NDP	National Development Plan
NHA	National Heritage Area
NIAH	National Inventory Architectural Heritage
NPF	National Planning Framework
NPWS	The National Parks and Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
NTS	Non-Technical Summary
NTS	Not To Scale (drawings)

OANZ	Outer Airport Noise Zone
OPW	Office of Public Works
OSI	Ordnance Survey Ireland
OWMP	Outline Waste Management Plan
PE	Population Equivalent
pNHA's	proposed Natural Heritage Areas
QLFS	Quarterly Labour Force Survey
QNHS	Quarterly National Household Survey
PRF	Potential Roosting Features
ProPG	Professional Guidance on Planning and Noise
RMP	Record of Monuments and Places
RPG	Regional Planning Guidelines
RPS	Record of Protected Structures
RSA	Road Safety Audit
RSES	Regional Spatial Economic Strategy
RSIA	Road Safety Impact Assessment
SAC	Special Area Conservation
SHD	Strategic Housing Development
SPA	Special Protection Area
SUDS	Sustainable Urban Drainage System
TII	Transport Infrastructure Ireland
TMP	Traffic Management Plan
TPO	Tree Preservation Order
TTA	Traffic and Transport Assessment
VSC	Vertical Sky Component
WAC	Waste Acceptance Criteria
WFD	Water Framework Directive

1 INTRODUCTION

1.1 Context

This Environmental Impact Assessment Report (EIAR) has been prepared to accompany an application for permission by Cosgrave Developments for development of a proposed Strategic Housing Development (SHD) at lands at Northwood Avenue, Santry, Dublin 9. The proposed development will consist of 331 no. apartment units over a shared basement together with ground floor mixed use commercial units, residential shared services, a childcare facility and associated car and bicycle parking spaces, landscaping, open space, pedestrian and cycle paths and ancillary services. The location of the site is illustrated in **Figure 1-1** below. A detailed description of the proposed development is provided in **Chapter 5** of this EIAR. The drawings included as part of the planning application contain further details of the proposed development.

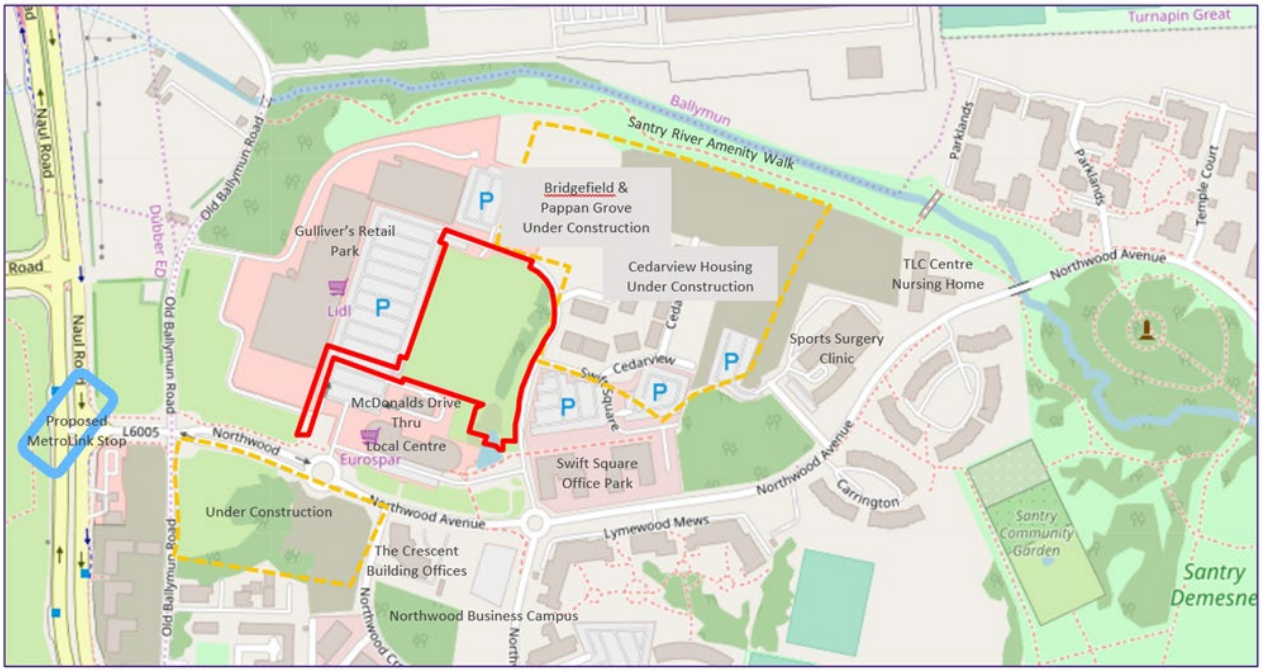

Figure 1-1: Site Context

This remainder of this chapter introduces the project for which consent or planning permission is sought and documents the procedure that was followed in preparing this EIAR.

1.2 Legislative Context

Certain public and private projects that are likely to have significant effects on the environment are subject to EIA requirements derived from EIA Directive (85/337/EEC), which is in force since 1985 and applies to a wide range of defined public and private projects. The initial Directive was amended three times in 1997, 2003 and 2009, which were in turn codified by Directive 2011/92/EU. Directive 2011/92/EU has been further amended in 2014 by Directive 2014/52/EU.

The provisions of the EU EIA Directive are transposed into law in Ireland primarily through the Planning and Development Act 2000 (as amended) and *the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018* (S.I. 296 of 2018).

The primary purpose of the EIA Directive (Directive 2011/92/EU as amended by 2014/52/EU) is to ensure that public and private projects which are likely to have significant effects on the environment are granted development consent only after an assessment of the likely significant environmental effects of those projects has been carried out i.e. an EIA.

1.3 EIA Process

Environmental Impact Assessment (EIA) is defined as:

> "*The process of examining the anticipated environmental effects of proposed project - from consideration of environmental aspects at design stage, through consultation and preparation of an Environmental Impact Assessment Report (EIAR), evaluation of the EIAR by a competent authority, the subsequent decision as to whether the project should be permitted to proceed, encompassing public response to that decision[1]".*

Broadly speaking the EIA process involves a number of steps which include the production of an EIAR, although this is not the end in itself but rather an output to assist in a wider decision making framework. This EIAR will be used by An Bord Pleanála to make a decision to consent or refuse the application or to seek further information if required. In line with current guidance, the EIA for the proposed development commenced at the project design stage.

Several interacting steps typify the early stages of the EIA process and include:-

- **Screening** - the term used to describe the process for determining whether a proposed development requires an EIA;
- **Scoping** - This stage firstly identifies the extent of the proposed development and associated site, which will be assessed as part of the EIA process, and secondly, it identifies the environmental issues likely to be important during the course of completing the EIA process through consultation with statutory and non-statutory stakeholders;
- **Assessing Alternatives** - This stage outlines the possible alternative approaches to the proposed development; and
- **Assessing and Evaluating** - The central steps of the EIA process include baseline assessment (desk study and field surveys) to determine the status of the existing environment, impact prediction and evaluation, and determining appropriate mitigation measures where necessary.

The EIAR will be circulated to statutory stakeholders and made available to the public for consultation prior to any decision being made.

It is acknowledged that the EIA process can extend beyond direct consent and into implementation of monitoring and mitigation programmes with the end focus being the protection of the environment in the long-term.

1.4 Requirement for EIA – Screening

For the purposes of the planning application made pursuant to the *Planning and Development Act 2000*, as amended, the obligations under Directive 2014/52/EU have been transposed into Irish law pursuant to the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations (S.I No. 296 of 2018)*. The regulations specify the developments for which EIA will be required and the information that must be provided in an EIAR prepared in connection with the subject project.

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

[1] https://www.epa.ie/monitoringassessment/assessment/eia/

The proposal has been screened by reference to the *Planning and Development Act 2000,* as amended, and the *Planning and Development Regulations 2001,* as amended.

The proposed development is a category 10 *"infrastructure projects"* of Part 2 of Schedule 5 of the Planning and Development Regulations 2001, as amended but does not exceed the category 10(b)(i) threshold *"Construction of more than 500 dwelling units"* but does align with category *13 "changes, extensions, development and testing"* which includes:

> *"(a) Any change or extension of development already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1) which would:-*
>
> *(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule, and*
>
> *(ii) result in an increase in size greater than –*
>
> *- 25 per cent, or*
>
> *- an amount equal to 50 per cent of the appropriate threshold, whichever is the greater."*

For clarity, the subject development in isolation does not fall within development classes set out in Part 1 or Class 10(b)(i) of Part 2 of Schedule 5. However, the subject development is located adjacent to a residential development which is currently under construction by the applicant. Permission for 374 no. residential units on a 7.0 hectare site under Reg. Ref. F15A/0440 was modified by F16A/0572, F17A/0371 and F18A/0205 resulting in the overall provision of 355no. residential units which are now almost complete.

It has therefore been determined that the quantum of development now proposed (331 no. units) in addition to the adjacent permitted residential development (335 no. units) would exceed the relevant threshold (i.e. 500 units) and that an EIA should therefore be undertaken to cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the proposed development.

1.5 Matters to be Considered in the EIAR - Scoping

Scoping is an integral part of the EIA process, the aim of which is to identify matters that should be covered in the EIAR. It is defined in the EC Guidance[2] as:

> *"determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR"*

The scoping of an EIAR is concerned with identifying those aspects of the environment where there is an interaction, either direct or indirect, positive or negative, with the project and as a consequence there are potential effects, which need to be assessed.

A scoping process to identify the issues that are likely to be most important during the EIA process was carried out by the applicant, design team and EIAR consultants and informed the format of this EIAR. This scoping was recorded in a draft scoping report which was the subject of pre-application consultation with environmental stakeholders before this EIAR was prepared (refer to **Chapter 2**). The responses received have been considered as part of the compilation of the EIAR. Other relevant matter.

The scope and content of this EIAR has also been informed by the following:

- European Union (Planning and Development)(Environmental Impact Assessment) Regulations 2018;

[2] *Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports* Environmental Protection Agency (EPA), 2017

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (Dept of Housing, Planning and Local Government, 2018);
- *Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports,* EPA, 2017
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper, (Department of Environment, Community and Local Government, 2017);
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017);
- The requirements of Part X of the Planning and Development Act, 2000, as amended, and Part 10 of the Planning & Development Regulations, as amended;
- The requirements of the Fingal Development Plan 2017-2023;
- Regional and National Planning Policy Documents;
- The likely concerns of third parties;
- The nature, location and scale of the proposal;
- The existing environment together with any vulnerable or sensitive local features and current uses;
- The planning history and environmental assessments associated with the subject site and adjoining lands;
- The likely and significant impacts of the proposed development on the environment; and,
- Available methods of reducing or eliminating undesirable impacts.

Having regard to the foregoing and in accordance with Annex IV(4) of Directive 2014/52/EU the environmental factors to be addressed in the EIAR are:

- Biodiversity
- Land, Soils & Hydrogeology
- Water and Hydrology
- Air Quality and Climate
- Noise and Vibration
- Cultural Heritage
- Landscape
- Material Assets: Traffic and Transportation
- Material Assets: Built Services
- Population and Human Health
- Cumulative Effects and Environmental Interactions.

1.6 EIAR Content

The content of this EIAR has been prepared in accordance with the provisions of Article 5(1) and Annex IV of Directive 2014/52/EU. The Article 5(1) requirements are set out in **Table 1-1**.

Table 1-1: Article 5(1) Requirements

Article 5(1) Requirements	Relevant Section in this EIAR
"The information to be provided by the developer shall include at least:	
(a) a description of the project comprising information on the site, design, size and other relevant features of the project;	Chapter 5, Volume 2
(b) a description of the likely significant effects of the project on the environment;	Chapers 6 – 16, Volume 2
(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;	Chapters 6 – 16, Volume 2
(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;	Chapter 3, Volume 2
(e) a non-technical summary of the information referred to in points (a) to (d); and	Volume 1
(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."	Chapters 6 – 16, Volume 2

Annex IV requirements are set out in **Table 1-2**.

Table 1-2: Annex IV requirements

Annex IV Requirements	Relevant Section in this EIAR
"1. A Description of the project, including in particular:	
(a) a description of the location of the project;	
(b) a description of the physical characteristics of the whole project, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;	Chapter 5, Volume 2 Chapter 5, Volume 2
(c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;	Chapter 5, Volume 2
(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases.	Chapters 6 - 16, Volume 2
2. A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Chapter 3, Volume 2
3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	Chapters 6 – 16, Volume 2
4. A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation),	Chapters 6 – 16, Volume 2

Annex IV Requirements	Relevant Section in this EIAR
material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	
5. A description of the likely significant effects of the project on the environment resulting from, inter alia:	
(a) the construction and existence of the project, including, where relevant, demolition works;	Chapters 6 – 16, Volume 2
(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;	Chapters 6 – 8, Volume 2
(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;	Chapters 9 – 10, Volume 2
(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);	Chapter 15, Volume 2
(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;	Chapter 16, Volume 2
(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;	Chapter 9, Volume 2
(g) the technologies and the substances used.	
The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.	Chapters 6 – 16, Volume 2
6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Chapters 6 – 16, Volume 2 and Section 1.9
7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Chapters 6 – 17, Volume 2
8. A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies	Chapter 15, Volume 2
9. A non-technical summary of the information provided under points 1 to 8	Non-Technical Summary Volume 1
10. A reference list detailing the sources used for the descriptions and assessments included in the report."	Chapters 6-16, Volume 2

Under Article 5(3) of the 2014 Directive, it is expressly required that the developer must ensure that the environmental impact assessment report (EIAR) is prepared by competent experts. Each of the chapters of this EIAR for the subject development have been prepared by experts with the requisite qualifications and competences. Refer to **Section 1.8** and the introduction of each environmental topic / chapter.

1.7 Structure and Format of the EIAR

The EIAR has been prepared in a *'Grouped Format'* structure having regard to the prescribed environmental factors of the EIA Directive and the *Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports* prepared by the EPA in 2017 (EPA Draft Guidelines 2017). In this way each aspect of the environment is presented as a separate section referring to the environment as it exists, likely significant impacts, and proposed mitigation measures. The advantages of using this format are that it is easy to investigate a single topic and it facilitates easy cross-reference to specialist studies.

The EPA Draft Guidelines 2017 list the following fundamental principles to be followed when preparing an EIAR: Anticipating, avoiding and reducing significant effects

- Assessing and mitigating effects;
- Maintaining objectivity;
- Ensuring clarity and quality;
- Providing relevant information to decision makers; and
- Facilitating better consultation.

It is also important that the EIAR document remains tightly focussed. This minimises expenses, delays and the potential for a confusing mass of data to obscure relevant facts. The EIA process has been project-managed and steered, so as to ensure that the EIAR documentation and analysis are confined to those topics and issues which are explicitly described in the legislation, and where environmental impacts may arise. Evaluation and analysis have been limited to topics where the indirect, secondary or cumulative impacts are either wholly or dominantly due to the project or development under consideration and remain focused on issues that:

- Are environmentally based;
- Are likely to occur; and,
- Have significant and adverse effects.

This EIAR has been compiled to comply with the requirements of Article 94 and Schedule 6 of the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018* (S.I. No. 296 of 2018).

This systematic approach described above employs standard descriptive methods, replicable assessment techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration. An outline of the methodology employed consistently in each chapter to examine each environmental topic is provided in **Table 1-3**.

Table 1-3: Methodology employed to evaluate each Environmental Topic

<table>
<tr><th>Topic</th><th>Methodolgy Employed</th></tr>
<tr><td>Introduction</td><td>This section provides an overview of the specialist area and specifies the specialist who prepared the assessment.This section can also expand on the information presented in Chapter 5 (Project Description) and take account of the feedback from stakeholders in relation to the scope and level of detail of the proposed assessment.</td></tr>
<tr><td>Assessment Methodology (including assessment criteria)</td><td>This section includes a clear description of the approach including methods used to predict/forecast impacts, sources of information used and standards and guidance used.</td></tr>
<tr><td>Baseline Scenario (Existing Environment)</td><td>This section comprises a description of the specific environment into which the proposal will fit, taking account of other developments likely to occur. The particular aspects of the environment will be discussed in terms of their context, character, significance and sensitivity.</td></tr>
<tr><td>Impact Assessment</td><td>The potential impact of the proposal will comprise a general description of the possible types of impacts which proposals of this kind would be likely to produce during the construction and operational phases. This includes a consideration of the "Do Nothing" scenario. This scenario describes the environment as it would be in the future if no development of any kind is carried out. An assessment of the specific direct and indirect impacts that the proposed development may have during both the construction and operational phases of the proposed development, in the absence of any remedial or reductive measures. The predicted impacts will be discussed having regard to their character, magnitude, duration, consequences and significance.
<table>
<tr><td rowspan="6">More Significant
 
Less Significant</td><td>Effects which are substantial. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with site or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity.</td></tr>
<tr><td>Effects which are major. These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.</td></tr>
<tr><td>Effects which are moderate. These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor.</td></tr>
<tr><td>Effects which are minor. These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.</td></tr>
<tr><td>Effects which are negligible. No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.</td></tr>
</table></td></tr>
<tr><td>Mitigation Measures</td><td>A description of any specific remedial or reductive measures considered necessary and practicable resulting from the assessment of potential impacts during the construction and operational phases. Monitoring proposals will also be included in this section as appropriate.</td></tr>
<tr><td>Cumulative Impact</td><td>The cumulative impact of the proposed development, along with other permitted and existing developments in the vicinity will be considered</td></tr>
<tr><td>Residual Impact</td><td>This section will review the impacts of the proposed development with mitigation measures in place and identifies remaining negative impacts.</td></tr>
</table>

The overall EIAR is arranged in three volumes, as follows:

1.7.1 Volume 1: Non-Technical Summary

A non-technical summary of the information contained within Volume 1 of the EIAR.

1.7.2 Volume 2: Main Text

This is the main volume of the EIAR. It provides information on the location and scale of the proposed development, details on design and impacts on the environment (both positive and negative) as a result of the project. The structure of the EIAR document is set out in below:

- Chapter 1: Introduction
- Chapter 2: Consultation and Project Scoping
- Chapter 3: Alternatives Considered
- Chapter 4: Planning Policy Context
- Chapter 5: Project Description
- Chapter 6: Biodiversity
- Chapter 7: Land, Soils and Hydrogeology
- Chapter 8: Water and Hydrology
- Chapter 9: Air Quality and Climate
- Chapter 10: Noise and Vibration
- Chapter 11: Cultural Heritage
- Chapter 12: Landscape and Visual
- Chapter 13: Material Assets: Traffic and Transportation
- Chapter 14: Material Assets: Built Services
- Chapter 15: Population and Human Health
- Chapter 16: Cumulative Effects and Environmental Interactions

1.7.3 Volume 3: Appendices

Specialists' technical data and other related reports are contained within Volume 3. Volume 3 comprises parts A and B. Part A includes 11 no. appendices associated with various specialisms. Part B includes verified views associated with Chapter 12 Landscape only.

Table 1-4: Volume 3 Part A Appendices

Appendix	Title
Appendix 4.1	**Pre-Planning Meeting Records March 5th 2019**
Appendix 4.2	**Pre-Planning Meeting Records May 2nd 2019**
Appendix 4.3	**ABP Opinion and ABP Record of Meeting**
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Appendix 13.3	**Sample Traffic Modelling Output File**

1.7.4 Other Reports / Documents

In addition to the EIAR and its appendices, the application documentation for the Proposed Development, also includes:

- Planning Report & Statement of Consistency with Planning Policy prepared by RPS Group Ltd.
- Statement of Response (to An Bord Pleanála's Opinion) prepared by RPS Group Ltd.
- Appropriate Assessment Screening Report prepared by Scott Cawley

- Architect's Design Statement prepared by McCrossan O Rourke Manning Architects
- Building Life Cycle Report prepared by McCrossan O Rourke Manning Architects
- Housing Quality Assessment prepared by McCrossan O Rourke Manning Architects
- Schedule of Units and Areas prepared by McCrossan O Rourke Manning Architects
- Landscape Report & Outline Landscape Specification prepared by Kevin Fitzpatrick Landscape Architecture
- Arboricultural Report prepared by The Tree File Ltd
- Flood Risk Assessment prepared by JB Barry & Partners Consulting Engineers
- Water Services Report prepared by JB Barry & Partners Consulting Engineers
- Traffic and Transport Assessment by JB Barry & Partners Consulting Engineers
- Public Lighting Report prepared by McElligott Consulting Engineers.
- Multiple Occupancy Building Car Charging Strategy by McElligott Consulting Engineers
- Daylight and Sunlight Assessment prepared by Geraghty Energy Consultants
- Energy Statement prepared by McElligott Consulting Engineers
- Childcare Demand Analysis prepared by RPS Group Ltd.
- Social and Community Audit of Schools prepared by RPS Group Ltd.
- Unit Mix Justification prepared by RPS Group Ltd.
- Waste Management Plan prepared by KeyWaste Management Ltd.
- Construction and Demolition Waste Management Plan prepared by JB Barry & Partners Consulting Engineers
- Outline Construction Environmental Management Plan by JB Barry & Partners Consulting Engineers
- Owners Management Company Operational Management Plan prepared by WYSE Property Management.

1.8 Contributors to the EIAR

This EIAR was project managed, co-ordinated and produced by RPS who liaised between the design team and various environmental specialist consultants. RPS were also responsible for editing the EIAR document to ensure that it is cohesive and not a disjointed collection of disparate reports by various environmental specialists. RPS does not accept responsibility for the input of specialist consultants or the design team.

The EIAR structure, responsibility and qualified input for each chapter are detailed in **Table 1-5**.

Table 1-5: List of Contributors to EIAR Chapters

Chapter	Lead Author(s)	Company	Subject	Qualifications
1	Helena Gavin	RPS	Introduction	BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI
2	Helena Gavin	RPS	Consultation and Project Scoping	BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI
3	Gerard O'Neill	MCORM	Alternatives Considered	Dip Const (Arch) MCIAT MRIAI
	Helena Gavin	RPS		BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI
4.	Helena Gavin	RPS	Planning Policy Context	BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI
5	Gerard O'Neill	MCORM	Project Description	Dip Const (Arch) MCIAT MRIAI
	Garry Flood	JB Barry		BSc, CEng, MIEI.
	Helena Gavin	RPS		BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI
6	Laura Higgins	Scott Cawley	Biodiversity	BSC Zoology
7	Kieran O'Dwyer	JB Barry	Land, Soils and Hydrogeology	BE Civil Engineering
8	Kieran O'Dwyer	JB Barry	Water and Hydrology	BE Civil Engineering
9	Claire Flynn	AWN	Air Quality and Climate	BA (Hons) Environmental Science, MSc Applied Environmental Science, MIAQM
10	Damian Kelly	AWN	Noise and Vibration	BSc Analytical Science, MSc Environmental Science, MIOA
11	Martin Byrne	Byrne Mullins & Associates	Cultural Heritage	MA, Dip. EIA Mgmt, MIAI
12	Kevin Fitzpatrick	KFLA	Landscape and Visual	BA (Hons) Land Arch, MLA, MILI
13	Gerard Claffey	JB Barry	Material Assets: Traffic and Transport	BA, BAI, MAI
14	Dan O'Donoghue	JB Barry	Material Assets: Built Services	BE Civil Engineering, MBA
	Richard McElligott	McElligott		BSc. Eng, C. Eng. MEI
15	Michael Higgins	RPS	Population and Human Health	BA (Hons) Econ & Eng, MSc Reg & Urb Planning, H Dip Edu, MIPI, CIHT, TPP
16	Helena Gavin	RPS	Cumulative Effects and Environmental Interactions	BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI

1.9 Technical Difficulties or Deficiencies in Knowledge Encountered

No technical difficulties were encountered when preparing this report. Discipline specific data limitations are identified within each chapter as relevant.

Relevant information was obtained from publicly available sources and mapping databases such as the EPA, NPWS, GSI, OPW, etc. It has been assumed that the information is correct and while reasonable care and skill has been applied in review of this data no responsibility can be accepted for inaccuracies in the data supplied.

In addition to published datasets, the preparation of the EIAR has drawn on other data sets undertaken to inform this EIAR as detailed in individual chapters of the report.

These additional survey works have been undertaken in order to provide up-to-date baseline information on which to undertake the environmental assessments, in addition to the site-specific information from the existing databases from official sources.

1.10 Viewing of EIAR

A dedicated website for this proposed development is established enabling all elements of the planning application to be viewed. The details of this website are included on the planning application statutory notices.

The EIAR can also be viewed at the offices of An Bord Pleanála and Fingal County Council as set out in the planning application statutory notices.

2 CONSULTATION AND PROJECT SCOPING

2.1 Consultation

In relation to consultation, the EIA Directive, Irish implementing legislation and recent guidance documentation make clear that there are specific requirements regarding the use of the EIAR, both as a tool to inform concerned stakeholders and the public, as well as to make decisions regarding development consent for projects. Accordingly, this EIAR provides evidence of effective consultations which have already taken place and provides the basis for effective consultations to come.

The scoping and consultation process have resulted in an iterative design procedure, such that the project has been modified to address the issues raised by statutory consultees and stakeholders.

A pre-planning meeting took place with Fingal County Council on 10th September 2018 which included an overview of the applicant's intention to deliver student housing and hotel on the subject site. The planning authority confirmed that the proposal would be compliant with Development Plan and provided a list of items that would need to be addressed in a planning application taking the proposal forward. The applicant undertook a detailed analysis of the proposed development and determined that the provision of a residential scheme was in keeping with the overall vision for Northwood.

Two pre-application meetings took place with Fingal County Council with respect to a residentially focused development proposal. The first meeting took place on 5th March 2019. The applicant submitted details of the proposed development to Fingal County Council including a description of the nature and scale of the project in advance of the meeting. A copy of the record is included in **Volume 3 Appendix 2.1**. A summary of the items discussed are set out in **Table 2-1.**

Table 2-1: Summary of Issues Discussed on 5th March 2019

Item	Key Issues / Recommendations
Design and layout:	– Confirmed that the layout of the proposed development and height were acceptable in principle.
Site Issues:	– The proposed Metrolink route to the west of the site adjacent to the Old Ballymun Road. – Existing public transport provision in the area is on the Swords Road, Ballymun Road and Santry Avenue. – Development Plan requirement for a masterplan on these lands – Applicant to address how it will not prejudice this. – Within the Outer Airport Noise Zone (OANZ) – Applicant to provide full noise assessment and suitable mitigation measures.
Water Services:	– Contact Irish Water regarding pre-connection agreement. – Provide detail on the means of attenuation – tree pits, swales etc. – A pumping station will be required for drainage from the basement, rest will be gravity fed.
Transportation and parking:	– Traffic assessment required. – Car parking requirement is 634 according to Development Plan. This may be reduced to 386 spaces but must be justified with suitable detail. – Parking spaces shall provide for electric charging / be future proofed for this. – 2 bicycle parking spaces per unit, suitably secured. – Crèche parking and set down areas to be provided and include staff parking. Should not allow for reverse manoeuvres. – Contribution towards upgrade of Northwood Avenue / Ballymun Road Junction. This will provide for SCATS controlled signals.
Landscaping and open space:	*5.1 Existing trees:* – Santry and Northwood are subject to a Tree Preservation Order. Require full tree survey, Arborist Report ensuring full details on the protection of trees. This report will inform the layout and set back/buffer required for these protected trees. The proposed landscaping / treatment of the ditch in the vicinity of the existing trees needs further discussion between the drainage consultants and the arborist. In general ditches in public areas attract dumping and anti-social behaviour. If possible, it would be best if the ditch can be filled and the area grassed. Full details of any proposed 'No dig solution' paths should be referenced in the Arborist's report.

Item	Key Issues / Recommendations
	5.2 Street trees: – Requirement for minimum rooting volume of 16 cubic metres in constructed tree pits. Detail of the constructed tree pit to be provided. No services within 2.5m of proposed trees. No street tree within 7m of lamp standards. *5.3 Landscape plan:* – The landscape plan shall include the following: ○ Services including proposed lamp standards. ○ Area (in sq. metres) of open space and playground provision in accordance with Development Plan standards. ○ Outline of constructed tree pit area. – Playground surface and equipment to be in accordance with BS EN 1176 and 1177. Play equipment to be provided / accessible for disabled users. (N.B. - Details of management maintenance to be included – RoSPA certification (or equivalent) frequency of checks and record keeping). – No incidental grass margins (less than 1 metre in width) which are unsustainable to maintain. Naturalised bulb planting and use of pollinator friendly species (in accordance with the National Pollinator Plan). Proposed tree planting to reflect where possible the tree species of the adjoining designed landscape of Santry Park. Further consideration is required on proposed landscaping adjoining Gulliver's Retail Park – in order to create a substantial visual separation / green buffer zone between the vast area of car parking and the proposed apartment units. The development will provide for a 'Green Route' through the southern edge of the site and continue through the Gulliver's Car Park in the direct of the Old Ballymun Road. Will include cycle and pedestrian route with landscaping. Bin stores, bike stores and sub-stations shall not be located on or directly adjoining open space areas (to avoid anti-social activity). – The Open Space Design Statement to clearly state how public open space provision and playground provision as well as communal open space provision is being dealt with. Emphasis to be given on the usability of the open space areas for various age groups.
Taking in charge drawing:	– Should design the services and open space to taking in charge standard.
Public Art:	– Provide following agreement with Fingal County Council Arts Office.
Other Assessments:	– Appropriate Assessment Screening. – EIAR. – Noise Assessment – OANZ. – Archaeology. – Daylight and shadow assessments. – Design Statement – DMS03 of the Fingal Development Plan 2017 – 2023. – Longer term at construction stage – May require a crane use strategy having regard to the proximity of the development to the airport.

The second meeting with Fingal County Council took place on 2nd May 2019. The applicant provided an update on progress in relation to the project and how the findings where influencing the evolution of the project design process. A copy of the record is included in **Volume 3 Appendix 2.2**. The items discussed are set out in **Table 2-2.**

Table 2-2: Summary of Issues Discussed 2nd May 2019

Item	Key Issues/Recommendations
Design and layout:	– Inclusion of a pedestrian / green route from the site through the Gulliver's Car Park to the site of the Metrolink stop. The route to be at grade with extensive tree/ shrub planting. Suitable lighting will be approved along this route. The applicant was advised that the lighting should be of a different type to that of the existing car park. – The blocks range in height from 7 to 8 storeys (7 with setback). Issue of 45m with regards to the airport.
Surface water drainage:	– Ditch with trees on the roadside. There is a potential to fill this ditch to provide for additional surface water drainage. – May use Stormtech for water attenuation. – Use of permeable paving and attenuation tank.
Parks and Green Infrastructure:	– Reinforced grasstech to be used for fire access in certain locations. Need for a root barrier in the vicinity of trees.

	– Lighting to be indicated on all submitted plans. Should include details on the depth of the light standard etc. below Ground Level (GL). – Need for a softer edge along the western boundary. – 16 cubic metres constructed tree pits. – Issue of falls etc. in amenity areas especially those not taken in charge. – Playground to centre of the site should be universally accessible – make allowance for this. Location of the playground with regards to apartment units to be carefully considered. – Play facilities to be in accordance with apartment guidelines.
Car parking and transport:	– One car parking space per unit to be provided. – Make provision (ducting or charging points) for electric cars.
Other issues:	– Environmental Impact screening – sub threshold but consider issue of cumulative impacts of development. – AA screening.

The Tripartite Meeting took place with Fingal County Council and An Bord Pleanála on 2nd September 2019. The Applicant submitted a preapplication meeting request to An Bord Pleanála. A copy of the meeting record is included in **Volume 3 Appendix 2.3** together with the Opinion. The items discussed are set out in **Table 2-3.**

Table 2-3: Summary of Issues Discussed 2nd September 2019

Item	Key Issues/Recommendations
Development Strategy for the site to include *inter alia*: • Quality and design of public/semi-public open provision including the provision of play facilities in-line with apartment guidelines. • Daylight and sunlight analysis for existing apartments and apartments to be on the north of the site. • Access and appropriate provision of refuse for residential and commercial. • Housing mix, SPPR 1 and the inclusion of a Housing Need and Demand Assessment (HNDA)	
ABP sought further elaboration discussion on:	– Usability of the play area to the east of the site considering the location within the protected trees which will remain. – Management of all play areas and the provision of recreation facilities for all ages – Daylight and sunlight analysis in relation to the impact on the existing buildings to the northern of the site and the proposed units within the scheme along the north – Design of the interface between the commercial and retail, in particular the refuse areas and the apartments on the ground floor. – Noise impact of the retail unit on residential. – Treatment of the drop off points at the childcare facility and basement. – Apartment mix and justification for the high number of two bed units.
Planning Authority's comments	– A play area of 500m2 is needed for small children. – The area of 136m2 for younger children is acceptable however the quality could be improved. – Location of the play area under the trees is a concern. – Ensure that the trees are protected and use of Stormtech is appropriate – The ditch could be used as storage for water. – There is attenuation and a discharge at Santry river. – In regard to daylight/sunlight the applicant needs to be conscious of the 8-storey element. – If trees are being induced it needs to be shown how much shadowing occurs. – There is more opportunity to provide the public realm. – Ensure that refuse collections are separate from the childcare facility drop off areas. – The applicant should submit a supporting retail statement within the uses proposed in the schemes. – Development plan standard for housing mix is different to the national requirements.
Prospective Applicant's response:	– Position of the play area can be examined. – The whole scheme will be private and managed. – The south of the site will be redesigned to allow more sunlight into the courtyard. – Shadow diagrams show no negative impact and additional documentation will be submitted. – Vertical Sky Component (VSC) method is being carried out. – The trees are oak, ash and sycamore and therefore will have a minimal impact on sunlight analysis. – The Average Daylight Factor (ADF) levels are currently being done.

Item	Key Issues/Recommendations
	– Interface between the retail units and parking can be examined. – The retail units will be tripled glazed, ventilation for units will be appropriate and uses will be restricted to have limited impact on residential amenity. – Heat recovery is being used and there is natural ventilation. – Operating hours will be managed. – There will be no units containing late night take-away. – The management report will address the access points and childcare facility collections. – There is a good unit mix in the surrounding area.
Further ABP comments:	– Examine the location of the play area integrate with any management plan – Address what is being done with the ditch/open space area – The single aspect north facing apartments at block D needs to be examined – Detail the treatment of the access points at the childcare facility and basement – In regard to mixed use commercial units – ensure future proofing – Submit a rationale as to why 89% of apartments are 2-beds
Quantum and quality of the provision of shared services, childcare and residential amenity provision. **ABP sought further elaboration/discussion on:** • The size use and management of shared services. • The size and scale of the existing and proposed childcare facility. • School provision in the area.	
Planning Authority's comments:	- Detail the shared services. - Outline the desire lines.
Prospective Applicant's response:	- Shared services are private for the residents. - The courtyard is only for occupants. - There is an existing childcare facility provided for housing units with 32 spaces and 72 are proposed in the scheme. - Schools have been assessed and additional analysis will be included to identify future capacity.
Further ABP comments:	- Justify the need for a scale of the childcare facility. - The provision of the residential amenity must be commensurate with size of the scheme.
Quantum and justification for car parking provision:	
ABP sought further elaboration/discussion:	- Basement parking and potential deficit in the quantum provided - Car club spaces. - Shared spaces and use of adjoining carpark for the scheme - Electric charging points. - Financial contribution for the upgrade of junctions in the vicinity of the site.
Planning Authority's comments:	- Justification for a lack of 29 spaces should be included. - Ducting should be in place. - A financial contribution for a junction upgrade under section 48 is needed. - Bicycle access to the basement needs to be designed to standards. - Stackable cycle parking spaces should be investigated. - Visitor bicycle parking should have a roof and be secure.
Prospective Applicant's response:	- Provision has been made for electric charge points and provision of charging can be done when a resident obtains a grant. - There are GoCar spaces. - Parking is 10% below the Planning Authority's minimum standards. - A Transport Impact Assessment will be provided as part of the EIAR although can also be submitted as a separate stand-alone document.
Further ABP comments:	- If standards are different for cycle or car parking a rationale will be required. - If a contribution is being sought for the upgrade of junctions the Planning Authority should detail this provision. - The PA should submit details of any specific financial contribution required for the upgrade of junction.
Any other matters: • Submit a rationale for the ESB substation at the entrance. • Clarify in relation to the external stairs on drawings from the basement at east Block D. • Detail of AA Screening • Ensure the futureproofing of space and apartment units. • Detail the materials being used in relation to their distinctiveness and place making. • Submit a drawing showing what is public open space having regard to the possible provision of future taking in charge. • There should not be a monotony of height, variation of the buildings will allow sunlight and daylight through. • This location is not going to be landmark although distinctiveness is required.	

Item	Key Issues/Recommendations
• In regard to Irish Water ensure that all concerns for third party lands are sought.	
Applicants Comments:	- The substation is for electricity and the possibility of screening will be investigated. - Stage 1 screening is being done. - The same brick is being used and distinctiveness will be outlined. - The aim is to build up the height towards a landmark building to the south of the site.

2.2 Scoping of the Project

An informal EIAR scoping exercise was undertaken as part of the EIAR process. During this process information on the project and an outline of the proposed EIAR was provided to consultees inviting any comments, queries or observations from the contacted parties on the nature of the proposed development, the potential environmental impacts and the content of the EIAR. The EIAR Scoping Report was issued via e-mail to the following organisations on the 21st of June 2019:

- Fingal County Council (Roads, Drainage, Environment Depts);
- Fingal County Childcare Committee;
- An Bord Pleanála;
- Irish Aviation Authority;
- daa - Dublin Airport Authority;
- Development Application Unit, Department of Culture, Heritage and the Gaeltacht;
- Department of Communications, Climate Action and Environment;
- Department of the Housing, Planning, Community and Local Government;
- Transport Infrastructure Ireland (TII);
- National Transport Authority (NTA);
- Inland Fisheries Ireland;
- An Taisce;
- Fáilte Ireland;
- The Heritage Council;
- ESB Networks;
- National Monuments Service;
- Environmental Pillar; and
- Irish Water.

The primary objective of involving these organisations and parties at an early stage in the EIA process is to aid in the scoping of and the content of the EIAR. **Table 2-4** presents the summary of the consultation responses received. All comments and recommendations from each of the Statutory Authorities and Consultees have been taken into consideration in this EIAR.

Table 2-4: Summary of Responses

Consultee	Key issues / concerns / recommendations raised in Response	Where addressed in the EIAR
Transport Infrastructure Ireland	• Potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development. • Consultation and cognisance with regard to locations of existing and future national road schemes, Metro Link and future bus and light rail alignments. • Consultations should be had with the relevant local authority with regard to locations of existing and future national road schemes and potential traffic management issues. • Traffic and Transport Assessments should be carried out in accordance with TII's Traffic and Transport Assessment Guidelines (2014) noting 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. 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. • The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required. • Environmental Impact Assessment shall include provision for travel planning/ mobility management • Regard should also be had to other relevant guidance available at www.TII.ie. • The EIAR 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.	Chapter 13
Inland Fisheries Ireland	• The proposed development is located in the catchment of the Santry River, a non-salmonid system. • Dublin City Council has secured funding to develop an ambitious river restoration and greenway project along a 4,500m stretch of the River. Restoration of the river, investment in the public realm, development of sustainable access through the creation of a cycle and walking greenway while rebuilding natural habitats will act as a flagship Green Infrastructure project for the north city suburbs. • Disturbance of riparian habitats should be minimised. • Best practice should be implemented at all times in relation to any activities that may impact on surface water. • An Invasive Species and Biosecurity Plan should be included to treat and manage identified invasive species onsite. • Good housekeeping measures are integral to achieving prevention of excessive turbid run-off to surface water systems. Silt fencing of discharge streams would also be essential during construction and possibly during operation.	Chapter 6
Fingal Childcare Committee	• No comment on EIAR Scoping Report. • Provided information on existing childcare facilities in the surrounding areas.	Chapter 15

Through the scoping process which has been carried out in the preparation of this EIAR, the issues which are likely to be important during the environmental impact assessment have been identified. The scoping process has identified the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected, and has defined the appropriate level of detail for the information to be provided in the EIAR.

3 ALTERNATIVES CONSIDERED

Assessment of reasonable alternatives is mandatory under the EIA Directive. The requirement to consider alternatives within an EIAR in Schedule 6 of the *Planning and Development Regulations 2001*, as amended, which state:

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

Reasonable alternatives may include project design proposals, location, size and scale, which are relevant to the proposed development and its specific characteristics. The Planning and Development Regulations require that an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects to be presented in the EIAR.

This Chapter has been prepared by Helena Gavin (BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI), Director, RPS Group Ltd and Gerard O'Neill Dip Const (Arch) MCIAT MRIAI, Director, O'Neill McCrossan O'Rourke Manning Architects.

3.1 Methodology

The Environmental Protection Agency (2017) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft* states:

> *"The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

The *Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment* (Dept. Housing, Planning and Local Government, 2018) states:

> *"The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment 66.*
>
> *Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each."*

This chapter describes the main alternatives examined during the design phase and sets out the main reasons for choosing the development as proposed. Alternatives considered have been may be considered at three levels:

- Alternative Land Uses;
- Alternative Designs; and
- Alternative Processes.

3.2 Alternative Land Uses

3.2.1 Starter Enterprise Units – Reg. Ref. F04A/1562

The subject site forms part of a larger Masterplan area of 19.8 hectares for which planning permission was granted in 2005 for a mixed use development under Reg. Ref. F04A/1562. The appropriate period for this consent has been extended to 2020 under Reg. Ref. F04A/1562/E2. The permitted Master Plan comprises modern business, enterprise and commercial facilities consisting of c. 77,016 sq. m. Completed elements of the Master Plan include a retail park (Gulliver's Retail Park), 2 no. of the 4 no. business units (Swift Square Office Park) and the Local Centre.

Starter Enterprise Units were permitted within the subject site as shown in **Figure 3-1**.

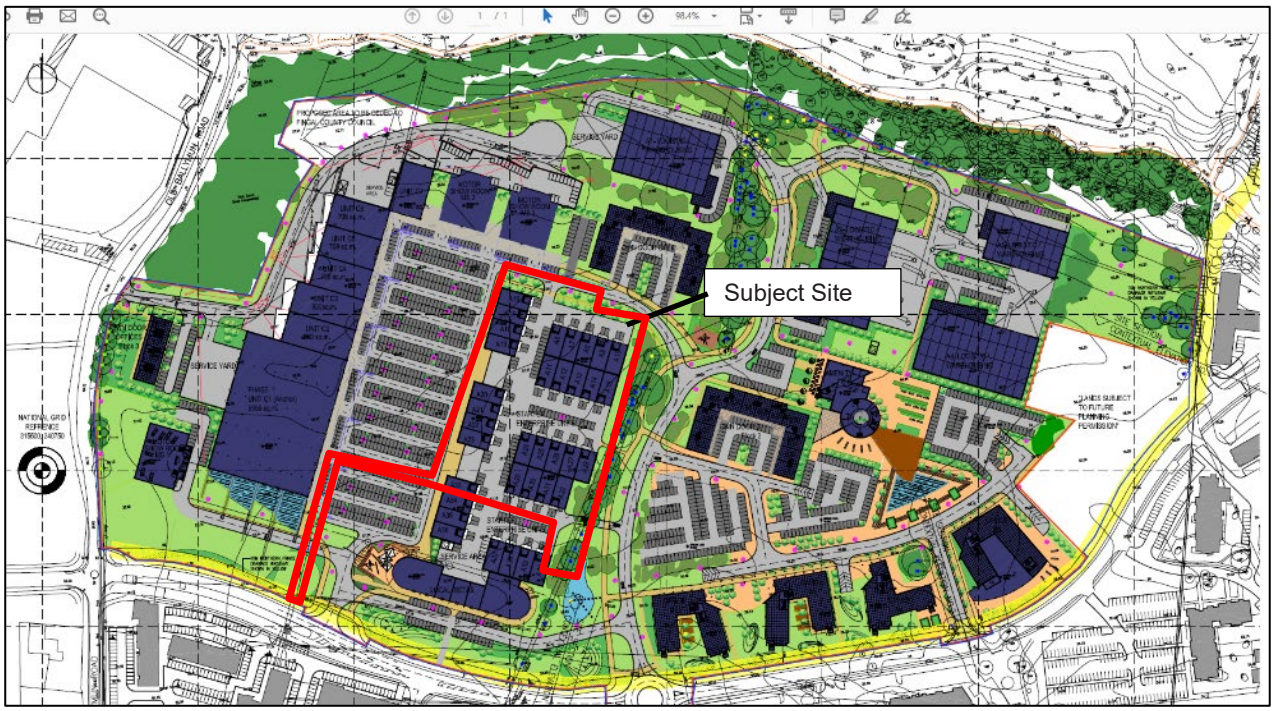

Figure 3-1: Masterplan of Permitted Reg. Ref. F04A/1562

The permitted Starter Enterprise Units were not constructed, due first to the challenging economic conditions and following that the evolving local context resultant in part from Metro North being granted permission (Rail Order 06F.NA.0003), the subsequent abonnement of the project and current plans for Metro Link.

The acute shortage of housing and the location of the Masterplan lands adjacent to planned high capacity public transport links including Metro Link (the successor to Metro North) and Bus Connects Core Corridors led to refinement of development strategy within the Masterplan lands not only for the Applicant but also Fingal County Council. This resulted in the land be designated as a Metro Economic Corridor where a mix of uses were permitted in principle.

Residential development within an area of the Masterplan adjacent to the subject site was permitted in 2015. Reg. Ref. F15A/0440 permitted the replacement of 5 no. logistic warehouses (11,126 sq.m), 23 no. 3 storey own door office buildings (9,696 sq.m), 1 no. amenity building (1,700 sq.m) and associated car parking with 374 no. residential units comprising apartments and houses on a c.7.0 ha site. Since this planning permission minor modifications have been granted resulting in 355no. units now permitted. All these units are currently under construction.

The subject lands are now located adjacent to a developing mixed use community including housing (Reg. Ref. F15A/0440), commercial development including the Swift Square Offices and retail development at Gulliver's Retail Park and Gulliver's Local Centre, all to be served by high capacity public transport.

The entire area of the subject site is zoned:

> *"ME – Metro Economic Corridor"* with an objective that seeks to *"Facilitate opportunities for high density mixed use employment generating activity and commercial development, and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor."* (see **Figure 4-2**).

The vision for lands with this zoning objective as stated in the *Fingal Development Plan 2017 - 2023* is to:

> *"Provide for an area of compact, high intensity/density, employment generating activity with associated commercial and residential development which focuses on the Metro within a setting of exemplary urban design, public realm streets and places, which are permeable, secure and within a high quality green landscape"*

Uses that are considered to be '*Permitted in Principle'* under the 'ME' zoning objective include inter alia:

- Residential;
- Restaurant / Café;
- Retail -Local up to 150sq.m nfa;
- Community Facility; and
- Open Space.

It is considered that the development of enterprise starter units at the subject site is no longer the most appropriate land use for the strategically located subject site.

3.2.2 Student Accommodation & Hotel

Our client met with Fingal County Council to discuss proposals for the development of student accommodation and a hotel at the subject site on 10th September 2018. Such a proposal was considered to be in accordance with the current land use zoning and overall vision for the area and a more appropriate use of the lands than the permitted starter enterprise units. A schematic view of the proposals is shown in **Figure 3-2** and the East and West elevations are shown in **Figure 3-3.**

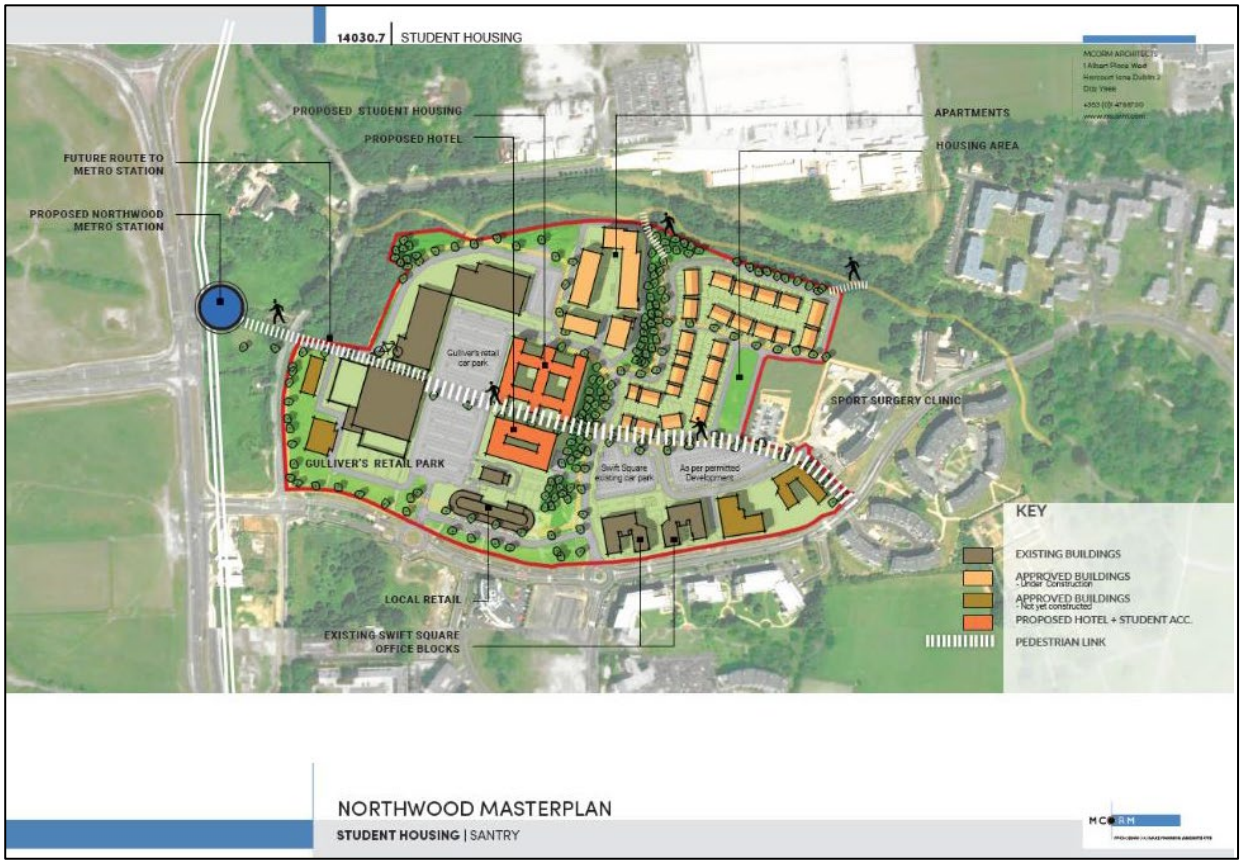

Figure 3-2: Schematic Site Layout Student Housing and Hotel [3]

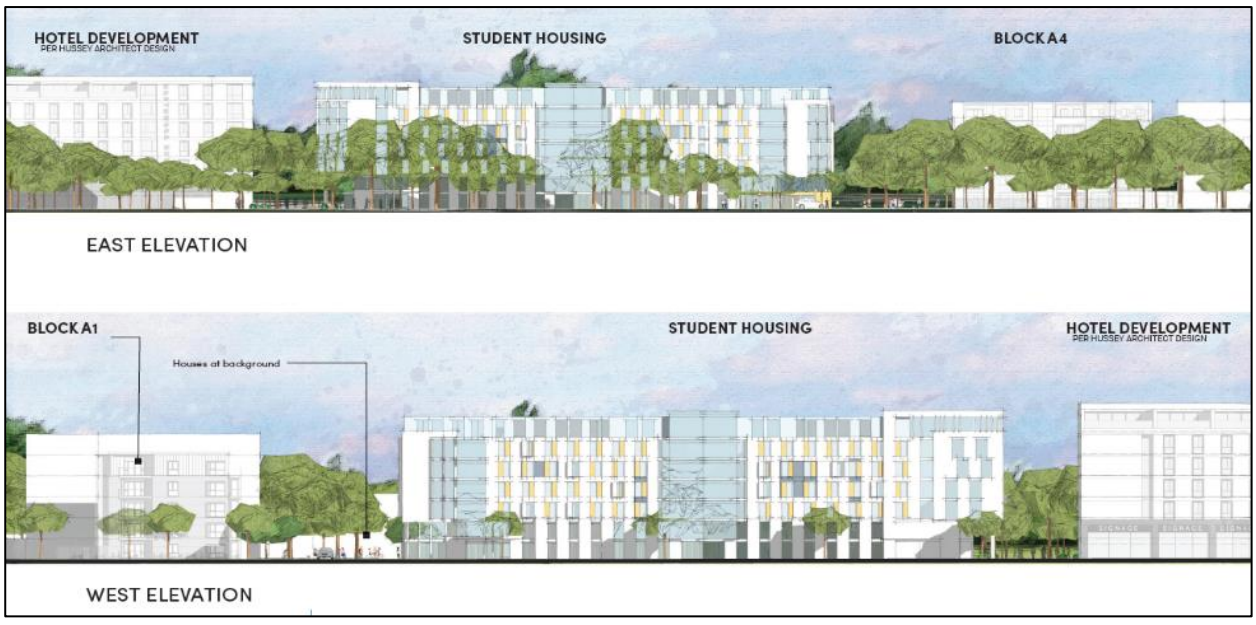

Figure 3-3: West Elevation Context - Student Housing and Hotel[4]

[3] Source: Student Housing Santry Brochure, (August, 2018).

[4]Source: Student Housing Santry Brochure, (August, 2018).

Following this meeting the Applicant and the project team undertook further analysis of the student accommodation and hotels. These reviews identified:

- Significant travel time to most third level institutions by sustainable transport modes (walk, public transport, cycle);
- Increased supply of student accommodation permitted / under construction within Dublin, closer to the city centre;
- Very significant increase in hotel beds throughout Dublin under construction / permitted:
- Ongoing and urgent requirement for residential development within Dublin; and
- Progressing of MetroLink proposals by the NTA.

3.2.3 Residential Development

Having considered these factors and identified clear demand for additional housing within Northwood as evidenced during the construction of apartments and houses under Reg. Ref. F15A/0440 as amended it is considered that the provision of residential units at this site is a more appropriate land use.

Such a use accords with planning policy as set out in the *Planning Report and Statement of Consistency* included in the planning application documentation and shall be well served by Metro Link. The confirmation of the location of the Northwood Metro Station at the junction of R108 / Northwood Avenue within 300m of the subject site provides additional assurance as to the quality of this location for residential development.

3.3 Alternative Designs

Design priorities which informed the Student Accommodation and Hotel proposals included the need for a pedestrian link to the metro station and the retention of existing trees on the eastern side of the subject site continue to be pertinent.

The approximate height and massing of the Student Accommodation and Hotel proposals also continues to be appropriate. Northwood Avenue is already an important route flanked by buildings establishing a building height of c. 6 no. residential stories. Future development ton land directly to the south of the subject site can be anticipated, particularly as Metro Link progresses. This further underpins the height strategy.

The design approach for the proposed development is set out in the *Architect's Design Statement* prepared by the project architects, MCORM Architects and it should be read in conjunction with this chapter of the EIAR.

The proposed layout is designed to function as an addition to the housing provision within Northwood to create a sustainable mixed-use neighbourhood adjacent to high capacity public transport services.

An early schematic view of the proposals as presented to Fingal County Council is shown in **Figure 3-4**.

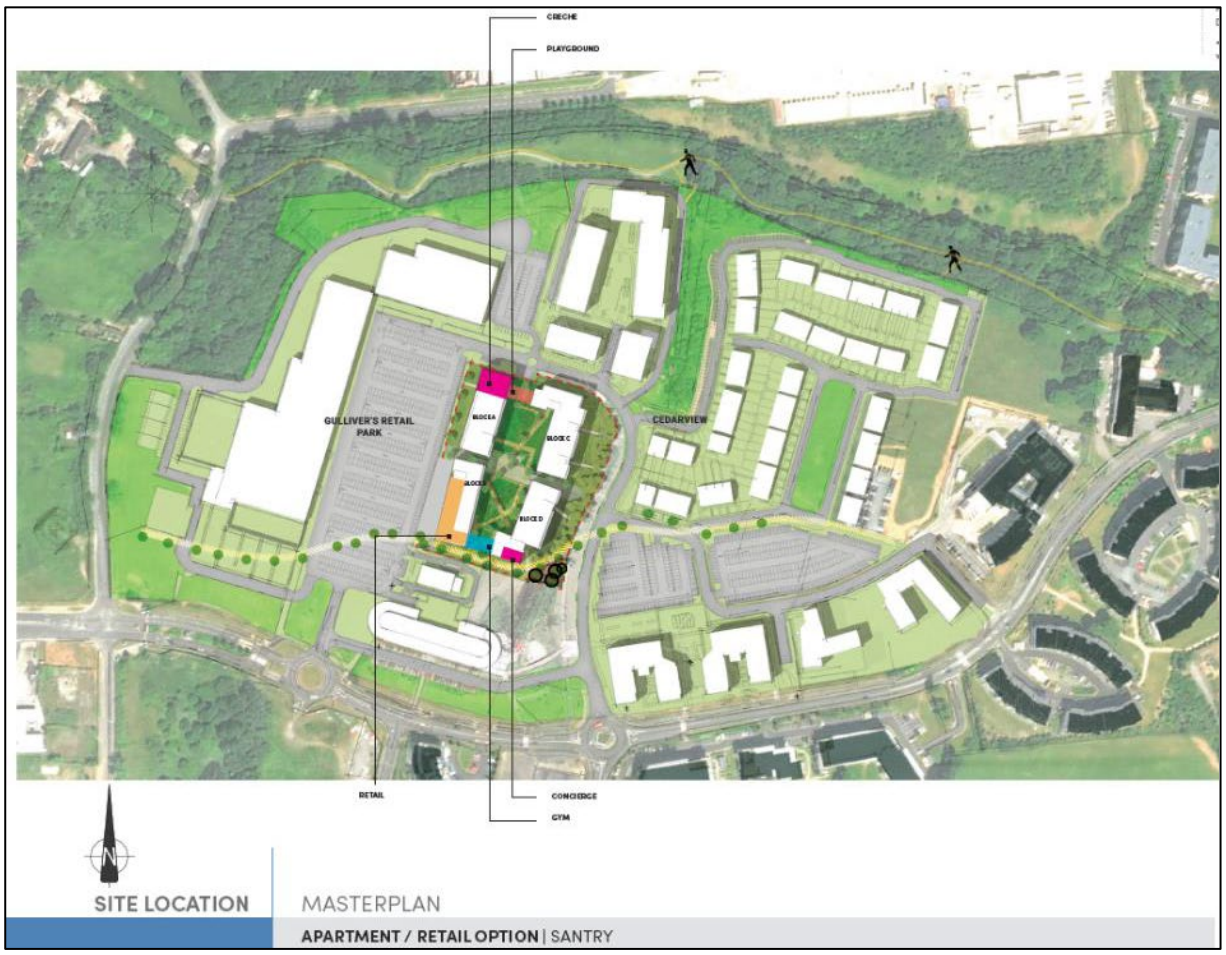

Figure 3-4: Schematic Site Layout – Apartment and Retail[5]

The design has evolved during the design phase in response to input from the appointed EIAR team, advice received from Fingal County Council at pre-planning stage, the identification of the location for the Northwood Metro Station at the junction of Northwood Avenue / Ballymun Road and the Tripartite meeting. This included:

- Provision of high quality link from subject site to planned Northwood Metro stop including, extensive tree / shrub planting and suitable lighting of a different type to that of the existing car park.
- One car parking space per unit to be provided.
- The proposed landscaping / treatment of the ditch in the vicinity of the existing trees needs further discussion between the drainage consultants and the arborist. In general ditches in public areas attract dumping and anti-social behaviour. If possible, it would be best if the ditch can be filled and the area grassed.
- Relocation of play areas and its expansion.
- Require full tree survey, Arborist Report ensuring full details on the protection of trees. This report will inform the layout and set back/buffer required for these protected trees.
- Reorientation of the ESB Substation building to lessen its perceived scale. Setting back the structure from the road/path edge deeper into the site. Separation of structure from open space to the north via

[5] Source: Apartment / Retail Option Santry Brochure (November, 2018).

proposed access road perpendicular to existing paths/road – therefore sufficiently removed from 'open space'. Enhanced quality of materials proposed. Extensive screening along the structures southern and eastern boundaries. Positioning of public art to direct the eye from the Northwood Avenue roundabout past the substation and to the 'entrance' to the proposed development.

- A summary of the design changes which were made to the scheme in order to maximise daylight and sunlight levels for both the existing and proposed scheme are outlined below:
  - Blocks A, B & D has moved 2m to the West.
  - Block C has moved 1m to the West.
  - Block B has additionally rotated on its most NW point by 1m to enlarge the gap between itself and Block A.
  - Block A has been adjusted to align with block B's south elevation / axis having the effect of enlarging the Gym and units in the floors directly above.
  - Unit A1 / 47 (Penthouse unit block A) has been moved to the south of the block which in turn has affected unit A1 / 49.
  - Block B has been recessed at GF level by 1.6m (West to East) reducing the retail units in Block B.
  - Level 6 of block D has been setback by 8 metres in order to minimise the impact of the proposed scheme on existing neighbouring Block A1 and A4.
  - A number of windows have been increased in size and additional windows have been incorporated in gable units.

This iterative process *inter alia* highlighted environmental matters that informed the consideration of alternative layouts and designs including; open space provision, addressing the issues of population and human health in a city environment, biodiversity, and transportation, which will continue up to the formalisation of the final scheme submitted for approval. The proposed layout is illustrated in **Figure 3-4.**

3.4 Alternative Mitigation Measures

The mitigation measures outlined in the various chapters are considered appropriate to the location, nature and extent of the project and its potential impacts. As such, no alternative mitigation measures were considered.

3.5 Alternative Processes

This is not considered relevant to this EIAR having regard to the nature of the proposed development, which contains over 100 residential units and as such, it is mandatory that the planning application is submitted to An Bord Pleanála as a SHD under the *Planning and Development (Housing) and Residential Tenancies Act 2016*, as amended.

3.6 Conclusion

In considering the future development the site a number of options were identified and considered by the Applicant. The provision of residential development was identified as the preferred option. The design for the proposed development has evolved from the initial concept layouts to the current agreed final layout – to fulfil the requirements set out in the original design brief and developed through each stage review in conjunction with that brief. At all stages of the design development, the design parameters have been influenced by both client and design team's core strategy to develop a suitable solution that provides the necessary infrastructure and buildings on site while maintaining and protecting the site environment in terms of a high-quality physical, visual and environmentally sound final proposal.

4 PLANNING POLICY CONTEXT

4.1 Contributor to the Chapter

This section of the EIAR sets out the national, regional and local land use, transport planning and development policy which guides the development of the subject site. It was prepared by Helena Gavin (BA, MSc Town & Country Planning, PG Dip Env Eng, MIPI), Director, RPS Group Ltd.

4.2 Introduction

This chapter of the EIAR sets out EU, national, regional and local land use and transport planning and development policy which guides the proposed development. **Figure 4-1** illustrates an overview of the Irish Planning System and the importance of policy in the assessment of planning applications. The relevant planning policies are set out for each level within the hierarchy in the sections that follow.

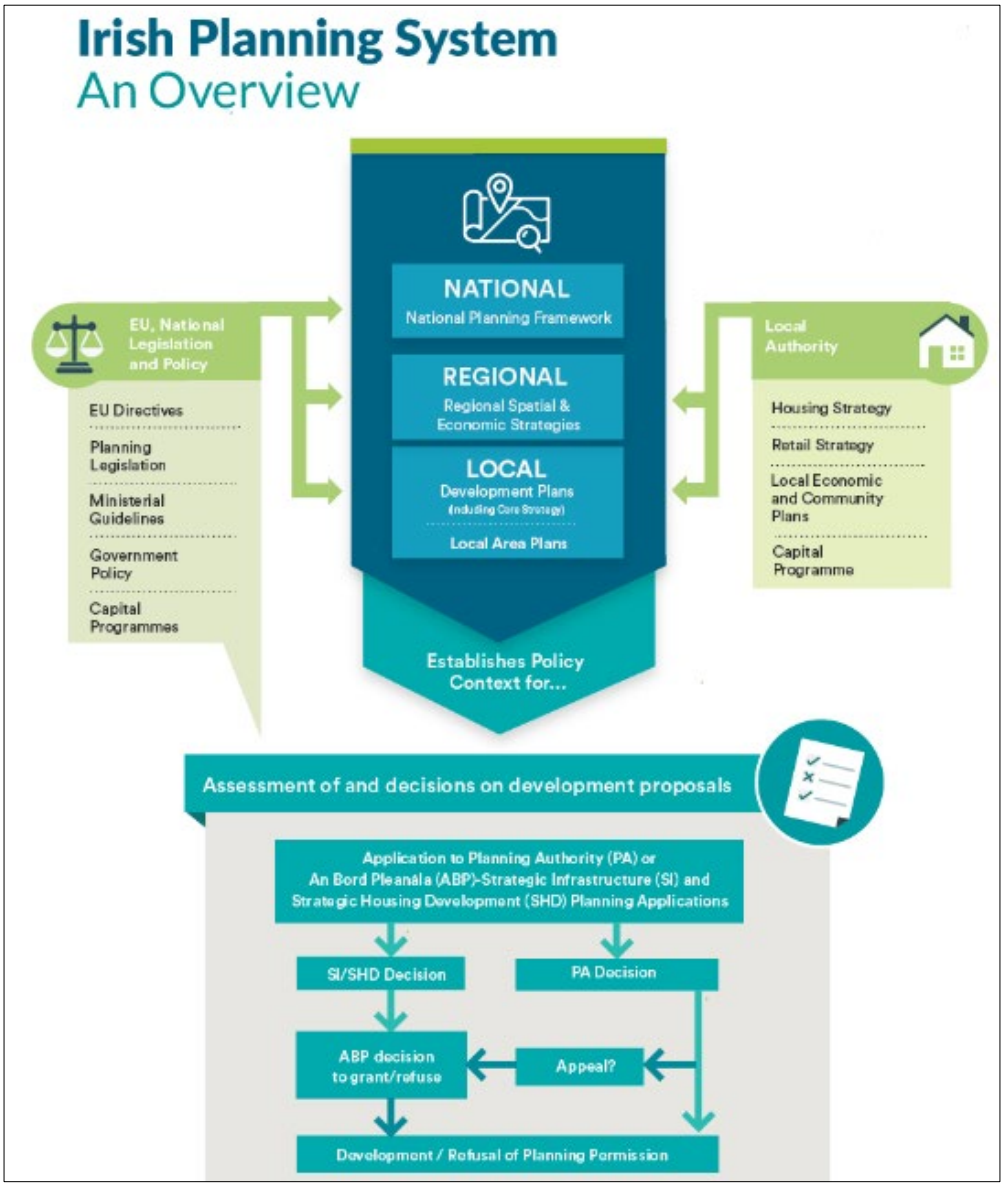

Figure 4-1: National Planning Policy[6]

[6] Source: National Planning Framework.

4.3 Relevant National Planning Policy and Guidance

4.3.1 Project Ireland 2040 National Planning Framework

Project Ireland 2040 National Planning Framework (NPF), published in July 2018, is the primary articulation of spatial, planning and land use policy within Ireland up to 2040. The NPF aims to avoid urban sprawl by promoting increased residential densities in urban areas, consequently reducing pressure on infrastructure demands and adverse impacts on the environment.

National Policy Objective 33 of the NPF states that it is a national policy to:

> *"Prioritise the provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location."* (page 92)

The NPF expands on this objective, explaining that the future homes of Ireland will be built in locations that support sustainable development such as cities and larger towns with provision of infrastructure, access to services and can be delivered in an efficient and appropriate way.

National Policy Objective 3b states that it is an objective of the NPF to:

> *"deliver at least half (50%) of all new homes that are targeted in the five Cities and suburbs of Dublin, Cork, Limerick, Galway and Waterford, within their existing built-up footprints".* (page 29)

In delivering these new homes the NPF aims to achieve inclusive and sustainable communities that are finished to a high standard.

National Policy Objective 4 of the NPF aims to:

> *"ensure the creation of attractive, liveable, well designed, high-quality urban places that are home to diverse and integrated communities that enjoy a high quality of life and well-being".* (page 55)

A number of "*key enablers"* for the growth of Dublin are identified in the NPF pertinent to the development of the subject site including:

- Delivering Metro Link;
- Development of an improved bus-based system; and
- Progressing housing development on public transport corridors.

4.3.2 Rebuilding Ireland – Action Plan for Housing and Homelessness

Rebuilding Ireland – Action Plan for Housing and Homelessness (Rebuilding Ireland) was launched in 2016 with the overarching goal to accelerate the delivery of housing from its current under-supply across all tenures. Rebuilding Ireland aims to help individuals and families meet their housing needs, and to help those who are currently housed to remain in their homes or be provided with appropriate options of alternative accommodation, especially those families in emergency accommodation. The plan seeks to double the annual level of residential construction to 25,000 homes and deliver 47,000 units of social housing over its period (2017-2021), while at the same time making the best use of the existing stock and laying the foundation for a more vibrant and responsive private rented sector.

Rebuilding Ireland is set around five pillars of proposed actions; Pillar 1 to address homelessness; Pillar 2 to accelerate social housing; Pillar 3 to build more homes; Pillar 4 to improve the rental sector; and Pillar 5 to utilise existing housing.

The delivery of housing in the right place is also recognised as being of crucial importance within Rebuilding Ireland. Locating housing in the right place provides for access to employment opportunities and to services such as education, public transport, health and amenities, while also delivering on sustainability objectives related to efficiency in service delivery and investment provision.

4.3.3 Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (2009)

The role of the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (the Residential Development Guidelines) is to ensure the sustainable delivery of new development throughout the country. It focuses on the provision of sustainable residential development, including the promotion of layouts that:

- Prioritise walking, cycling and public transport, and minimise the need to use cars;
- Are easy to access for all users and to find one's way around;
- Promote the efficient use of land and of energy, and minimise greenhouse gas emissions; and
- Provide a mix of land uses to minimise transport demand.

The Guidelines also provide guidance on the core principles of urban design when creating places of high quality and distinct identity. They recommend that planning authorities should promote high quality design in their policy documents and in their development management process.

4.3.4 Sustainable Urban Housing– Design Standards for New Apartments 2018

In March 2018, the Department of Housing, Planning and Local Government published the updated *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2018* (the New Apartment Standards). The updated document builds on previous guidelines published in 2015 taking account of; experience in their implementation since 2015; the need to enhance apartment output to secure both additional housing supply and more compact urban development patterns; and departmental and stakeholder research and analysis into the deliverability of increased supply of apartments.

Accordingly, the 2018 update of the Apartment Standards aims to:

- *"Enable a mix of apartment types that better reflects contemporary household formation and housing demand patterns and trends, particularly in urban areas;*
- *Make better provision for building refurbishment and small-scale urban infill schemes;*
- *Address the emerging 'build to rent' and 'shared accommodation' sectors; and*
- *Remove requirements for car-parking in certain circumstances where there are better mobility solutions and to reduce costs".* (page 2)

A key inclusion in the guidelines is the acknowledgement of the importance of strategic sites in existing urban areas in close proximity to existing public transport facilities. These locations within reasonable walking distance (i.e. up to 15 minutes or 1,000-1,500m) to/from high capacity urban public transport stops (such as DART or Luas); and sites within easy walking distance (i.e. up to 5 minutes or 400-500m) of reasonably frequent (min 10 minute peak hour frequency) urban bus services are considered suitable for residential development such as that proposed.

The Design Standards for New Apartment also sets out design standards that supersede Development Plan standards in relation to:

- Apartment mix;
- Internal space standards;
- Dual aspect ratios;
- Floor to ceiling heights;
- Apartment to stair / lift ratio;
- Storage spaces;
- Amenity spaces including balconies and patios;
- Car parking; and
- Room dimensions.

4.3.5 Design Manual for Urban Roads and Streets 2013

In March 2013, the Department of Transport, Tourism and Sport (DTTAS) and the Department of the Environment, Community and Local Government (DECLG) jointly published the *Design Manual for Urban Roads and Streets* (DMURS), a new guidance document setting out an integrated and holistic approach to road and street design in our cities, towns and villages. The use of DMURS is mandatory on all urban roads and streets with a speed limit of 60 km/h or less and it replaces the use of the DMRB in urban areas. DMURS calls for an integrated approach to street design that incorporates not only what could be considered traditional engineering elements (such as geometric parameters), but also elements of urban design and landscaping that instinctively alter driver behaviour, resulting in lower speeds and thus a safer environment for all road users. In order to achieve the balanced approach to street design promoted in DMURS, four key design principles have been set out: connected networks, multi-functional streets, a pedestrian focus and a multi-disciplinary approach.

4.3.6 Urban Design Manual – A Best Practice Guide

The Urban Design Manual seeks to create residential developments where people want to live and visit. In order to achieve this, the Urban Design Manual is based around 12 no. criteria:

- Context;
- Connections;
- Inclusivity;
- Variety;
- Parking;
- Efficiency;
- Distinctiveness;
- Layout;
- Public Realm;
- Adaptability;
- Privacy and Amenity; and
- Detailed Design

The 12 no. criteria are considered as a means of testing a proposal against the principles of good urban design.

4.3.7 Guidelines for Planning Authorities on Childcare Facilities

The *Childcare Facilities – Guidelines for Planning Authorities* (Childcare Guidelines) provide a framework to planning authorities for the preparation of forward planning documents and set a standard for assessing planning applications with consideration for childcare facilities.

The Childcare Guidelines state that planning authorities should require the provision of *"one childcare facility providing for a minimum 20 childcare places per approximately 75 dwellings*" (page 14). However, the Guidelines note that*: "this is a guideline standard and will depend on the particular circumstances of each individual site"* (page 9).

4.3.8 The Planning System and Flood Risk Management

The *Planning System and Flood Risk Management Guidelines* (FRM Guidelines) introduced a *"comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process"* (page iv). The FRM Guidelines were prepared by the Office of Public Works (OPW) in partnership with the then Department of Environment, Heritage and Local Government (DEHLG). The OPW are the lead agency for flood risk management in Ireland. They develop indicative flood maps and catchment-based Flood Risk Management Plans (FRMPs) in partnership with planning authorities, the EPA and other relevant departments and bodies.

Implementation of the FRM guidelines will be achieved through actions at the national, regional, local and site-specific levels. The FRM Guidelines assist in the preparation of relevant national and regional

departmental publications and regulations which in turn guide local planning authority policies and objectives. At local level, the FRM Guidelines highlight that *"flood risk is a key consideration in preparing development plans and local area plans and in the assessment of planning applications"* (page 1).

The FRM Guidelines also states that they *"should be utilised by developers and the wider public in addressing flood risk in preparing development proposals"* (page 1). When applying for planning permission, applicants and their agents are required to:

> *76 "Carefully examine their development proposals to ensure consistency with the requirements of these Guidelines including carefully researching whether there have been instances of flooding or there is the potential for flooding, on specific sites and declaring any known flood history in the planning application form as required under the Planning and Development Regulations 2006.*
>
> *77 Engage with planning authorities at an early stage, utilising the arrangements for pre-planning application consultation with regard to any flood risk assessment issues that may arise.*
>
> *78 Carry out a site-specific flood risk assessment, as appropriate, and comply with the terms and conditions of any grant of planning permission with regard to the minimisation of flood risk"* (page 2).

4.4 Regional Spatial and Economic Strategy

The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region is a significant evolution of regional policy making and replaces the Regional Planning Guidelines (RPGs). The RSES include Metropolitan Area Strategic Plans (MASP) and shall support the implementation of the NPF and the economic policies and objectives of the Government by providing a long-term strategic planning and economic framework for the development of the region. The RSES for the Eastern and Midland Region including the MASP Dublin came into effect in June 2019 and will:

- *"Take account of national policy – the NPF – Ireland 2040 and future national planning frameworks,*
- *Support and reflect the economic policies and objectives of Government and link with spatial planning objectives,*
- *Consider the qualities, population size, service offering and location of our towns and cities, and*
- *Support balanced economic development, building on the individual strengths of the 3 Irish regions and our shared interests (including our links with Northern Ireland)"* (page 10)

The high level vision set out in the RSES is:

> *"To create a sustainable and competitive region that supports the health and wellbeing of our people and places, from urban to rural, with access to quality housing, travel and employment opportunities for all."* (page 6)

This vision is underpinned by three key principles:

- *"Healthy Placemaking: To promote people's quality of life through the creation of healthy and attractive places to live, work, visit and study in.*
- *Climate Action: The need to enhance climate resilience and to accelerate a transition to a low carbon economy recognising the role of natural capital and ecosystem services in achieving this.*

- *Economic Opportunity To create the right conditions and opportunities for the Region to realise sustained economic growth and employment that ensures good living standards for all."* (page 4)

The RSES includes a Metropolitan Area Strategic Plan (MASP) which is aimed at providing the metropolitan area with planning and investment frameworks to address high-level and long-term strategic development matters including: strategic growth and development; transport and water infrastructure; regeneration, housing and employment; and regional parks and pedestrian and cycling networks. The subject site is located within the MASP and is proximate to the Dublin – Belfast Corridor. The RSES supports the construction of MetroLink from Swords to Sandyford.

With regard to housing the RSES identities an acute need to increase the supply of housing, particularly within cities and defined settlements.

4.5 Transport Strategy for the Greater Dublin Area 2016 -2035

The *Transport Strategy for the Greater Dublin Area, 2016 to 2035*, prepared by the National Transport Authority sets out how transport will be developed across the region, covering Dublin, Meath, Wicklow and Kildare up to 2035. The strategy purpose of the Transport Strategy is *"To contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods"*. (page 3)

The Transport Strategy promotes significant improvements to the pedestrian and cycling network in order to maximise inclusive accessibility for all. The Transport Strategy supports the provision of New Metro North (Now titled MetroLink) and the Ballymun to City Centre core bus corridor.

With regard to development, including residential development, the Transport Strategy supports the integration of land use and transport through:

- Reducing the need to travel;
- Reducing the distance travelled;
- Reducing the time take of travel;
- Promoting walking and cycling; and
- Promoting public transport use.

Strategic Planning Principles of the Transport Strategy state that:

- *"Residential development located proximate to high capacity public transport should be prioritised over development in less accessible locations in the GDA;*
- *To the extent practicable, residential development should be carried out sequentially, whereby lands which are, or will be, most accessible by walking, cycling and public transport – including infill and brownfield sites – are prioritised".* (page 98)

4.6 Fingal Development Plan 2017-2023

The local planning policy framework is set out in the *Fingal Development Plan 2017 – 2023* (FDP). Future development of the subject lands is governed by the Development Plan which sets out planning policies and objectives, as well as design standards for the administrative area.

The Development Plan is underpinned by a number of cross cutting themes including the principles of sustainable development, climate change adaptation, social inclusion and high quality design. The Development Plan's overall aims and strategic direction focus on consolidated development, efficient use of land and integrated transport and land-use planning was formulated from a consideration of various national, regional and local documents including the NSS and the RPGs for the GDA.

The Development Plan acknowledges Fingal's diverse range of environmental and heritage resources which include the coast, countryside, rivers, amenity lands, and rich archaeological and architectural heritage. The Development Plan identifies a number of key environmental challenges for the County which include *inter alia:*

- *"Protecting the ecological integrity of Natura 2000 sites while allowing for ongoing growth and development.*
- *Providing for growth and development which reduces energy consumption, promotes sustainable modes of transport and reduces car-dependency.*
- *Ongoing provision of high-quality accessible parks and open spaces for our growing population."* (page 22)

The entire area of the subject lands is zoned *"ME – Metro Economic Corridor"* with an objective that seeks to *"Facilitate opportunities for high density mixed use employment generating activity and commercial development, and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor"* (see **Figure 4-2**). The vision for lands with this zoning objective is to:

- *"Provide for an area of compact, high intensity/density, employment generating activity with associated commercial and residential development which focuses on the Metro within a setting of exemplary urban design, public realm streets and places, which are permeable, secure and within a high quality green landscape"* (page 386)

Uses that are considered to be *'Permitted in Principle'* under the 'ME' zoning objective include inter alia:

- Residential;
- Restaurant / Café;
- Retail -Local up to 150sq.m nfa;
- Community Facility; and
- Open Space.
- Policy objectives with regard to the Metro Economic Corridor included within the Development Plan state:

Objective ED98

> *"Prepare Local Area Plans and Masterplans within the lifetime of the Development Plan for strategically important Metro Economic zoned lands in collaboration with key stakeholders, relevant agencies and sectoral representatives."* (page 242)

Objective ED99

> *"Protect the integrity of the Metro Economic corridor from inappropriate forms of development and optimise development potential in a sustainable and phased manner."* (page 242)

Objective ED100

> *"Ensure high quality urban design proposals within the Metro Economic zoning, incorporating exemplary public spaces, contemporary architecture and sustainable places within a green landscape setting."* (page 242)

There is a local objective to prepare a Masterplan for lands at Northwood including the subject site.

"Objective SANTRY 5

- *Prepare and implement a Masterplan for lands identified at Northwood (see Map Sheet 11, MP 11.E) during the lifetime of this Plan. The main elements to be included are provided below. The list is not intended to be exhaustive.*
- *Facilitate provision of an underpass to include provision for a car, bus, cycle, and pedestrian link to link lands east and west of the R108 to enhance connectivity.*
- *Ensure where feasible, development overlooks the Santry River Walk.*
- *Allow the re-location of existing units to facilitate connectivity to the proposed Northwood Metro Stop.*
- *Enhance pedestrian links within and to Santry Demesne.*
- *Ensure the continued protection of trees within the subject lands.*
- *Facilitate provision of a direct access route from Old Ballymun Road through Northwood. Development shall enhance connectivity to the proposed Northwood Metro Stop." (page 121)*

The subject site is located within the Outer Airport Noise Zone.

The Development Plan provides specific guidance on a number of issues pertaining to the development of apartments including:

- Residential Mix;
- Private Amenity Space;
- Communal Amenity Space;
- Public Open Space;
- Overlooking and Overshadowing;
- Retail / Café Units;
- Ancillary Development Uses;
- Car Parking;
- Cycle Parking; and
- Public Art.

The consistency of the proposed development with planning policy and guidance documents is outlined in the separate *Planning Report and Statement of Consistency* prepared by RPS and accompanies the application for permission.

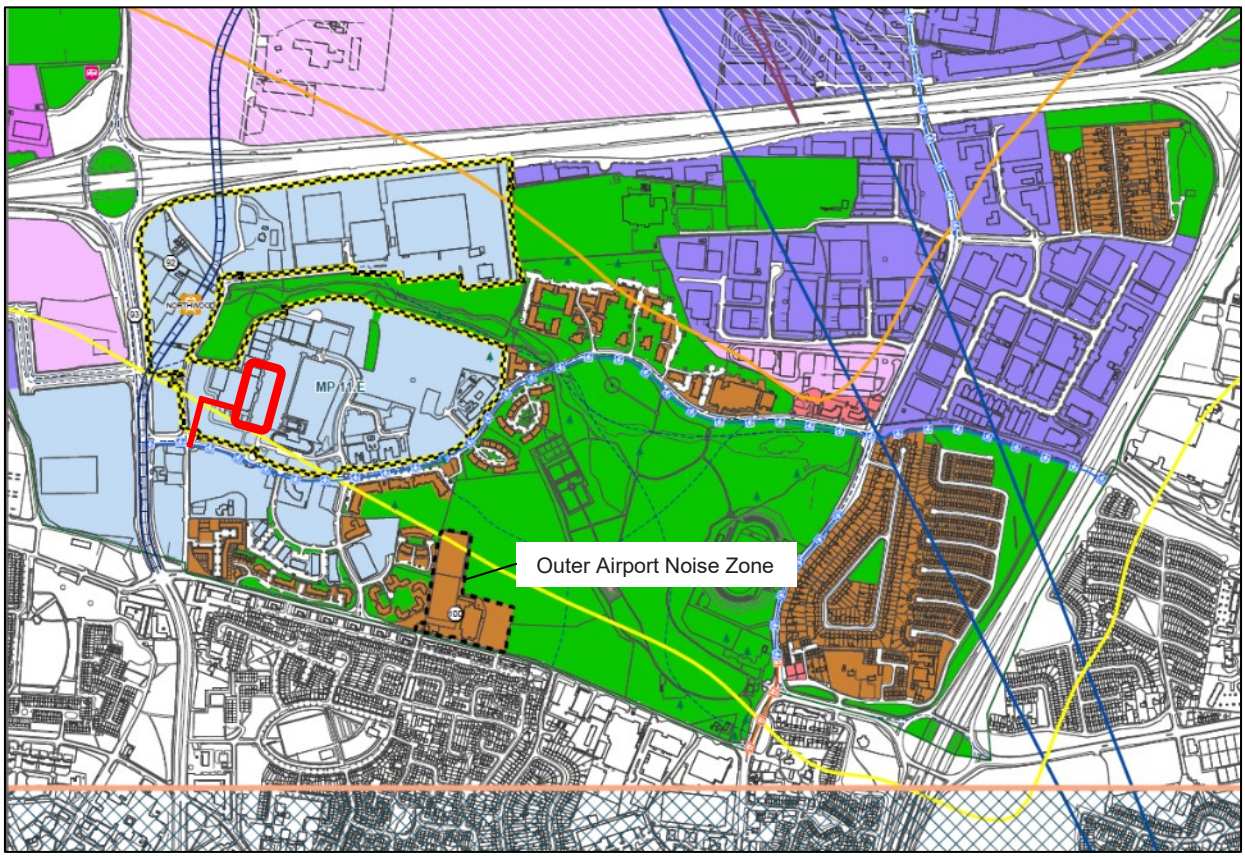

Figure 4-2: Fingal Land Use Zoning[7]

4.7 References

Project Ireland 2040 National Planning Framework - http://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf

Rebuilding Ireland – Action Plan for Housing and Homelessness (Rebuilding Ireland) 2016 - https://rebuildingireland.ie/

Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas 2009 - https://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C19164%2Cen.pdf.

Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2018 - https://www.housing.gov.ie/sites/default/files/publications/files/design_standards_for_new_apartments_-_guidelines_for_planning_authorities_2018.pdf

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The Childcare Facilities – Guidelines for Planning Authorities (Childcare Guidelines) - https://www.housing.gov.ie/sites/default/files/migrated-files/en/Publications/DevelopmentandHousing/Planning/FileDownLoad%2C1601%2Cen.pdf

[7] Source: Fingal Development Plan 2017 – 2023, Fingal South, Sheet No. 11

The Planning System and Flood Risk Management Guidelines 2009 - https://www.opw.ie/media/Planning%20System%20and%20Flood%20Risk%20Management%20Guidelines.pdf

The Regional Spatial and Economic Strategy for the Eastern and Midland Region - https://emra.ie/dubh/wp-content/uploads/2019/07/Regional-Spatial-and-Economic-Strategy-EMRA-1.pdf

The Transport Strategy for the Greater Dublin Area 2016 – 2035 - https://www.nationaltransport.ie/wp-content/uploads/2016/08/Transport_Strategy_for_the_Greater_Dublin_Area_2016-2035.pdf

Fingal Development Plan 2017 -2023 - https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement_compressed_compressed.pdf

5 PROJECT DESCRIPTION

5.1 Introduction

This Chapter of the EIAR sets out a description of the proposed development and contains information on the project site, design, size and other relevant features in order to establish the characteristics of the project for the purposes of environmental assessment.

In accordance with Article 5(1)(a) of the 2011 Directive as amended by Directive 2014/52/EU the description of the proposal should comprise *"…information on the site, design, size and other relevant features of the project"*.

This chapter has been prepared by RPS with input from Gerard O'Neill McCrossan O'Rourke Manning Architects, Garry Flood J.B Barry & Partners Consulting Engineers and Simone Kennedy Kevin Fitzpatrick Landscape Architecture. This chapter should be read in conjunction with **Chapter 12 Landscape and Visual** and **Chapter 14 Material Assets: Traffic and Transportation** of this EIAR as well as the Architect's *Design Statement*, prepared by McCrossan O'Rourke Manning Architects, which includes a masterplan for the proposed development, and the *Landscape Report and Outline Landscape Specification* prepared by Kevin Fitzpatrick Landscape Architecture - both of which are included in the application documentation.

A description of the site and its surrounding is presented, together with the proposed design parameters. A summary of the demolition and construction phases of the development is also presented. This description sets the basis against which the specialist assessments presented in this EIAR have been undertaken.

5.2 Location of the Project

The subject site is located within the former Santry Demesne c.7km to the north of Dublin's city centre. The proposed MetroLink Northwood Stop is located c.350m to the west of the subject site. The site is bounded to the north by a residential development which is currently under construction (Reg. Ref. F15A/0440, as modified) and to the west by existing car parking associated with Gulliver's Retail Park. The site is bound to the east by an internal roadway and beyond this, by car parking associated with Swift Square Office Park office and housing under construction (Reg. Ref. F15A/0440, as modified). The site is bound to the south by a McDonald's fast food restaurant and Gulliver's Local Centre. Further to the south of the subject site is Northwood Avenue. The M50 is located c. 500m to the north. The location of the subject site and its surrounding context is illustrated in **Figure 5-1**.

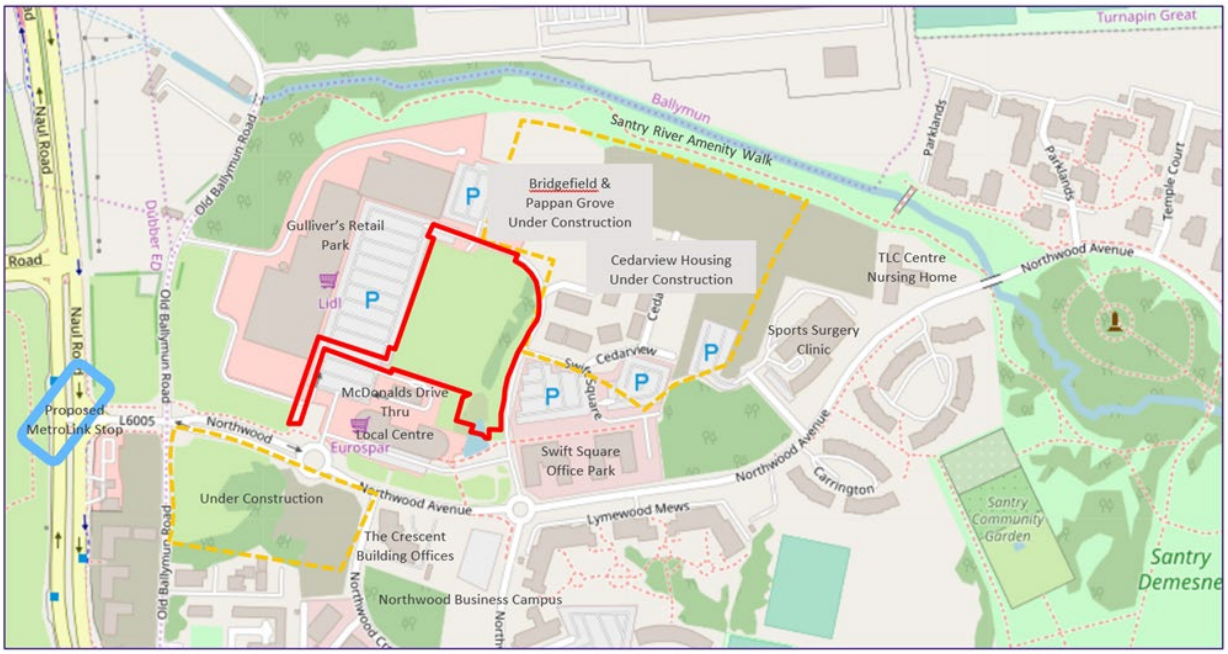

Figure 5-1: Site Location (indicative subject lands outlined in red)[8]

5.3 Adjacent Land Uses

The surrounding lands have been subject to significant land use change over the last 15 years.

The applicant has developed Gulliver's Retail Park, Gulliver's Local Centre and part of Swift Square Office Park in the immediate vicinity of the subject site and is currently completing adjacent residential development to the north (Bridgefield and Pappan Grove) and to the east (Cedarview) - part of which will be occupied later this year. A childcare facility within the adjacent Bridgefield development has recently opened and will accommodate 100 no. children.

Gulliver's Retail Park accommodates Lidl, Home Base, Home Focus, Mr. Price, Petmania and a number of furniture stores. Gulliver's Local Centre accommodates Spar, Costa Coffee, a chemist, hair and beauty salon and other local shops.

To the east of the subject site is the Sports Surgery Clinic and TLC Centre Nursing Home. To the south of Northwood Avenue is The Crescent Building office complex, Northwood Business Campus and Lymewood Mews Apartments. Other sites along Northwood Avenue are under currently construction. The Santry River Amenity Walk is located c. 250m to the north of the subject site, and Santry Park (a regional park) is located c.350m to the southeast.

5.4 Existing Site

The southern portion of the 2.1 hectare site primarily consists of a greenfield area. The northern portion of the site comprises a temporary surface car park and including storage and temporary structures for construction workers at the adjacent residential development. The ground levels within the site area are generally flat with a slow and gradual rise from the southwest corner in a northerly direction. There are some localised steep slopes, however this only occurs along the banks of the drainage ditch on the eastern edge of the lands. Apart from the drain, the lowest level is in the southwest corner of the site (57.10m OD). From this low point the ground levels rise by 1.4m towards the very northern edge of the site (58.50m OD). Other

[8] Source: Openstreet Maps and RPS Group annotation

than the drainage ditch and temporary spoil heaps, the slope across the site is consistent. The site drains to the Santry River.

The trees on site are from two different origins. The first is the primary, more historic trees which are remnants of agricultural stock proof field boundaries. These are contained on the eastern side of the ditch. These trees are primarily oak and are very large both in height and crown spread. The second type of trees are the more recently planted trees within the historic tree line and along the path on the eastern perimeter.

The proposed development is located within an area that is covered by the Tree Preservation (Santry Demesne) Order 1987. An *Arboricultural Report* prepared by The Tree File is included as part of the planning application documentation. The *Arboricultural Report* indicates that the root systems related to these trees are contained to the east of the ditch running along the western side of the tree belt. This drainage ditch, which runs north to south through the site, historically acted as constraint to natural root development of the belt of trees and effectively prevented root growth across the ditch line in a westerly direction.

5.4.1 Existing Access

5.4.1.1 Existing Vehicular Access

The existing site is a part greenfield and part temporary car park site. The temporary car park is used for construction workers from the adjacent construction site. Vehicular access is currently provided off Northwood Avenue past Swift Square Office Park and also through Gulliver's Retail Park off Northwood Avenue.

5.4.1.2 Existing Cycling and Pedestrian Facilities

There are good quality pedestrian walkways on all of the major links locally, including dedicated pedestrian crossing facilities at the signalised junctions in the area. Along the length of Northwood Avenue, adjacent to the Sports Surgery Clinic, there are footpaths on both sides of the road and an off-road cycle track.

Additionally, off-road cycle tracks are provided throughout Northwood and on the external road network. Ballymun Road has an off-road cycle track while Swords Road has an on-road cycle track. The off-road cycle track along Northwood Avenue branches out at numerous locations along the route providing additional cycle facilities throughout Northwood.

5.4.1.3 Existing and Proposed Public Transport Facilities

The subject site benefits from its proximity to a number of high frequency bus services. Stops are located on the R108, c. 350m from the site are served by routes 4 and 13. Dublin Bus and TFI operate numerous routes along Swords Road, Ballymun Road and Santry Avenue. These Dublin Bus operated services operate on a daily basis and offer relatively frequent schedules as summarised in **Chapter 13**.

The National Transport Authority is currently progressing the Bus Connects project. This includes Core Bus Corridors which will provide higher frequency and capacity bus services including measures such as dedicated lanes, higher quality stops, off-board ticketing and full priority at traffic signals. The proposed Ballymun to City Centre Core Bus Corridor Route runs along the R102, c. 700m to the southwest of the site. Bus Connects also provides for the redesign of the bus network. Revised Network Maps have been published and are subject to public consultation until the 3rd of December 2019.

Metro Link is the proposed high-capacity, high-frequency rail line running from Swords to Charlemont, linking Dublin Airport, Irish Rail, DART, Dublin Bus and Luas services and thereby creating a fully integrated public transport service in the Greater Dublin Area. The 'Preferred Route' has been published with the location of the planned Northwood Station located c. 350m from the subject site at the Northwood Avenue / R108 junction.

Metro Link will be similar to the Luas in operation, but will enjoy complete priority along its route, allowing for increased frequency of service with a tram expected every 2 minutes during peak periods. Services are scheduled to commence in 2027. The preferred route and location of Northwood Station is illustrated in **Figure 5-2.**

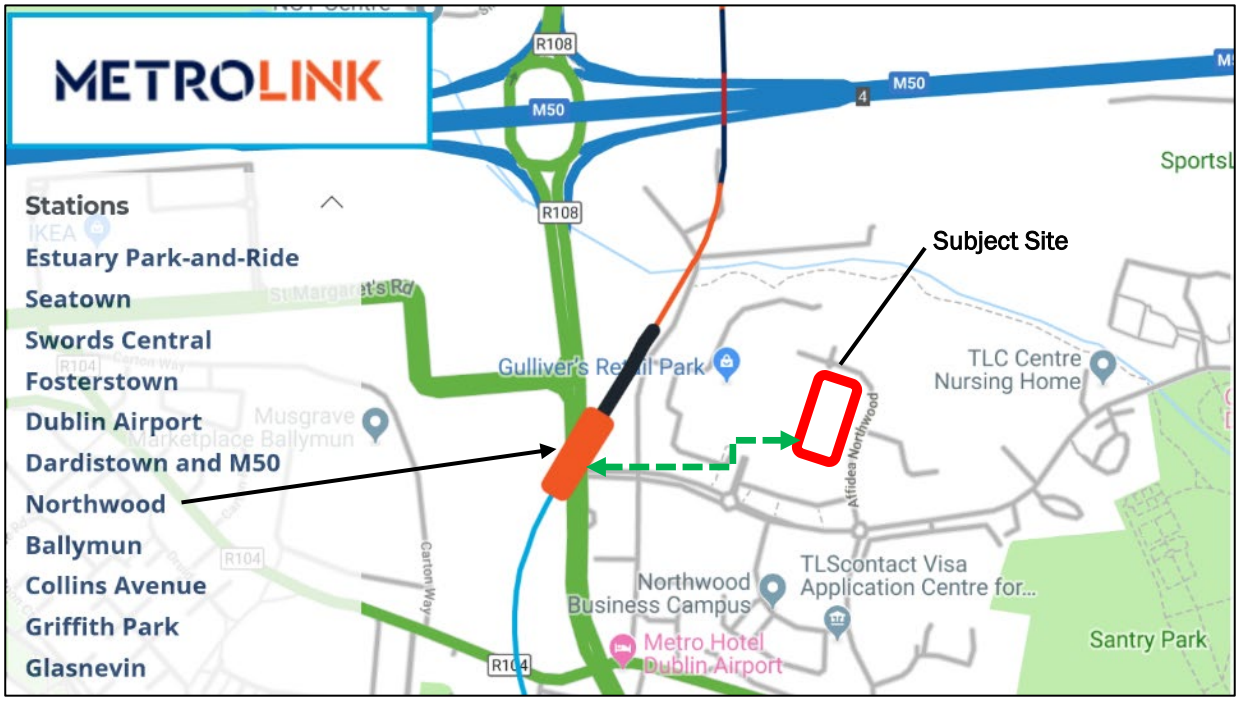

Figure 5-2: MetroLink Preferred Route[9]

The site is located within a developing mixed-use community which will benefit from excellent metro and bus public transport linkages.

5.4.2 Services and Utilities

5.4.2.1 Potable Water Supply

The existing 600mm North Fringe Watermain is located along Northwood Avenue. The North Fringe Watermain is a key trunk watermain laid along the North Fringe from Cappagh Cross to Baldoyle. It is supplied from the Leixlip Water Treatment Plant via the Ballycoolin Reservoir and the High Level Water Tower at Sillogue.

5.4.2.2 Wastewater Services

The North Fringe Sewer is located along Northwood Avenue. The North Fringe Sewer is a major trunk sewer that runs east from Ballymun / Santry to Balboyle. At Baldoyle the sewer is laid in a south easterly direction to Sutton Pumping Station. The Sutton Pumping Station is connected via submarine pipeline to the Wastewater Treatment Plant at Ringsend. The Ringsend Plant is currently being upgraded from a Population Equivalent (PE) of 1.6 Million to 2.4 million PE.

5.4.2.3 Electricity & Gas

There are no electricity or gas connections on the subject site but electricity and gas are available in the area.

[9] Source: NTA

5.4.2.4 Telecommunications

There is a dedicated ducting network installed by Virgin and Eir within the Northwood area.

5.4.3 Cultural Heritage

There are no previously identified individual sites of archaeological interest located within the defined study area.

There are no structures listed in the RPS of the *Fingal Development Plan 2017-2023* as being located within the subject site.

5.5 Proposed Development

5.5.1 Vision

The vision for the development of the subject lands is to provide a high quality residential development that promotes sustainability, a connected and legible movement network as well as high quality and usable public spaces that fully accord with the policies and objectives of the *Fingal Development Plan 2017-2023.* To achieve this vision, a set of guiding development principles have been set for the lands, which include:

- Fully capitalise on the location of the site by providing a well-connected, permeable built environment that establishes a clear urban structure;
- Provide well landscaped public realm that integrates existing mature vegetation where possible and promote opportunities for active and passive recreation while ensuring that the majority of residential units have a relationship with open space areas and the public realm;
- Provide a range of unit types and sizes to provide further housing choice for future residents of Northwood while supporting a sustainable and diverse community; and
- Integrate sustainable development principles into the design and management of the development.

5.5.2 Proposed Site Layout

A site layout has been prepared by McCrossan O'Rourke Manning Architects for the subject site within the context of the masterplan for the Applicant's landholding and the Northwood area. This layout has been devised with reference to the policies and objectives of the Development Plan and the adjoining development. The site layout is illustrated in **Figure 5-3** and is included in the *Architect's Design Statement* prepared by McCrossan O'Rourke Manning Architects which accompanies the application. It is based on best practice in urban design, including providing permeability, connectivity and legibility. The proposed development completes the central portion of the overall masterplan lands, connecting into the hierarchy of streets, public realm, residential zones, employment zones and recreational open spaces.

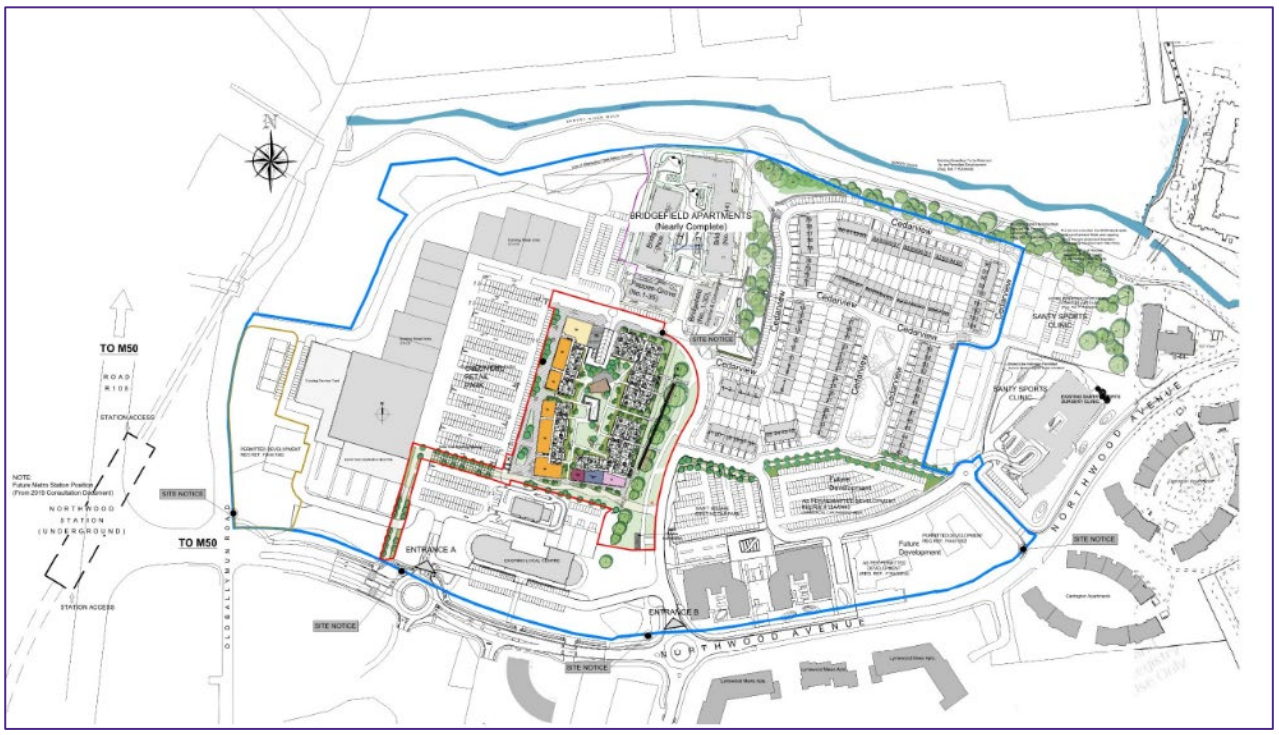

Figure 5-3: Proposed Site Layout[10]

5.5.3 Proposed Development

The proposed development comprises of 4 no. apartment blocks arranged around an internal courtyard over a shared basement. A description of each block is set out below:

- **Block A** with a parapet height of 82.225mOD, comprises 88 no. units (2 no. one bedroom units, 63 no. two bedroom units and 23 no. three bedroom units).
- **Block B** with a parapet height of 82.875mOD, comprises 77 no. units (70 no. two bedroom units and 7 no. three bedroom units).
- **Block C** with a parapet height of 82.875mOD, comprises 77 no. units (76 no. two bedroom units and 1 no. three bedroom units).
- **Block D** with a parapet height of 82.225mOD, comprises 89 no. units (4 no. one bedroom units, 83 no. two bedroom units and 2 no. three bedroom units).

Each of the apartment blocks are 7 no. storeys plus penthouse (8-storeys). Some roof top plant will also be required to service the building.

The proposed development will also include the provision of a childcare facility and 5 no. mixed use commercial units which may accommodate a range of Class 1, 2 and 8, café, restaurant uses at ground floor within Blocks B and C (c. 939 sq.m). These units will address and animate pedestrian routes and existing retail development in the environs.

Ancillary resident facilities include communal open space, concierge, multi-function room area and gym are also provided at ground floor level.

Secured resident bicycle parking spaces comprising 690 no. are provided at basement level and an additional 70 no. bicycle parking spaces are provided at surface level.

[10] Source: Architect's Design Statement

Resident car parking is comprised of 331 no. car parking spaces and 3 no. disabled spaces at basement level. Visitor car parking shall be facilitated through shared used of existing surface level car parking spaces associated with the adjoining retail park and local centre. In addition to the disabled car parking spaces at basement level, 1 no. disabled car parking space will be allocated at surface level. 3 no. car club spaces shall also be allocated at surface level.

Landscaping and boundary treatments including a new east-west pedestrian/cyclist route linking to existing and planned public transport services is proposed. A north-south pedestrian cycle route is also proposed linking with the pedestrian route through the residential development to the north and providing connectivity with the Santry River Amenity Walk.

A site plan of the proposed elements of the works is presented in **Figure 5-4**.

Figure 5-4: Site Plan[11]

The principal development statistics of the proposal are as shown in **Table 5-1**.

Table 5-1: Principal Development Statistics

Development Statistic	Area / Quantum
• Red Line Boundary	• 21,191sq.m
• Apartments	• 331 no. apartments
• Childcare Centre	• 224 sq.m
• Mixed Use Commercial Units	• 939 sq.m

[11] Source: Architect's Design Statement

• Gym	• 140 sq.m
• Multi-Function Area	• 133 sq.m
• Concierge	• 81.5 sq.m
• Car Parking	• 331 no. spaces + 4 no. disabled
• Car club/share spaces	• 3 no. spaces
• Childcare facility short term parking spaces	• 5 no. spaces
• Bicycle Parking	• 690 no. spaces (basement) + 70 (surface)
• Motorcycle Parking	• 5 no. spaces
• Public Open Space	• 4,672 sq.m (incl. 650sq.m play area)
• Private courtyard and periphery gardens	• 3,671 sq.m (incl. 152sq.m play area)
• Public Realm including route to Metrolink	• 5,255 sq.m

5.5.4 Proposed Residential Use

The development will include the construction of 4 no. apartment blocks with a combined total of 331 no. apartment units. All proposed apartments are provided with private balcony / terrace. A summary of unit sizes within each block is provided in **Table 5-2.**

Table 5-2: Schedule of Areas[12]

Schedule of Apartment Units and Areas		
Block A	**No. of Units**	**Area**
1 Bed	2	50.0 – 70.7sq.m
2 Bed	63	81 - 100.8sq.m
3 Bed	23	99 – 121sq.m
Block B	**No. of Units**	**Area**
1 Bed	0	
2 Bed	70	80 – 99sq.m
3 Bed	7	105 - 119sq.m
Block C	**No. of Units**	**Area**
1 Bed	0	
2 Bed	76	80 – 110sq.m 3.6
3 Bed	1	105sq.m
Block D	**No. of Units**	**Area**
1 Bed	4	50 – 57.5sq.m
2 Bed	83	76 – 99sq.m
3 Bed	2	107 – 110sq.m

Further details on proposed apartments is set out in the *Housing Quality Assessment* prepared by McCrossan O'Rourke Manning Architects and enclosed as part of the application documentation.

5.5.5 Proposed Commercial Units

The proposed development also includes provision of mixed use commercial, café and restaurant uses along the southern and western boundaries adjacent to the existing neighbourhood centre, adjacent to the proposed pedestrian / cycle route to the planned Northwood Metro Station and addressing existing retail development in the area. These units will accommodate a range of uses under class 1, 2 and 8 of the

[12] Source: Architect's Schedules

Planning and Development Regulations 2001, as amended, in addition to café/restaurant uses. It is proposed that the first use within each of the units will be agreed with the planning authority prior to occupancy with the exempted development planning regulations commencing on all changes of uses thereafter.

The provision of these uses along this frontage will provide for increased activity at ground level and increase the level of animation along the frontage. The provision of these uses at ground level will provide for additional amenity to the future and existing residents in the area. A summary of unit sizes is provided in **Table 5-3**.

Table 5-3: Commercial Units Schedule of Areas

Proposed Units	Area
Unit 1 - Block B	• 239sq.m
Unit 2 - Block B	• 216sq.m
Unit 3 - Block B	• 102sq.m
Unit 4 - Block C	• 140sq.m
Unit 5 - Block C	• 242sq.m

5.5.6 Proposed Childcare Facility

A childcare facility of 224sqm is to be provided in the ground floor of Block C in the northwest of the site. This facility can accommodate 48 no. places as derived from the *Childcare Demand Analysis* prepared by RPS which forms part the application documentation. This facility will be designed and fitted out to best practice standards with a dedicated area of private open space for the use of staff and children and is proximate to the proposed playground within the courtyard.

5.5.7 Cycle Parking

The proposed development will provide 690 no. resident bicycle parking spaces in bicycle store areas within the basement. This equates to 1 no. bicycle space per bedroom. These bicycle store areas will provide for the secure storage of bicycles with access restricted to residents only. The storage areas are located in close proximity to the apartment entrances to ensure ease of access and convenience for apartment residents.

A further 70 no. bicycle spaces are provided in the form of sheltered bike rails. These rails will be suitably overlooked for passive surveillance.

5.5.8 Car Parking

The proposed development will include a total of 335 no. car parking spaces (including 4 no. disabled car parking). Each apartment will have one dedicated car parking space.

In order to support sustainable use of private vehicular transport provision shall be made for electric vehicle spaces with charging facilities. All car parking spaces shall be ducted to allow for future provision of electric charging. A *Multiple Occupancy Building Car Charging Strategy* prepared by McElligott Engineers is included as part of the planning application documentation and sets out the rationale for the nature, extent, further provision and management of car charging facilities which accord with policy and SEAI grant incentives.

To further support sustainable transport patterns an additional 3 no. spaces for short term car club rental are proposed. These are located at surface level proximate to the proposed commercial units and adjacent to the pedestrian route connecting the subject site to the planned Northwood Metro Link station. 1 no. of the disabled car parking space will also be provided at this location.

The provision of resident car parking spaces within the basement ensures that surface car parking within the subject site is minimised with spaces around the proposed apartment blocks instead forming part of the designed landscape.

Visitor parking and any car park demand generated by the local commercial units shall be facilitated by the use of existing car parking immediately to the west of the subject site associated with the existing retail park and local centre.

5.5.9 Nature of Materials and Building Elevational Treatments

Finishes and materials will ensure consistency with existing surrounding developments including the housing scheme to the north and wider development within Santry Demesne (currently under construction).

The proposed buildings employ a controlled palette of materials. It is envisaged that the brickwork will match or be similar in character to that of the adjacent Bridgefield apartments, a soft muted buff. Window, balcony and cladding material and detail will also carry through from Bridgefield.

Continuous vertical planes of bay windows will contrast with and visually break the general brickwork – taut technical planes set against the warm buff masonry.

The top floor of each building is clad with glazed curtain walling which allows the buildings to read as 7 storeys of masonry with a visually and materially lighter sky reflecting attic storey over. Balconies at this level will be punched into the curtain walled volume, retaining a clean un-broken parapet line

Further details in relation to the proposed materials and finishes are provided in the *Architect's Design Statement* prepared by McCrossan O'Rourke Manning Architects and enclosed as part of the application documentation.

5.5.10 Access and Connectivity

The proposed development identifies a clear hierarchy of pedestrian, cycle and vehicular routes to provide movement to and through the site. This is illustrated on **Figure 5-5**.

The proposed development will connect with the existing pedestrian and cycle route running east-west along Northwood Avenue and provide connectivity with wider development within Santry Demesne and a future Northwood Metro Stop. There will also be a north -south pedestrian / cycle route running from Northwood Avenue to the Santry River Amenity Walk. A Metro Link stop is currently proposed at Northwood in close proximity to the proposed development. Metro Link is the proposed high-capacity, high-frequency rail line running from Swords to Charlemont, linking Dublin Airport, Irish Rail, DART, Dublin Bus and Luas services, creating a fully integrated public transport service in the Greater Dublin Area. The proposed Northwood Metro Link stop will likely be located west of the proposed development at the junction of the Ballymun Road (R108)/Northwood Avenue. The exact location is yet to be confirmed. In this regard, the proposed development also includes a new pedestrian walkway through Gulliver's Retail Park, providing direct access to the MetroLink stop. The new route will require removing c.44 car parking existing spaces.

Vehicular and bicycle access to the proposed residential scheme will be via Northwood Avenue. It is proposed that an existing roundabout shall provide access to the basement car park.

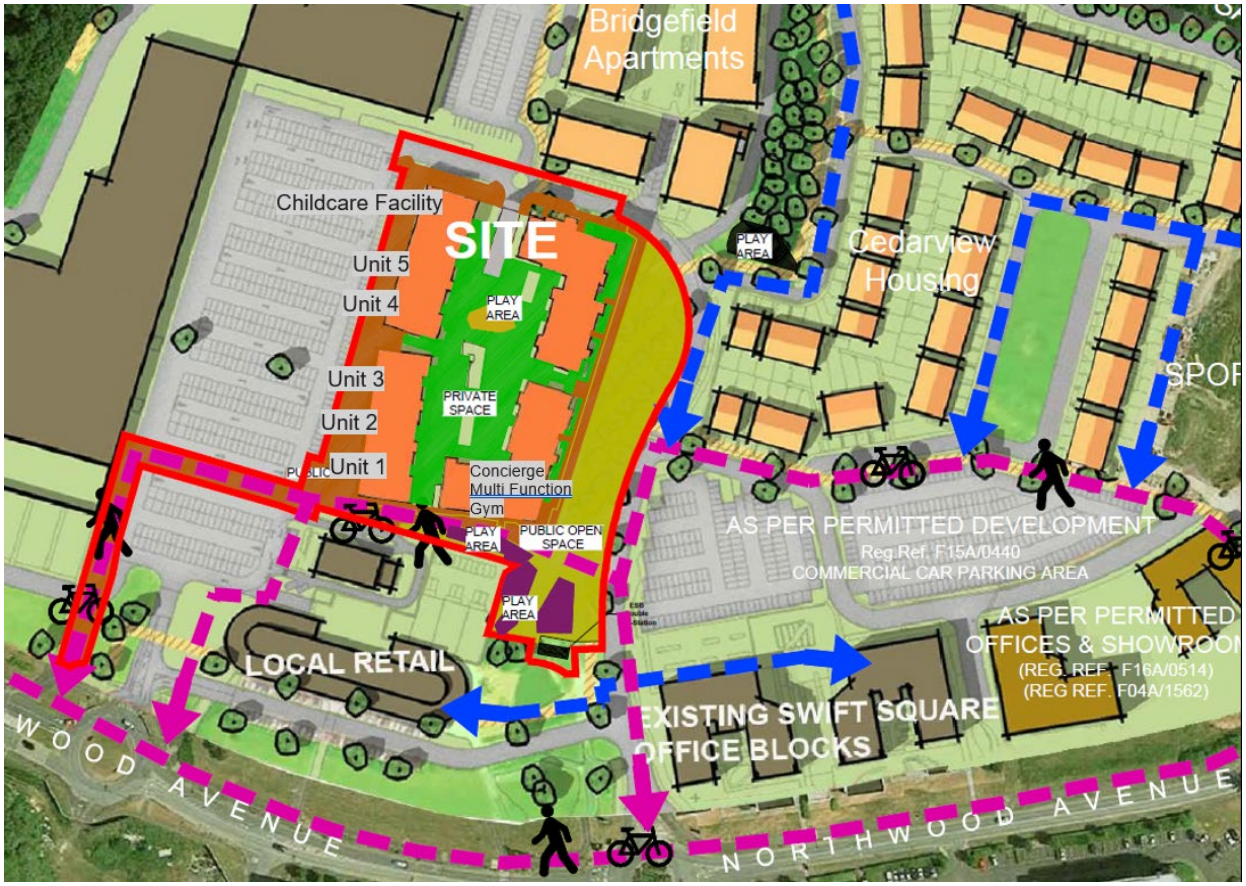

Figure 5-5: Connectivity to Proposed Development [Source: MCORM Architect's Drawings]

5.5.11 Proposed Public Realm and Open Spaces

The open space within the proposed residential scheme provides a hierarchy of spaces comprising public, communal and private open spaces. Proposals are illustrated on the landscape drawings prepared by Kevin Fitzpatrick Landscape Architecture within the planning application package. These proposals have been developed and refined in close collaboration with the project arborist and project engineer. The character of the open spaces proposed comprise public parkland open spaces and public realm open space. The private open spaces are confined to the central communal courtyard and private balconies and terraces.

5.5.11.1 Public Parkland Open Space

The public parkland open space is located to the east and south of the proposed apartment blocks and is indicated on drawing number PL03 prepared by McCrossan O'Rourke Manning Architects. This area (4,672sq.m) is predominantly characterised by mature trees forming a linear belt running north to south through the site. An area has been designated to the south east for a future Public Art commission, located along the green route and at the entrance to the apartment development.

5.5.11.1.1 Play Areas

In compliance with the *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2018,* 3 no. play spaces (175sq.m, 237sq.m, 238sq.m) have been located to the south east of the apartment buildings. Details of these spaces are illustrated on drawing number 101 prepared by Kevin Fitzpatrick Landscape Architecture. The play areas are located where they may be passively supervised from the concierge/management suite and pedestrians moving along north-south and east-west pedestrian pathways through the proposed development and which connect into wider landscape and public open space strategy for the overall residential area. These connections are illustrated on drawing number PL02 prepared by McCrossan O'Rourke Manning Architects.

5.5.11.2 Public Realm Open Space

The site layout has been devised to respond to the urban design principles as set out in the *Sustainable Residential Density Guidelines for Planning Authorities* and seeks to provide a legible layout through the creation of a new public realm with a strong building line, actives frontages and the varied use of materials, finishes and planting. The public realm open space (5,255sq.m) is located to the west and south of the proposed apartment blocks and is indicated on drawing number PL02 prepared by McCrossan O'Rourke Manning Architects.

This part of the site is devoted to the creation of a public realm which will provide a new street edge and also form part of a defined route through the subject site area enabling a direct connection between the existing and proposed residential development with the potential MetroLink station at the junction of Northwood Avenue and Ballymun Road.

The new north-south street is west facing with the space widening the closer it gets to the intersection with the east-west pedestrian route. The landscaping proposals have been formulated with flexibility in mind to ensure that those areas capable optimising aspect and position will be provided with seating to facilitated passive leisure or spill out areas associated with any prospective café type use.

The landscape measures provide open space areas to a high specification at ground level. The landscaping strategy and public realm proposals have been developed with particular regard to the existing character of the site, the particular position of the space in respect of light availability and functionality of the space in order to ensure that the landscaping of the development is tailored specifically to the site. The landscape strategy will increase the quantity and diversity in the locale adhere to sound sustainable development principles. The suite of measures includes paving, civic and amenity lighting and appropriate planting.

5.5.11.3 Central Communal Courtyard

Semi-private open space is included as an integral part of the proposed development in the form of a communal landscaped area (3,196sq.m) at the centre of the proposed development and surrounded by the apartment buildings. This semi-private open space will be a high quality useable space which will be a genuine addition to the residential amenity for the future residents of the proposed scheme. This space will be accessible to the future residents of the proposed scheme only. In addition, private spaces (475sq.m) are provided external to the apartment blocks which act as defensible or buffer areas between ground floor residential units and public areas.

5.5.11.3.1 Area of Play

Within the communal courtyard it is proposed to locate an area of play intended for use by younger children. This area comprises approximately 152sq.m, which was agreed with Fingal County Council during the pre-application stage as being appropriate, and will be for the sole use of the residents of the development.

5.5.11.4 Planting Strategy

The plant species are chosen to respect the local environment while providing suitable vegetation that is harmonious with a residential area and will be successful through all stages of its maturity. Therefore, the planting palette has a limited number of species chosen for their appropriateness and with a preference for native planting where possible.

There are a large number of new trees proposed and the species are chosen for their appropriateness to the scale of the scheme. The planting palette is chosen to provide seasonal interest all year round, whilst contributing to the local biodiversity, with herbaceous planting interspersed throughout and evergreen planting and hedges as a backdrop. The herbaceous planting is intended to support the aims of the Council's *All Ireland Pollinator Plan 2015-2020*.

The tree species have been chosen specifically for their suitable compact habit. These species are appropriate for the scale of the spaces in which they are to be used and are of a variety that will complement other native trees. Where required, structural tree pits are provided using a 'Rootcell' Soil Structure System.

The existing trees that are retained within the scheme are to be complemented by additional planting of native and naturalised broadleaf tree planting. Throughout the landscape spaces a mix of broadleaf deciduous trees will be planted that will increase the woodland cover while facilitating safe use of the spaces.

5.5.11.5 Management and Taking in Charge

The proposed apartment development will be located over a podium basement area. The open space on the podium will be privately managed and no private open space areas will be taken in charge by the Planning Authority. The maintenance of high quality landscaping will be ensured into the future by means of a management company.

Public open spaces will also be privately managed however should taking in charge procedures occur in the future the landscape design ensures that a clear delineation of management can take place. These areas are illustrated on drawings number PL26 prepared by McCrossan O'Rourke Manning Architects.

Figure 5-6: Proposed Public Realm and Public and Private Open Space and Play Areas

5.5.12 Services and Utilities

5.5.12.1 Water Supply and Wastewater Disposal

A pre-connection application to Irish Water in respect of water supply and wastewater disposal for the proposed development was submitted on the 25th January 2019. Irish Water advised in their *Confirmation of Feasibility Statement*, dated 8th March 2019 that their water supply network and wastewater infrastructure

could cater without upgrades for the proposed development. A copy of the *Confirmation of Feasibility Statement* is included in an Appendix to the *Water Services Report* prepared by JB Barry & Partners Consulting Engineers and which form part of the application documentation.

The proposed development will be supplied via the existing 200mm watermain in the Access Road. This 200mm main is supplied from the existing 600mm North Fringe Watermain in Northwood Avenue. The North Fringe Watermain is a key trunk watermain laid along the North Fringe from Cappagh Cross to Baldoyle. It is supplied from the Leixlip Water Treatment Plant via the Ballycoolin Reservoir and the High Level Water Tower at Sillogue. The proposed watermain layout is shown on Drawing 19205-JBB-00-XX-DR-C-01004 prepared by JB Barry & Partners Consulting Engineers and which form part of the application documentation.

The proposed development will be connected to the 225mm foul sewer in the Access Road. This sewer is connected to the North Fringe Sewer at the roundabout on Northwood Avenue. The North Fringe Sewer is a Major trunk sewer that runs east from Ballymun / Santry to Baldoyle. At Baldoyle the sewer is laid in a south easterly direction to Sutton Pumping Station. The Sutton Pumping Station is connected via submarine pipeline to the Wastewater Treatment Plant at Ringsend. The Ringsend Plant is currently being upgraded from a Population Equivalent (PE) of 1.6 Million to 2.4 million PE. Irish Water advised in their *Confirmation of Feasibility Statement*, dated 8 March 2019, that their water wastewater infrastructure could cater for the proposed development. A *Statement of Design Acceptance* from Irish Water, dated 29 October 2019, also forms part of the planning documentation. The proposed foul sewer layout is shown on Drawing 9205-JBB-00-XX-DR-C-01003 prepared by JB Barry & Partners Consulting Engineers and which form part of the application documentation.

5.5.12.2 Surface Water

The foul and storm sewer networks will be on the separate systems. No foul effluent will discharge to the storm water system.

The SUDS strategy for the development provides a comprehensive approach to the management of surface water on the site including: water quality and water quantity. Source controls proposed for this development include permeable Paving and a Stormtech System / Hydrocarbon interceptor.

There is provision for outflows(overflows) from the permeable paving via the internal surface water drains to the Stormtech system and then to the surface water infrastructure (including the existing attenuation tank) which discharges to the Santry River in the North-West corner of the existing development.

The proposed surface water network and the proposed SUDS measures for this development are shown on Drawings 19205-JBB-00-XX-DR-C-01001, 19205-JBB-00-XX-DR-C-01002 and 19205-JBB-00-XX-DR-C-01007 prepared by JB Barry & Partners Consulting Engineers and which form part of the application documentation.

5.5.12.3 Lighting

The application proposes street lighting throughout the development as an integral part of the scheme. The lighting plan has been designed in accordance with the *Fingal Development Plan 2017-2023* providing a level of brightness that will minimise incidences of light spillage or pollution on the neighbouring residential developments and biodiversity in the surrounding area. Detailed lighting proposals are set out in the *Public Lighting Report* and associated drawings prepared by McElligott Consulting Engineers and which form part of the application documentation.

5.5.12.4 ESB Substation

A double substation is required to support the proposed development and future level of car charging facilities. The requirements of the ESB in this regard are set out in the *Energy Statement* prepared by McElligott Engineers and which form part of the application documentation. A design rationale for the location of the utility is set out in the *Architect's Design Statemen*t prepared by McCrossan O'Rourke Manning Architects.

5.5.13 Sustainability

An *Energy Statement* has been prepared by McCrossan O'Rourke Manning Architects and McElligott Engineers in order to identify the energy strategy for the proposed development and confirmation of the proposed method of compliance with Part L 2011 of the Building Regulations and is included with the application documentation. The *Energy Statement* confirms that the approved construction details will achieve a minimal thermal bridging factor of 0.08. The net impact of these combined criteria is that the heat losses associated with the apartments will be below 25% of the total thermal demand.

5.5.14 Emissions and Waste

Effluent arising from foul drainage from the proposed development will be discharged through piped systems to the local authority sewers. Operation of the development will involve the discharge of uncontaminated surface water from the impermeable areas to a proposed network all linking into the proposed wetland area to the north. Details of the impacts and remedial and reductive measures for surface water and foul drainage are recorded in **Chapter 8** of this EIAR.

5.5.14.1 Municipal Waste/Waste Management

The principal objective of sustainable resource and waste management is to use material resources more efficiently, to reuse, recycle and recover material and reduce the amount of waste requiring final disposal.

Municipal waste means household waste as well as commercial and other waste that, because of its nature or composition, is similar to household waste. It excludes municipal sludge and effluents.

- An operational *Waste Management Plan* has been prepared by KeyWaste Management Ltd. and is included in the application documentation.

- The proposed development will include 9 no. dedicated bin stores (8 no. at basement level and 1 no. at surface level) providing a total of 68 no. Euro Bins and 21 no. 240lt bins at basement level, and 10 no. Euro Bins at surface.

These bin stores are distributed evenly around the basement area, proximate to the lift cores serving the floors above. The filled bins will be taken via the vehicular ramp to the layby located at the north of the proposed buildings for collection on designated days. The *Waste Management Plan* prepared by KeyWaste Management Ltd. proposes collection staggered across a number of days to limit the bins volume on any particular day.

- The bin store serving the proposed ground floor commercial units is located between Blocks B and C, immediately inside the western entrance gate. This ground level location is seen as the most convenient for the commercial units and avoids the carrying of waste from these units down a level to the basement. The location of this bin store just inside the courtyard gate minimises the distance bins will have to be rolled within the courtyard on collection days thereby maintaining the residential amenity of the shared open space and protecting the privacy of residents.

- All waste will be collected in accordance with the relevant by-laws and there will be a 'zero to landfill' policy for the development.

- General Waste - General waste will be sent to the newly opened 'Waste to Energy Plant' in Poolbeg Dublin 4, where it will be transferred into energy.

- Recycling/Cardboard – Recycling and cardboard will be processed and transferred to mills and recycling plants.

- Glass – Glass is brought to KeyWaste's partner, Glassco who have a world class facility in Kildare. There it is turned into glass cullet and eventually is recycled back into glass bottles.

- Food Waste – Food waste is fully composted while trapping methane produced to create electricity, making it the greenest practice available.

5.5.14.2 Air Emissions

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust and PM10/PM2.5 emissions.

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO2, CO, benzene, PM10 and PM2.5. This is considered more fully in **Chapter 9**.

5.6 Construction Management Strategy

5.6.1 Phasing / Stages of Construction

The expected construction will be delivered in a single phase. However, it is feasible that market conditions would require alterations to any programme which is specified at this time and it is likely that it will be reviewed in the course of construction. The proposed phasing programme is outlined in the *Outline Construction and Environment Management Plan* (CEMP) prepared by JB Barry Consulting Engineers (part of the Planning Documentation).

The main stages of construction will proceed in a general sequence as follows:

- Removal of the existing hard standing areas;
- Enabling Works including set-up of site construction facilities;
- Service diversion works;
- Site clearance will include cut and fill of existing ground profiles and formation of basement excavation;
- Construction of drainage, water supply and utility service distribution network within the site;
- Construction of basement car park and podium/transfer slab at ground level;
- Construction of multi-storey apartment blocks;
- Roads, landscaping and paving; and
- Building fit-out and commissioning.

5.6.2 Construction Waste

The scheme will result in waste generation from the following activities:

- Removal of the existing boundaries;
- Removal of the existing hard standing areas; and
- Removal of soil to make way for construction.

A geotechnical investigation was undertaken by Ground Investigation Ireland Limited in February 2019. The main findings established a stiff layer of black boulder clay at approximately 2.0-2.5m below ground level throughout the site and the water table was not encountered in any trial pits or boreholes at a depth of 7.5m.

The construction of the basement will involve excavations to an approximate depth of 4.0m below existing ground level and the removal of approximately 47,000m^3 of excavated material from site.

Management of all waste throughout the project lifecycle will be in accordance with EU, National and Regional waste management policy and the principles of the Waste Hierarchy i.e. prevention, minimization, reuse, recovery and recycling. In order to prevent and minimize the generation of wastes, the Contractor is required to ensure that raw materials are ordered in a timely manner so as the quantity delivered, and the storage does not lead to the creation of unnecessary waste.

A *Construction and Demolition Waste Management Plan* (CDWMP) has been prepared by JB Barry Consulting Engineers and forms part of the planning documentation. Further detail on construction waste is provided in **Chapter 7**.

5.6.3 Site Management

All construction activities will be governed by a Construction Traffic Management Plan (CTMP) the details of which will be agreed with Fingal County Council's Roads Department prior to the commencement of the Construction Phase.

5.6.3.1 Construction Hours

This plan will include the permitted site operation hours which are expected to be 07:00-19:00 on weekdays and 09:00-13:00 on Saturdays with no works on Sundays or bank/public holidays in accordance with the Environmental Noise Regulations 2006 and subject to final agreement with Fingal County Council.

In exceptional instances should works be required outside of these hours, bespoke agreement will be sought from Fingal County Council prior to any works taking place. The appointed contractor will be required to prepare and adhere to a Site Environmental Policy Plan and any employed subcontractors will be required to buy into this document. Unscheduled deliveries will not be allowed access.

5.6.3.2 Construction Site Access

Pedestrian access will be strictly controlled. Only Safepass accredited personnel will be permitted on site and daily in-out attendance records will be maintained. Safe pedestrian access points will be provided based on the stage of works and layout of the construction site.

Construction traffic will access the site via the service entrance to the rear (west) of Gulliver's Retail Park so as to minimise disruption on other routes. The routing will be strictly managed and controlled, and details will be incorporated into the Traffic Management Plan.

A site compound will be provided to the north of the development site as shown in **Figure 5.7**.

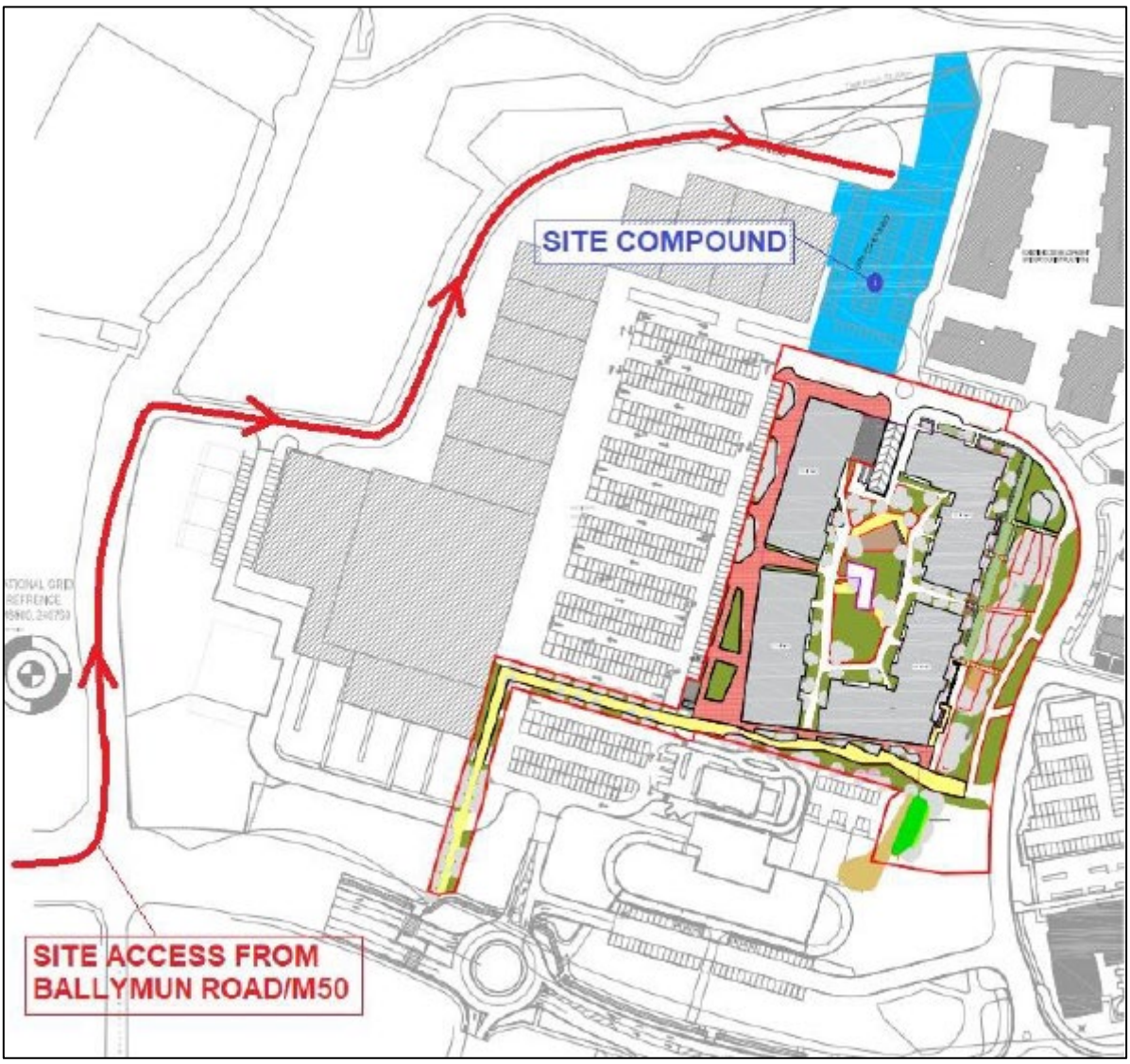

Figure 5-7: Site Access and Construction Compound

5.6.3.3 On Site Parking

Construction car park will be accommodated within the site compound.

5.6.3.4 Construction Personnel

Based on a 150-week construction period and on industry standard figures it is likely that an average of c.60 construction personnel will be on site on a daily basis. However, it is likely that this figure may be higher during periods of peak activity.

5.6.3.5 Traffic Management

Construction traffic generated during the Construction Phase tends to be outside of peak hours (staff and deliveries arrive before 07:00 and generally depart after 19:00). The traffic generated by the construction phase will not be higher than the peak hour predicted volumes for the Operational Phase. Any specific recommendations/requirements with regard to construction traffic management made by Fingal County Council will be adhered to during this phase.

5.7 Cumulative Effects

The cumulative impacts of the proposed development with other projects is considered in specialist chapters. Among the projects considered in these chapters are proximate developments which have been granted planning permission including:

F15A/0440 (as amended):	Planning permission was granted on 22nd July 2016 and subsequently amended resulting in the development of 355 no. residential units consisting of houses and apartments being constructed immediately to the north and east of the subject site.
Reg. Ref. F18A/0421:	Planning permission was granted on 7th March 2019 for a mixed use residential scheme comprising 99no. apartments, concierge, creche, residents lounge and meeting rooms on lands approximately 180m to the southwest of the subject site, south of Northwood Avenue.
Reg. Ref. F18A/0438:	Planning permission was granted on 16th April 2019 for a mixed use development comprising 2no. 6 storey blocks containing 99no. apartments in total, four storey office building (c.2,536 sq.m) and other associated development. The application forms phase 2 of the development permitted under Reg. Ref. F18A/0421 and is located approximately 180m to the southwest of the subject site, south of Northwood Avenue.

6 BIODIVERSITY

6.1 Introduction

6.1.1 Quality Assurance

This chapter was written by Laura Higgins, has been reviewed by Meave Maher-McWilliams and was approved by Aebhín Cawley, all of Scott Cawley Ltd.

Laura Higgins holds a first class honours degree in Zoology from Trinity College Dublin. Laura has a range of fieldwork experience in Ireland including habitat, invasive species and protected species surveys. She has surveyed a wide range of mammal, bird and invertebrate species in terrestrial and aquatic habitats in Ireland. Laura has a great interest in ecology and is continually improving her professional skills through training courses and volunteer work. Since joining Scott Cawley, her work has included the collection of ecological data, data analysis and preparing Appropriate Assessment reports and Ecological Impact Assessments for residential and infrastructural projects across the country.

Maeve holds a BSc (Honours) in Biological Sciences from Queen's University Belfast and obtained a distinction in her MSc in Evolutionary and Behavioural Ecology from the University of Exeter. Maeve has worked in environmental consultancy for 6 years across Ireland, Northern Ireland and Scotland specialising in ornithology, Ecological Impact Assessment and Appropriate Assessment. Maeve has worked on a variety of EIA and non-EIA projects mainly in terrestrial, freshwater and inter-tidal environments, across a number of sectors including, large to small scale residential schemes, flood defence schemes, tourism/recreational projects, wind farm developments, solar developments, hydro-schemes, linear infrastructure projects, quarrying operations and aquaculture. Her involvement includes technical input at all stages of a project from inception, ecological baseline surveys, impact assessment, production of EIAR Chapters and Natura Impact Statements, post-submission requirements, post-consent compliance and Ecological Clerk of Works.

Aebhín Cawley is Director with Scott Cawley. She holds an honours degree in Zoology from Trinity College, Dublin and a postgraduate diploma in Physical Planning at Trinity. She is a Chartered Environmentalist (CEnv) with the Society for the Environment (Soc Env) and a Full Member of the CIEEM. Aebhin Cawley is an experienced ecological consultant with extensive experience in public and private sector projects including renewable energy, ports and other major infrastructural developments. Aebhín has been undertaking Ecological Impact and Appropriate Assessment work in Ireland since 2002 and has been influential in determining the direction in which EcIA and AA work is evolving in Ireland. She has delivered lectures and training on Appropriate Assessment to a range of organisations and professional institutes (including the Irish Planning Institute, the Royal Town Planning Institute, the Irish Environmental Law Association, National Roads Authority, Engineers Ireland, An Bord Pleanála and EirGrid) and regularly provides Appropriate Assessment training to local authorities and other public sector organisations. She authored guidelines on Appropriate Assessment for the EPA and delivered training on its application to its inspectorate.

6.1.2 Background

This chapter should be read in conjunction with project description provided in **Chapter 5** of this EIAR and the drawings accompanying this application for permission. The proposed development site is comprised of several habitats. The southern section of the proposed development site is comprised of recolonising bare ground. An existing car-park is present in the north of the site. There is a hedgerow with an associated unconnected drainage ditch present along the eastern boundary of the site. There is a small strip of amenity grassland present to the east of the hedgerow. The site is bounded to the west, south-west and north by built land and bounded to the south-east by recolonising bare ground. Santry Demesne pNHA is located approximately 170m north of the proposed development site.

6.1.3 Scoping

The NPWS Development Applications Unit was consulted regarding this proposed development. At the time of writing, no response had been received.

The scope of this chapter includes the following:

- Establish baseline ecological data for the proposed development site;
- Determine the ecological value of the identified ecological features;
- Assess the impact of the proposed development on ecological features of value (flora and fauna);
- Apply mitigation measures to avoid, reduce, remedy or compensate impacts; and,
- Identify any residual impacts after mitigation.

6.2 Assessment Methodology

6.2.1 Desk-top study

A desk study was undertaken to collect any available information on the local ecological environment. The following resources assisted in the production of this report:

- Ordnance Survey Ireland (OSI) mapping and aerial photography available from OSI online GeoHive mapping resource;
- Data on protected species and European sites, available for download and interrogation from the National Parks and Wildlife Service (NPWS) maps and data page;
- Spatial information relevant to the planning process including land zoning and planning applications from Department of Housing Planning, Community and Local Government web map portal;
- Data on waterbodies, available for download and interrogation from the EPA web map service;
- Information on soils, geology and hydrogeology in the area available for download and interrogation from the Geological Survey Ireland (GSI) online Spatial Resources service;
- Information on the location, nature and design of the proposed development supplied by the Applicant's design team;
- NPWS (2013). *The Status of EU Protected Habitats and Species in Ireland*. Species Assessments Volume 3, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland; and
- Colhoun, K. & Cummins, S. (2013). *Birds of Conservation Concern in Ireland 2014 -2019*. Irish Birds 9: 523-544.

6.2.2 Site visits

Habitats and Flora Survey

The proposed development site was surveyed on 8th February 2019 by Laura Higgins of Scott Cawley Ltd. All habitats were classified using the Guide to Habitats in Ireland13, recording dominant species, indicator species and/or species of conservation interest; with the Fossitt category codes given in parentheses. Plant nomenclature follows the BSBI's List of Accepted Plant Names[14].

[13] Fossitt, J. (2000). *Guide to Habitats in Ireland*. The Heritage Council

[14] BSBI (2007). *BSBI's List of Accepted Plant Names.* Revised in 2007. Available online from the BSBI website www.bsbi.org/resources

Fauna Surveys

Fauna surveys were carried out concurrently with the habitat and flora survey on 8th February 2019. Two no. specialist breeding bird surveys were carried out by Laura Higgins of Scott Cawley on 20th May and 10th June 2019. Two no. specialist bat activity surveys were undertaken by Laura Higgins of Scott Cawley on 5th June and 20th June 2019. Fauna were surveyed through detection of field signs such as tracks, markings, feeding signs and droppings, as well as through direct observation. The habitats on site were assessed for signs of usage by protected / red-listed fauna species, and potential to hold these species.

The assessment criteria outlined in **Table 6-1** below are used for the assessment of the site in terms of its suitability for commuting and foraging bats, and where relevant, the suitability of roosting habitats for bats. An inspection of the trees within the subject lands involved a search for evidence of bats such as:

- Dead specimens;
- Bat droppings;
- Urine splashes;
- Fur-oil staining;
- Squeaking noises; and
- Feeding remains (moth wings).

Table 6-1: Assessment Criteria for potential suitability of proposed development sites for bats, derived from similar criteria in Bat Surveys for Professional Ecologists: Good Practice Guidelines[15, 16]

Suitability	Description of Roosting Habitat	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[17] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.

[15] Based on our professional experience and understanding, a category of "*moderate suitability*" is not included in the assessment criteria as it is felt that this category overlaps significantly with the categories "*low suitability*" and "*high suitability*"

[16] Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).* The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1

[17] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

Suitability	Description of Roosting Habitat	Commuting and Foraging Habitats
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats in a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub, hedgerows. Linked back gardens, river valleys, streams and woodland edge. Habitat that is connected to the wider landscape that could be used by foraging bats such as trees scrub, grassland or water. Site is close to and connected to a known roost.

Two bat activity surveys were undertaken within the subject lands, with the aim of identifying bat activity and presence/absence of roosting bats. Two dusk activity surveys were undertaken on 5th June and 20th June 2019 using direct observation and a handheld ultrasound detector (Echo Meter Touch and Elekon BatLogger M). The dusk surveys were carried out from 15 minutes prior to sunset to 1.5 hours after sunset. The surveys covered all areas of the site with a focus on treelines and trees that may be important foraging habitats or offer potential features to support small numbers of roosting bats.

Anecdotal bird observations were made during the flora and fauna survey carried out on the 8th February 2019. And specialised breeding bird surveys were carried out on 20th May and 10th June 2019 Bird activity within the subject lands was recorded using a combination of direct sightings and identification of songs and calls.

The drainage ditch present on the site was identified as being suitable habitat for breeding amphibian species. This area was checked during visits to the site for signs of amphibians i.e. amphibians and spawn.

6.2.3 Assessment Approach

The criteria used to assess the ecological value (**Volume 3, Appendix 6.1**) and significance of the site for habitats and species follows *Guidelines for Assessment of Ecological Impacts of National Road Schemes*, and is consistent with *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*.

6.2.4 Definition of Study Area

The study area for the Biodiversity chapter assessment has been defined with reference to the area in which there is potential for ecological impacts to occur as a result of the proposed development.

The zone of influence is a distance within which the proposed works could potentially affect key ecological receptors (KERs). The zone of influence is likely to vary by KER and depends on the source of impact, the sensitivity of the receptor, and the presence of a pathway between the two.

In this instance, the key sources of potential impacts are construction works within the lands, and discharge of pollutants during operation of the project. The potential receptors in this instance are designated sites (including European sites) (**Figure 6.1 and Figure 6.2**) outside of the landownership and terrestrial habitats, breeding birds, and bats within the proposed development site.

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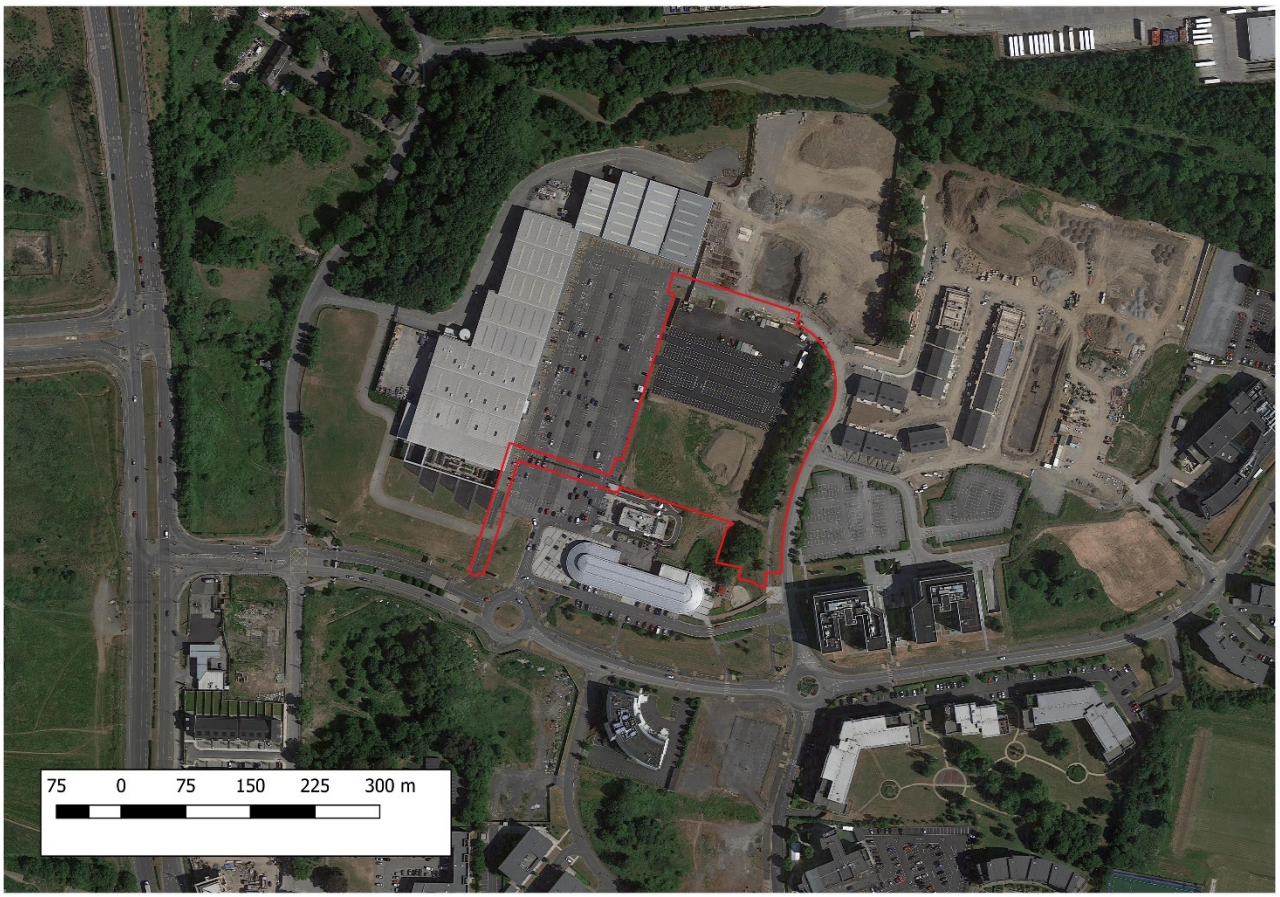

Figure 6-1: The proposed development site

6.2.5 Assessment Criteria

In accordance with NRA guidelines (2009), impact assessment is only undertaken of 'key ecological receptors' (KERs). KERs are within the zone of influence[18] of the development and are 'both of sufficient value to be material in decision making and likely to be affected significantly'. To qualify as KERs, features must be of local importance (higher value) or higher as per the criteria in **Volume 3, Appendix 6.1**. Features of lower ecological value are not assessed. The highest levels of impact significance for each key ecological receptor 'value' rating are shown in **Figure 6-2.**

Table 6-2: Key Ecological Receptor assessment criteria

Key Ecological Receptor 'value' rating	Highest possible significance level
International importance	Significant Positive/ Negative impact at International level
National importance	Significant Positive/ Negative impact at National level
County importance	Significant Positive/ Negative impact at County level
Local importance (higher value)	Significant Positive/ Negative impact at Local level

[18] In accordance with NRA (2009) guidelines, the Zone of Influence is an important term to define the receiving environment for the activities associated with the project and the biophysical changes that are likely to occur. The Zone of Influence is the 'effect area' over which change is likely to occur. This differs for different species and habitats due to varying sensitivities to potential impacts.

Impacts are described as being either significant or not significant. Broadly, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)[7]. In this instance, effects are qualified with reference to a geographic scale as outlined in **Volume 3, Appendix 6.1** of this report.

6.3 Baseline Scenario (Existing Environment)

6.3.1 Land Use Zoning

The subject lands are currently zoned as *"ME- Metro Economic Corridor"* with the zoning objective to "Facilitate opportunities for high density mixed use employment generating activity and commercial development, and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor" within the *Fingal Development Plan 2017-2023*[19]. The lands immediately surrounding the proposed development site are also zoned as *"ME- Metro Economic Corridor".* Santry Demesne is located approximately 150m north of the proposed development site and this is zoned as "OS- Open space" to *"Preserve and provide for open space and recreational amenities".* Lands to the east and south of the development site comprise a mixture of "RS - Residential" to "Provide for residential development and protect and improve residential amenity" and "OS – Open Space".

6.3.2 Designated Sites

Special Areas of Conservation (SAC) are designated under the EC Habitats Directive (92/43/EEC), as amended, which is transposed into Irish law through a variety of legislation including the Birds and Habitats Regulations and the Planning and Development Acts. The legislation enables the protection of certain habitats (listed on Annex I of the Directive) and/or species (listed on Annex II). Special Protection Areas (SPAs) are designated under the Birds Directive (2009/147/EC). This allows for the protection of protected bird species listed on Annex I of the Directive, regularly occurring populations of migratory species (such as ducks, geese or waders), and areas of international importance for migratory birds.

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

The subject lands are not designated as an SAC, SPA, NHA, or pNHA, however, potential pathways of connectivity between the subject lands and designated sites have been identified. A separate report by Scott Cawley (Appropriate Assessment Screening Report[20]) which accompanies this planning application has considered potential source-pathway-receptor links through hydrological means and identified connectivity via the surface water and foul water networks and Dublin Bay European sites.

The proposed development is located approximately 170m south of the Santry River which discharges to Dublin Bay c. 7.4km downstream. The following European sites are located within Dublin Bay - North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA. Significant effects on European sites in Dublin Bay have been excluded for the reasons outlined in the Appropriate Assessment Screening Report.

The nearest pNHA to the proposed development is the Santry Demesne pNHA, located 150m north of the proposed development site. Prior to the construction of the local road off Northwood road to the east of the subject site, the hedgerow present to the east of the subject lands was connected to the woodland of the

[19] Fingal Development Plan 2017-2023

[20] **Scott Cawley (2019).** *Appropriate Assessment Screening Report.*

demesne[21]. The hedgerow present on the proposed development site may act as foraging and breeding habitat for woodland fauna species of the demesne such as bats and birds.

A list of European and nationally designated sites within the vicinity of the proposed development, along with their qualifying interests or reasons for designation, are included in **Tables 6-3** and **6-4** overleaf. The locations of these designated sites in relation to the proposed development are illustrated in **Figure 6-2** and **Figure 6-3**, overleaf.

Sites shown on **Figures 6-2** and **6-3** and not listed in **Tables 6-3** or **6-4** are considered to fall outside the zone of influence of the proposed development due to their distance from the proposed development site and lack of source-pathway-receptor links, mainly hydrological.

[21] Based on examination of historical maps available on the GeoHive mapviewer. Available from: http://map.geohive.ie/mapviewer.html

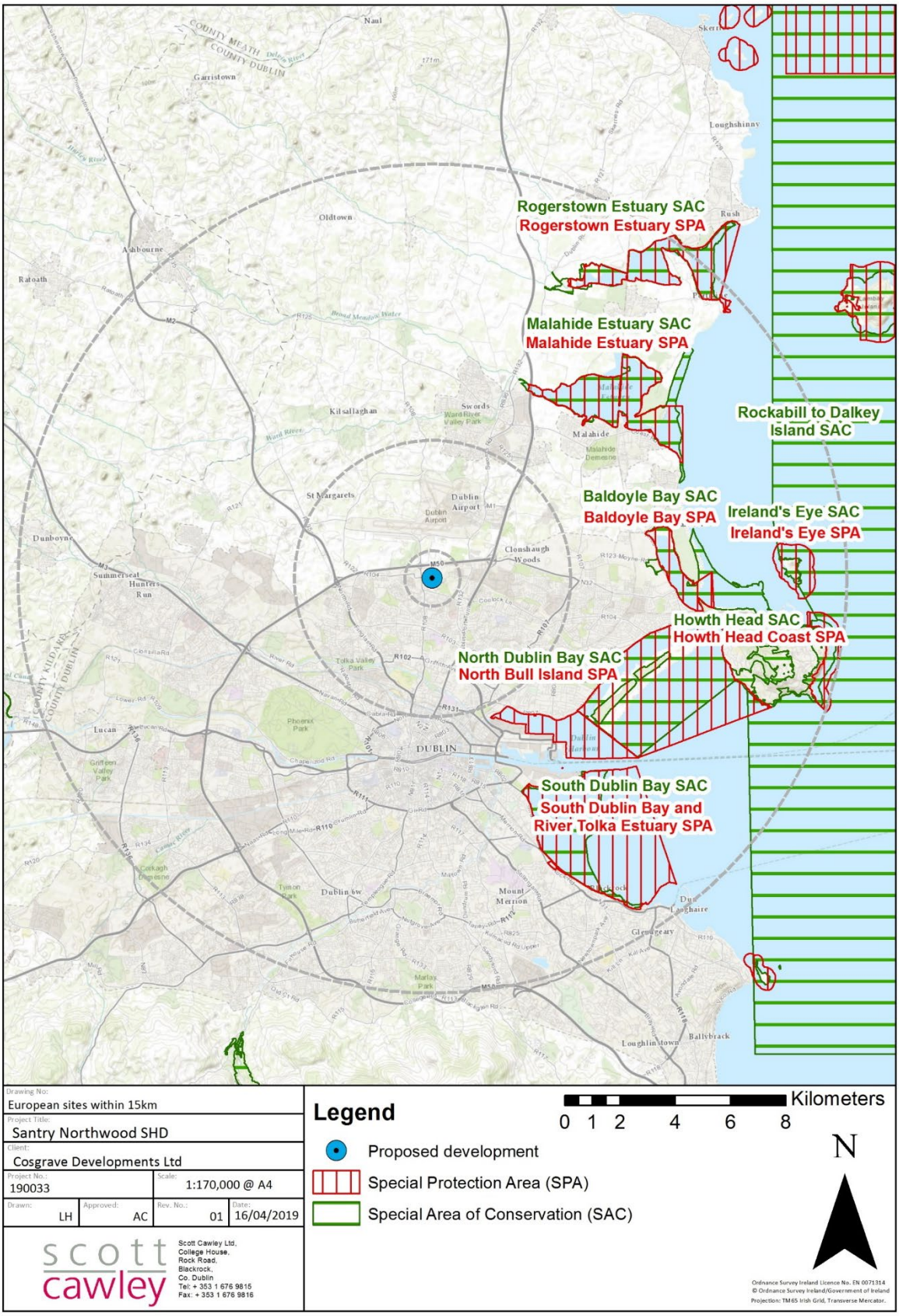

Figure 6-2: European Sites in the Vicinity of the Proposed Development Site

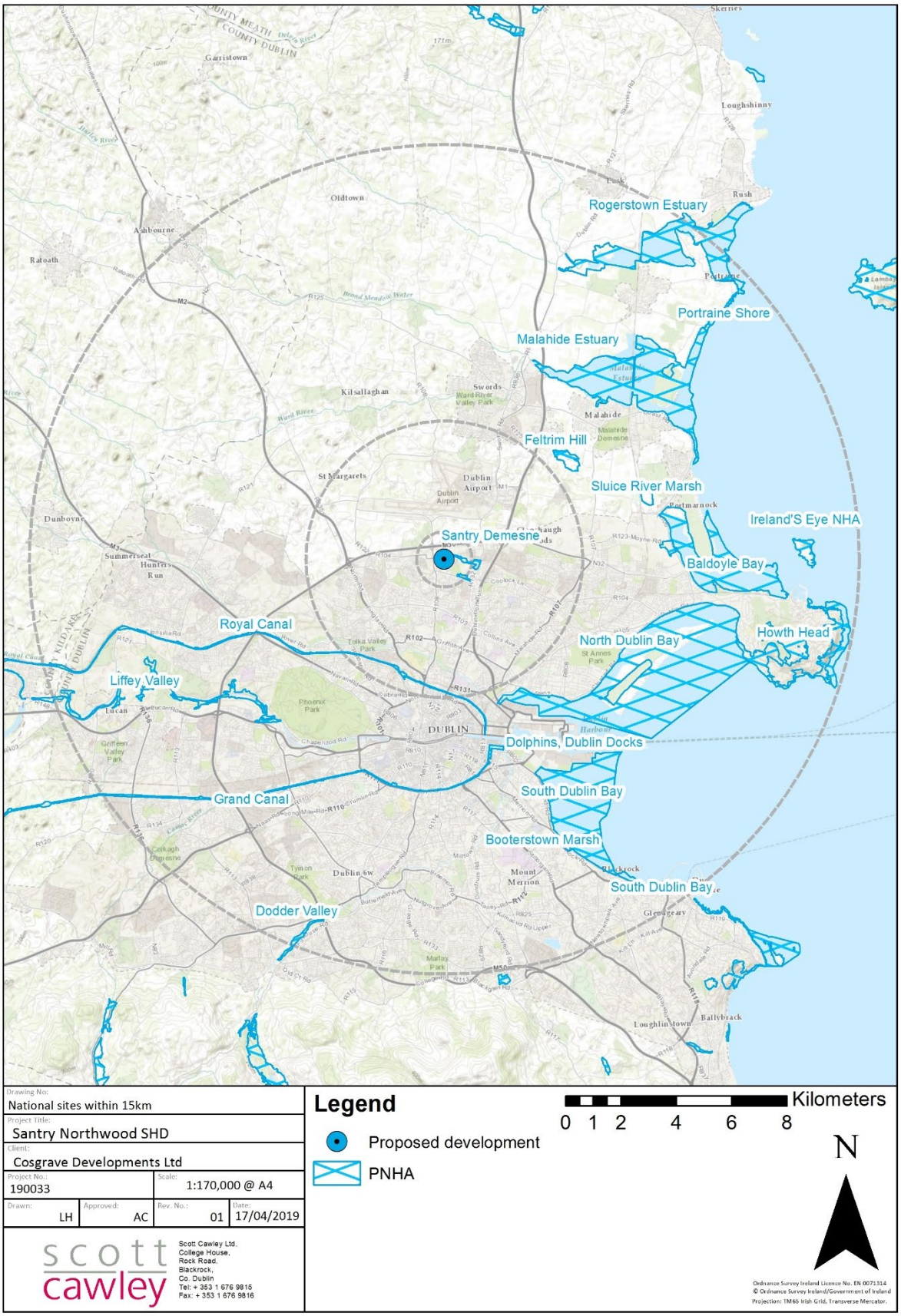

Figure 6-3: Nationally Designated Sites in the Vicinity of the Proposed Development Site

Table 6-3: European Designated Sites in the Vicinity of the Proposed Development Site

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
Special Area of Conservation (SAC)	
North Dublin Bay SAC [000206] [1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] *Salicornia* and other annuals colonising mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1395] Petalwort *Petalophyllum ralfsii* [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [2110] Embryonic shifting dunes [2120] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2190] Humid dune slacks NPWS (2013a) *Conservation Objectives: North Dublin Bay SAC 000206.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 7km south-east east of the proposed development site
South Dublin Bay SAC [000210] [1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] *Salicornia* and other annuals colonising mud and sand [2110] Embryonic shifting dunes NPWS (2013b) *Conservation Objectives: South Dublin Bay SAC 000210.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 8.1km south-east of the proposed development site
Baldoyle Bay SAC [000199] [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) NPWS (2012) *Conservation Objectives: Baldoyle Bay SAC 000199.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht	Located *c.* 7.7km east of the proposed development site
Malahide Estuary SAC [000205] [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonising mud and sand [1320] Spartina swards *(Spartinion maritimae)* [1330] Atlantic salt meadows *(Glauco-Puccinellietalia maritimae)* [1410] Mediterranean salt meadows *(Juncetalia maritimi)* [2120] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)	Located *c.* 7.5km north of the proposed development site

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
NPWS (2013) *Conservation Objectives: Malahide Estuary SAC 000205.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
Howth Head SAC [000202] [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts [4030] European dry heaths NPWS (2016) *Conservation Objectives: Howth Head SAC 000202.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	Located *c.* 12km east of the proposed development site
Rogerstown Estuary SAC [000208] [1130] Estuaries [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonising mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [2120] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes) NPWS (2013) *Conservation Objectives: Rogerstown Estuary SAC 000208*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 11.2km north-east of the proposed development site
Rockabill to Dalkey Island SAC [003000] [1170] Reefs [1351] Harbour porpoise *Phocoena phocaena* NPWS (2013) *Conservation Objectives: Rockabill to Dalkey Island SAC 003000.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 12km east of the proposed development site
Ireland's Eye SAC [002193] [1220] Perennial vegetation of stony banks [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts NPWS (2017) *Conservation Objectives: Ireland's Eye SAC 002193.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	Located *c.* 12.5km east of the proposed development site
Special Protection Area (SPA)	
North Bull Island SPA [004006] [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata* [A130] Oystercatcher *Haematopus ostralegus* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola*	Located *c.* 5.4km south-east of the proposed development site

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
[A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina* [A156] Black-tailed Godwit *Limosa* [A157] Bar-tailed Godwit *Limosa lapponica* [A160] Curlew *Numenius arquata* [A162] Redshank *Tringa totanus* [A169] Turnstone *Arenaria interpres* [A179] Black-headed Gull *Croicocephalus ridibundus* [A999] Wetlands & Waterbirds NPWS (2015a) *Conservation Objectives: North Bull Island SPA 004006.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
South Dublin Bay and River Tolka Estuary SPA [004024] [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A130] Oystercatcher *Haematopus ostralegus* [A137] Ringed Plover *Charadrius hiaticula* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina* [A157] Bar-tailed Godwit *Limosa lapponica* [A162] Redshank *Tringa totanus* [A179] Black-headed Gull *Croicocephalus ridibundus* [A192] Roseate Tern *Sterna dougallii* [A193] Common Tern *Sterna hirundo* [A194] Arctic Tern *Sterna paradisaea* [A999] Wetland and Waterbirds NPWS (2015b) *Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located 8.3km south-east of the proposed development site
Baldoyle Bay SPA [004016] [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna* [A137] Ringed Plover Charadrius hiaticula [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A157] Bar-tailed Godwit *Limosa lapponica* [A999] Wetland and Waterbirds	Located *c.* 8.4km east of the proposed development site

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
NPWS (2013) *Conservation Objectives: Baldoyle Bay SPA 004016. Version 1.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
Malahide Estuary SPA [004025] [A005] Great Crested Grebe *Podiceps cristatus* [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna* [A054] Pintail *Anas acuta* [A067] Goldeneye *Bucephala clangula* [A069] Red-breasted Merganser *Mergus serrator* [A130] Oystercatcher *Haematopus ostralegus* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A149] Dunlin *Calidris alpina* [A156] Black-tailed Godwit *Limosa* [A157] Bar-tailed Godwit *Limosa lapponica* [A162] Redshank *Tringa totanus* [A999] Wetland and Waterbirds	Located *c.* 7.8km north-east of the proposed development site
NPWS (2013) *Conservation Objectives: Malahide Estuary SPA 004025.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
Ireland's Eye SPA [004117] [A017] Cormorant *Phalacrocorax carbo* [A184] Herring Gull *Larus argentatus* [A188] Kittiwake *Rissa tridactyla* [A199] Guillemot *Uria aalge* [A200] Razorbill *Alca torda*	Located *c.* 12.2km east of the proposed development site
NPWS (2018) *Conservation objectives for Ireland's Eye SPA [004117].* Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.	
Rogerstown Estuary SPA [004015] [A043] Greylag Goose *Anser anser* [A046] Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A056] Shoveler *Anas clypeata* [A130] Oystercatcher *Haematopus ostralegus* [A137] Ringed Plover *Charadrius hiaticula* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A149] Dunlin *Calidris alpina alpina*	Located *c.* 12.3km north-east of the proposed development site

European Site Name [Code] and its Qualifying interest(s) / Special Conservation Interest(s) (*Priority Annex I Habitats)	Location Relative to the Proposed Development Site
[A156] Black-tailed Godwit *Limosa limosa* [A162] Redshank *Tringa totanus* [A999] Wetlands NPWS (2013) *Conservation Objectives: Rogerstown Estuary SPA 004015*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
Howth Head Coast SPA [004113] [A188] Kittiwake *Rissa tridactyla* NPWS (2018) *Conservation objectives for Howth Head Coast SPA [004113].* Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.	Located *c.* 13.7km east of the proposed development site

Table 6-4: Nationally Designated Sites in the Vicinity of the Proposed Development Site

National Site Name [Code] and Site Description[22] Where available, reasons for designation for pNHAs have been interpreted from information in Site Synopses available online from the NPWS.	Location Relative to the Proposed Development Site
Santry Demesne pNHA [SY000178] This site is located immediately north of old Santry village, Co. Dublin. The site comprises the remnants of a former demesne woodland. The remaining woods are generally good quality. Hairy St. John's wort (*Hypericum hirsutum*), a species legally protected under the Flora (Protection) Order (2015), was recorded here in 1991. The primary importance of this site is that it contains a legally protected plant species. The woodland, however, is of general ecological interest as it occurs in an area where little has survived of the original vegetation.	Located *c.* 150m north of the proposed development site
North Dublin Bay pNHA [SY000206] This site is designated for the same features for which the North Dublin Bay SAC and the North Bull Island SPA have been: intertidal/coastal habitats and wintering bird species.	Located *c.* 5.3m south-east of the proposed development site
South Dublin Bay pNHA [SY00210] This site is designated for the same features for which the South Dublin Bay SAC and the South Dublin Bay and River Tolka Estuary SPA have been: intertidal/coastal habitats and wintering bird species.	Located *c.* 8.2km south-east of the proposed development site
Howth Head pNHA [SY000202] This site is designated for the same features for which the Howth Head SAC and the Howth Head Coast SPA have been: intertidal/coastal habitats and wintering bird species.	Located *c.*12km east of the proposed development site
Baldoyle Bay pNHA [SY000199] This site is designated for the same features for which the Baldoyle Bay SAC and the Baldoyle Bay SPA have been: intertidal/coastal habitats and wintering bird species.	Located *c.* 8.6km east of the proposed development site

[22] Only pNHAs considered to have potential source-pathway-receptor links or where risk of potential impact exists are listed in **Table 6-4**. pNHAs shown on **Figure 6-3** and not listed in **Table 6-4** are considered to fall outside the zone of influence of the proposed development due to the distance between the proposed development site and the pNHA and lack of source-pathway-receptor links, mainly hydrological.

6.3.3 Habitats and Flora

6.3.3.1 Desk Study Flora Records

The National Biodiversity Data Centre (NBDC) database search returned no records of protected flora species under the Flora (Protection) Order, 2015 within 2km of the subject lands. However, Santry Demesne pNHA is located approximately 150m north of the proposed development site and is designated for Hairy St. John's Wort *Hypericum hirsutum*, a species legally protected under the Flora Protection Order. This plant was not found during the site surveys.

The NBDC database search returned records of four non-native invasive species within 2km of the subject lands, one of which- giant hogweed *Heracleum mantegazzianum* is listed within Schedule 3 of the Birds and Habitats Regulations (2011). The desk study also returned records of sycamore *Acer pseudoplatanus*, winter heliotrope *Petasites fragrans* and goat's beard *Tragopogon pratensis*, none of which are subject to any restrictions under the Birds and Habitats Regulations (2011). The site visit noted the presence of butterfly bush *Buddleja davidii* on the proposed development site, this species is not subject to any legal restrictions.

6.3.3.2 Field Survey Results

No records of plant species protected through their inclusion within the Flora Protection Order were recorded during the field surveys. The listed invasive species butterfly-bush *Buddleja davidii* was noted within the proposed development site to the south-west of the car-park.

The following habitat types of the Heritage Council classification system were identified within the subject lands and surroundings and are mapped in **Figure 6-4**:

- Buildings and artificial surfaces (BL3);
- Dry meadows and grassy verges (GS2)/ Recolonising bare ground (ED3) mosaic;
- Hedgerows (WL1);
- Drainage ditches (FW4); and,
- Amenity grassland (improved) (GA2).

The proposed development site is largely comprised of buildings and artificial surfaces habitat including a car park in the north of the site and a fenced path running from north to south in the eastern part of the site. The southern half of the proposed development site is comprised of a mosaic of dry meadows and grassy verges and recolonising bare ground. There is a hedgerow with a drainage ditch along the eastern boundary of the site. There are also narrow strips of amenity grassland to the east of the site.

Plate 6-1: BL3- Buildings and Artificial Surfaces within the Proposed Development Site

Approximately half of the proposed development site is of buildings and artificial surfaces habitat. This includes a car park in the northern part of the site and a footpath running north to south, west of the hedgerow. The artificial surfaces present are all relatively new and have not been invaded by any plant species.

Plate 6-2: GS2- Dry Meadows and Grassy Verges/ ED3- Recolonising Bare Ground Mosaic

The southern portion of the site comprises a mosaic of dry meadows and grassy verges and recolonising bare ground habitat. Some of the ground has been disturbed in the recent past, including the spoil heap. These areas have been recolonised by a variety of weedy herbaceous species. Species present in this area include such as ragwort *Senecio jacobaea*, dandelion *Taraxacum officinale* agg., ribwort plantain *Plantago lanceolate*, bush vetch *vicia sepium* and thistle species *Cirsium* sp. There are also grass species such as perennial ryegrass *Lolium perenne* and cocksfoot *Dactylis glomerata* present. There are some wetter areas in the western portion of the site where rushes *Juncus* sp. And sedges *Carex* sp. have colonised. This habitat provides foraging habitat for common bird species such as hooded crow *Corvus cornix* and woodpigeon *Columa palumbus*. It is considered to be of local importance (lower value).

Plate 6-3: WL1- Hedgerow

There is hedgerow present along the eastern boundary of the proposed development site. Full details of this hedgerow may be found in the arborist's report accompanying this planning application (The Tree File, 2019). In summary, this hedgerow has an associated earth bank of approximately 1.25m in height, on which there is a mature, largely native hedgerow. Most of the mature trees are oak *Quercus robur* with some mature limes *Tilia europea* and ash *Fraxinus excelsior*. There has been planting in recent years and there are young trees present on either side of the hedgerow. The thicket present is comprised of bramble *Rubus fruticosus* agg., ivy *Hedera helix*, dog rose *Rosa canina* and hawthorn *Crataegus monogyna*. Ground flora includes cleavers *Galium aparine*, nettles *Urtica dioica*, thistle species and species also present in the GS2 / ED3 habitat.

This hedgerow feature has suitability for breeding birds and several bird species displaying breeding activity were recorded within the hedgerow (See **Section 6.3.4.2**).

In theory, the hedgerow also has suitability for commuting and foraging bats. The presence of a drainage ditch and a mature treeline make it a suitable feature. Two mature trees within the hedgerow were noted to have potential roosting features (PRFs). However, as outlined below in **Plate 7**, there is currently excessive light spill from the existing non-directional street lighting. This reduces the suitability of the hedgerow for use as a commuting and foraging route for bats.

This hedgerow is of moderate value. This was determined using the Hedgerow ecological evaluation criteria listed in **Volume 3, Appendix 6.1**. This habitat is considered to be of local importance (higher value). Given the built-up nature of the surrounding area and the presence of Santry Demesne *c.* 150m north of the proposed development site.

Plate 6-4: FW4- Drainage ditch

There is a drainage ditch present within the hedgerow to the east of the site. It was shaded by overhanging trees and was filled with stagnant water. From examination of the EPA Envision MapViewer, it is likely that this ditch is the remnants of the Ballymun Stream. It is possible that this habitat is suitable for breeding amphibians although they were not noted during the site surveys. Given that this ditch is part of the hedgerow, it is also considered to be of local importance (higher value).

Plate 6-5: GA2- Amenity grassland (improved)

There are strips of managed amenity grassland present to the east of the hedgerow. This habitat is dominated by perennial ryegrass *Lolium perenne*. It is a common habitat in urban environments and is of little ecological value. It is therefore considered to be of local importance (Lower value).

Figure 6-4: Habitats noted within the subject lands during field surveys

6.3.4 Fauna

6.3.4.1 Desk Study Fauna Records

The following records for rare, threatened or protected fauna species were generated from a 2km search around the proposed development site using the National Biodiversity Data Centre's online map viewer (this excludes low resolution records that cover areas >1km²).

Mammals

The desk study returned records of three bat species within 2km of the proposed development site and included common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and Leisler's bat *Nyctalus leisleri.*

These bat species are all protected under the Wildlife Acts and the European Habitats Directive, where they are listed on Annex IV.

Records of five other mammal species protected under the Wildlife Acts were returned within the 2km search area including the Eurasian badger *Meles meles,* otter *Lutra lutra,* Irish hare *Lepus timidus subsp. hibernicus*, Irish stoat *Mustela erminea subsp. hibernica* and European hedgehog *Erinaceus europaeus.*

Birds

All nesting wild birds are protected from disturbance and destruction under the Wildlife Acts. Records of two Red-listed species in the of Birds of Conservation Concern in Ireland (BoCCI) (Colhoun and Cummins, 2013) were returned within 2km from the subject lands; black-headed gull *Larus ridibundus* and tufted duck *Aythya fuligula.* Given the nature of the site and its environs, only black-headed gull has potential to be present in the surrounding area, however are unlikely to occur within the zone of influence of the development due to the built nature of the immediate surroundings.

Records of nine Amber-listed species of BoCCI were also returned within 2km from the subject lands. These species include a range of common sub-urban species such as barn swallow Hirundo rustica, starling *Sturnus vulgaris*, swift *Apus apus*. There were also four water birds recorded- cormorant *Phalacrocorax carbo*, coot *Fulica atra*, mute swan *Cygnus olor* and little grebe *Tachybaptus ruficollis.* Additionally, there is a record of lesser whitethroat *Sylvia curruca* nearby, a scarce visitor to Ireland, and one raptor species, sparrowhawk *Accipiter nisus*.

Amphibians

Records of one amphibian species protected under the Wildlife Acts or listed on Annex V of the EU's Habitats Directive were returned within the 2km search area, the common frog *Rana temporaria*.

Invertebrates

There are no records of invertebrate species listed on Annex II of the EU's Habitats Directive returned within the 2km search area.

6.3.4.2 Field Survey Results

Bats

The hedgerow within the subject lands is considered to be suitable for foraging and commuting habitat for bats. During the flora and fauna survey on 8th February 2019 two trees within the site were considered to have potential roost features (PRFs) that could support small numbers of bats, see **Table 6-1** above. These trees were assessed from ground level and an endoscopic inspection of PRFs was not possible.

Plate 6-6: Potential Roost Features identified within the Subject Lands

The two trees with potential roost features for bats identified within the proposed development site, both of which were present in the northern section of the hedgerow (**Plate 6**). The features of these trees that may be suitable for roosting bats include knot-holes, splits in the bark and dense ivy cover.

Plate 6-7: Excessive Illumination of the Hedgerow

The bat surveys recorded very little bat activity on the site, most likely as a result of excessive light spill from non-directional street lighting present along both sides of the hedgerow and in the retail centre (**Plate 7**). One species of bat was recorded along the hedgerow- Leisler's bat *Nyctalus leisleri*.

Other mammals

No signs of badger or other protected mammals were noted within the subject lands during surveys, rat droppings were frequently observed through the site. Foxes were seen during several of the site visits and rabbits were found to be burrowing under the hedgerow.

Amphibians

The drainage ditch onsite was examined for signs of amphibians during site visits. No signs of amphibians were noted, however, the drainage ditch represents suitable breeding habitat for these species.

Birds

The lands contain a range of garden and woodland bird species common in a sub-urban setting. The following bird species were recorded within the subject lands; blackbird *Turdus merula*, magpie *Pica pica*, blue tit *Parus caeruleus*, pied wagtail *Motacilla alba*, wood pigeon *Columba palumbus*, hooded crow *Corvus corone cornix,* song thrush *Turdus philomelos*, dunnock *Prunella modularis*, robin *Erithacus rubecula*, great tit *Parus major* and wren *Troglodytes troglodytes*.

Breeding bird behaviour was recorded predominantly within and adjacent to the hedgerow onsite. Bird species breeding onsite include magpie, blue tit, great tit, robin, wren, wood pigeon, hooded crow, dunnock and blackbird. Bird activity was also noted within the 'Dry meadows and grassy verges/ recolonising bare ground' habitat.

6.4 Impact Assessment

6.4.1 Summary of Key Ecological Features

The following ecological features are considered to be KERs in relation to the proposed development and its potential construction and/or operational impacts:

I. Bats

Bats are considered to be KERs on a precautionary basis as all bats and their roosts are protected under the Wildlife Acts and under the Habitats Directive. Two trees located within the proposed development site contained potential roost features (PRFs) that may be utilised by bats and a hedgerow with associated drainage ditch that could be used as a foraging and commuting route.

II. Breeding Birds

Breeding birds are considered to be KERs for the protection of breeding birds within the proposed site based on a precautionary approach due to their protection under the Wildlife Acts, the presence of suitable breeding bird habitat (*e.g.* hedgerow and scattered trees within the amenity grassland) across the proposed development site and the breeding bird behaviour recorded.

III. Hedgerows

Hedgerows (WL1) within the study area provide potential roost, foraging and commuting habitat for bats and suitable breeding habitat for birds, subsequently they have been included as a KER for their function in supporting the local bat and breeding bird population.

IV. Drainage ditch

The drainage ditch (FW4) within the study area is considered to be a KER as it is present within the hedgerow and due to its potential to support breeding amphibians.

V. Amphibians

Although no signs of amphibians were recorded in the drainage ditch during the site visits, amphibians are considered to be KERs based on a precautionary approach due to their protection under the Wildlife Acts, the presence of suitable breeding habitat *i.e.* the drainage ditch (FW4) and due to the records of common frog *Rana temporaria* in the vicinity of the proposed development.

Table 6-5 summarises all ecological features identified as KERs based on the completion of the desk study and field survey of the subject lands. KERs have been identified as at risk of potentially significant impacts via a source-pathway-receptor link.

Table 6-5: Ecological evaluation of Key Ecological Receptors (highlighted in grey)

Habitat/ Species	Highest Ecological Valuation Level	Key Ecological Receptor?
Designated sites		
European sites	International Importance	No
Proposed Natural Heritage Areas	National Importance	No
Fauna		
Roosting/ Foraging/ Commuting Bats	Local Importance (Higher value)	Yes
Breeding Birds	Local Importance (Higher value)	Yes
Amphibians	Local Importance (Higher value)	Yes
Habitats & Flora		
Buildings and artificial surfaces (BL3)	Local importance (Lower value)	No
Dry meadows and grassy verges (GS2)/ Recolonising bare ground (ED3) mosaic	Local importance (Lower value)	No
Hedgerow (WL1)	Local Importance (Higher value)	Yes
Drainage ditch (FW4)	Local Importance (Higher value)	Yes
Amenity grassland (improved) (GA2)	Local importance (Lower value)	No

6.4.2 Do Nothing

Under the do-nothing scenario, it is likely that the site would continue to offer suitable habitat for roosting, commuting and foraging bats and nesting habitat for breeding birds.

6.4.3 Construction Phase

6.4.3.1 Breeding birds

Bird species are protected under the *Wildlife Acts 1976-2012* and it is an offence to disturb birds while on their nests, or to wilfully take, remove, destroy, injure or mutilate their eggs or nests. In the absence of adoption of protocols for the protection of birds and their nests, there is potential for direct impacts on nesting birds and/or mortality of birds arising from the clearance of vegetation within the subject lands. Vegetation removal required to facilitate the construction of the proposed development includes habitat loss of hedgerow and dry meadows and grassy verges.

It is possible that birds currently using the site and its environs may be disturbed as a consequence of habitat removal, increased noise and human activity levels in the construction zone of the proposed development. This disturbance could potentially result in the temporary displacement of birds within the construction zone and as a result, a potential reduction in the breeding success of such birds during this

period. This impact is considered to be temporary and restricted to the construction phase of the development and post construction until replacement trees are planted and birds in the locality habituate to the increased levels of noise and human activity. Birds recorded within the subject lands are typical garden and sub-urban species which are considered to tolerate increased levels of disturbance providing suitable habitat remains. Additionally, suitable alternative breeding and feeding bird habitat is available to the north of the proposed site in Santry Demesne and to the south-east in Santry Park, both of these areas are zoned as *"OS- Open Space"* to "*Preserve and provide for open space and recreational amenities"*. In the *Fingal Development Plan 2017-2023*[9] and therefore will not be developed during the current development plan. Overall, the development is predicted to result in a temporary significant impact on breeding birds at a local scale.

6.4.3.2 Bats

All bat species in Ireland are protected under the *Wildlife Acts 1976-2012*. Water sources such as drainage ditches provide breeding habitat for insects that bats feed on such as midges and flies. As part of the development, it is proposed to infill the ditch located along the eastern boundary of the site. This will result in a loss of potential foraging opportunities for bats.

The permanent loss of hedgerow connectivity will result in the loss of potential commuting and foraging habitat. Impacts would be significant at a local scale.

6.4.3.3 Hedgerows

The drainage ditch acts as a physiological barrier to root development, works to be carried out during the construction phase of the development are therefore unlikely to damage the mature trees. It is proposed to cut routes through the hedgerow to allow access to the proposed development off Northwood Avenue. The removal of trees, hedges and thicket to facilitate this will result in habitat fragmentation of the hedgerow and reduce its suitability to support fauna. Therefore, the development is predicted to result in a permanent significant impact on hedgerows at a local scale.

6.4.3.4 Drainage ditch

It is proposed to permanently remove the drainage ditch. The hedgerow and presumably, the associated drainage ditch present along the eastern boundary of the site, is a historical feature (can be viewed on maps from the 1830s, available at map.geohive.ie/mapviewer.html). From examination of the EPA Envision MapViewer, it is likely that this ditch is a remnant of the Ballymun stream. Although no signs of amphibians were recorded during the site visits, the drainage ditch provides suitable breeding habitat for amphibians and it may be periodically used by these species at other times. It also provides suitable breeding habitat for insects that birds and bats may feed on. The development is predicted to have a permanent significant impact at a local scale.

6.4.3.5 Amphibians

Loss of the drainage ditch onsite will result in the loss of all wetland habitat within the proposed development site. Although no amphibians were recorded during the surveys, the drainage ditch represents potentially suitable breeding habitat for amphibians, particularly frogs. Therefore, the development is predicted to have a permanent significant impact at a local scale.

6.4.4 Operational Phase

6.4.4.1 Breeding birds

It is possible that birds using the site and environs may be temporarily disturbed as a result of increased noise and human activity levels during operation of the proposed development. This could potentially result in the temporary disturbance and displacement of birds until they habituate to the increased levels of noise and human activity. Birds recorded within the subject lands are typical garden and sub-urban species which are considered to tolerate increased levels of disturbance providing suitable habitat remains which birds use

as a refuge. Additionally, suitable alternative breeding and feeding bird habitat is available to the north of the proposed site in Santry Demesne and to the southeast in Santry Park, both of these areas are zoned as *"OS- Open Space"* to "*Preserve and provide for open space and recreational amenities"*. In the *Fingal Development Plan 2017-2023*[9] and therefore will not be developed during the current development plan. Overall, the development is predicted to result in a temporary significant impact on breeding birds at a local scale.

6.4.4.2 Bats

During operation of the project, it is not anticipated that noise, light and human presence will increase significantly over the existing baseline for the proposed development site. The area is currently well lit and subject to high levels of human activity due to its proximity to a housing estate and a retail centre. Therefore, the operation of the project will result in no significant impacts to bats.

6.4.4.3 Hedgerows

It is proposed to cut paths through the hedgerow within the proposed development site, which will increase human disturbance in the area. This may result in negative impacts such as damage to trees, litter, trampling of ground flora and disturbance to fauna.

6.5 Mitigation Measures

6.5.1 Construction Phase

6.5.1.1 Breeding birds

The following mitigation measures are proposed to comply with legislation protecting birds and their nests:

> **BBM1**: In order to avoid disturbance of breeding birds, their nests, eggs and/or their unflown young, all works involving the removal of trees or hedgerows will be undertaken outside of the nesting season (1st March to 31st August inclusive).
>
> **Or where this seasonal restriction cannot be observed then:**
>
> **BBM2**: A breeding bird survey will be undertaken during the appropriate survey season (between early March and late June) by an ecologist with experience undertaking breeding bird surveys in order to confirm whether birds are nesting within suitable habitat affected by or immediately adjacent to the subject lands. Should nesting birds be encountered during surveys, the removal of trees or hedgerows may be required to be delayed until after the nesting season (1st March to 31st August inclusive).

6.5.1.2 Bats

The following mitigation measures are proposed to ensure compliance with legislation within the Wildlife Acts 1976-2012 which protects bats and their roosts:

> **BM1:** Two trees located within the proposed development site contained suitable features for roosting bats. If these trees are scheduled for removal at any stage of the development, as a precautionary measure, it is recommended that the potential bat roost trees are inspected by an experienced ecologist for the presence of bats. They will then be section-felled using controlled rigging under the supervision of an experienced ecologist. If bats are present, the relevant works will have to cease and NPWS will have to be contacted in order to obtain a derogation licence.

6.5.1.3 Hedgerows

The following mitigation measures are proposed to protect the hedgerow located on the proposed development site and to comply with the Tree Preservation Order (TPO) granted for the trees within it. These measures will ensure compliance with the legislation within the Planning and Development Acts 2000 (as amended).

HM1: In order to preserve the trees to be retained within the hedgerow, the root protection area must be calculated by a qualified arborist. Protective barriers must be installed to exclude construction activities from the root protection area of the trees.

6.5.1.4 Amphibians

AM1: An amphibian check will be carried out by an experienced ecologist prior to works to infill the drainage ditch to ensure that no protected species are present. Should amphibians be encountered during this check, works must be delayed in order to apply for a derogation licence to the NPWS to allow for the disturbance of amphibians.

6.5.2 Operational Phase

6.5.2.1 Bats

BM1: Lighting proposals for the operational phase have been reviewed by an ecologist. The remaining parts of the hedgerow will be kept as dark as is feasibly possible and the lighting columns will be fitted with baffles as appropriate to minimise light spill.

6.5.2.2 Hedgerows

HM1: The sections of remaining hedgerow will be kept intact and planted with a range of native species. This will prevent further deterioration of the habitat.

6.5.3 Compensation Measures

6.5.3.1 Hedgerows

HC1: The remaining sections of the existing hedgerow will be enhanced with a range of native herbaceous and tree/ shrub species.

6.6 Monitoring Measures (Construction and Operational)

No ecological monitoring is proposed as part of this development.

6.7 Cumulative Impact

The subject lands are currently zoned as "*ME- Metro Economic Corridor*" with the zoning objective to "*Facilitate opportunities for high density mixed use employment generating activity and commercial development, and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor"* within the *Fingal Development Plan 2017-2023*. With the exception of Santry Demesne to the north and Santry park to the east and south-east, the surrounding lands will be largely developed under current zoning as *"ME- Metro Economic Corridor"* and *"RS- Residential"*,

There are numerous granted planning permissions for residential and industrial developments in the vicinity of the proposed site. Planning permission was granted to Cosgrave Property Developments Ltd. in 2015 for the construction of 355 no. residential units on a site adjacent to the proposed development (planning reference F15A/0440). This development is currently under construction. This residential development and other residential and industrial developments in the vicinity are likely to be in construction at the same time

as the proposed development. In this case, there is potential for cumulative impacts to arise, as a consequence of the proposed development acting in-combination with other plans and projects, on water quality in the downstream surface water environment and on disturbance to fauna. It is considered that these potential cumulative impacts would be temporary and occur at a significant local geographical scale.

There is also potential for cumulative impacts on fauna in the area to arise as a result of infilling the drainage ditch and fragmentation of the hedgerow. It is considered that these potential cumulative impacts would be permanent and occur at the local geographic scale.

6.8 Residual Impact

6.8.1.1 Bats

Following the implementation of mitigation measures, residual impacts on bats are considered to be reduced but will remain significant at a local level. This is because there will be habitat fragmentation of the hedgerow which reduces its suitability for use by bats as a commuting and foraging route. Additionally, the infilling of the drainage ditch will decrease foraging opportunities for bats.

6.8.1.2 Hedgerows

Following the implementation of mitigation and compensation measures to protect the remaining pieces of hedgerow, residual impacts on hedgerows are considered to be reduced but will remain significant at a local level. This is because habitat fragmentation will reduce the ability of the hedgerow to support fauna. The proposed paths through the hedgerow will increase human disturbance in the area and may result in damage to trees, trampling of ground flora, litter and disturbance to fauna.

6.8.1.3 Drainage ditch

As it is proposed to infill the drainage ditch, the proposed development will result in the permanent loss of wetland habitat from the site. This is considered to be a significant residual impact at the local scale.

6.8.1.4 Amphibians

As it is proposed to infill the drainage ditch, the proposed development will result in the permanent loss of potential amphibian breeding habitat from the site. This is considered to be a significant residual impact at the local scale.

6.9 References

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7 LAND, SOILS AND HYDROGEOLOGY

7.1 Introduction

This section outlines the environmental effects of the proposed residential project on the Land and Soils environment (including Hydrogeology).

Kieran O'Dwyer is an Associate Director with J. B. Barry and Partners Limited responsible for the environmental and hydrogeological and land and soils elements of development projects. He holds a degree in civil engineering from University College Dublin (1981). He has over 35 years' experience in environmental and hydrogeological consultancy (J. B. Barry and Partners Limited (JBB), WYG and K. T. Cullen) and has managed the environmental element of numerous infrastructure projects throughout Ireland (including the Ringsend Wastewater Treatment Plant (WwTP) Upgrade Project and the Associated Regional Biosolids Facility (Land and Soils and Water), The Lesotho Highlands Water Project, the N81 Route Selection Study and Moville Greencastle Sewerage Scheme Planning Application and EIAR). He carried out the hydrology and hydrogeology assessment for the Greater Dublin Drainage EIAR (and oral hearing) and has presented specialist evidence at numerous other oral planning hearings. He has also provided expert witness testimony relating to hydrogeological issues in the High Court and District Court. He has presented technical papers on groundwater to Engineers Ireland and the International Association of Hydrogeologists (IAH) as well as providing workshops on groundwater vulnerability and source protection to various local authorities and the Environmental Protection Agency .

This section should be read in conjunction with the site layout plans for the site and project description provided in **Chapter 5** of this EIAR.

7.1.1 Scoping

Scoping of the proposal identified the following issues for consideration in the EIAR:

This section outlines the environmental effects of the proposed residential project (described in **Chapter 5**) on the Land and Soils environment (including Hydrogeology).

- What will the land take be?
- What are the baseline characteristics of the soil, geology and hydrogeology of the subject site and its environs in the context of its local and regional geological setting?
- What are the implications of inserting the proposed development on the soil, geology and hydrogeology of the subject site and its environs?

7.2 Assessment Methodology

This section of the EIAR was prepared having regard to:

- *Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);*
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);*
- *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) (EPA, August 2017);*
- *Advice Notes for Preparing Environmental Impact Statements (Draft) (EPA, September 2015); and*
- *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).*

- *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI 2013)*

The following methods were used in assessing the baseline conditions and potential impact on the land, soils and hydrogeological environments:

Desk-top study:

Information on the land, soils and hydrogeology has been obtained from the following sources:

- *GSI Bedrock Geological Map of Ireland;*
- *GSI Groundwater and Geology Mapping Databases;*
- *GSI Quaternary Geology Map of Ireland;*
- *EPA – website mapping and database information;*
- *NPWS – Protected Site Register;*
- *Ground Investigations Ireland; Santry Demense, Northwood Ground Investigation Report;*

Site-specific Site Investigations:

Site-specific investigations have been carried out to establish subsurface conditions at the site and these are summarised below in **Table 7-1**.

Table 7-1: Site Investigation Summary

Contractor	Description of Investigation	Details of Investigation	Date of Works
Ground Investigations Ireland	Santry Demesne Northwood, Ground Investigation Report	4 No. Cable Percussion Boreholes Geotechnical and Environmental Laboratory testing	April 2019

The Site Investigation Report was reviewed and used and assisted in the development of a conceptual model of the subsurface conditions.

7.2.1 Assessment Approach

The aspects of the project that interact with and effect the receiving/existing land and soils environment were examined.

The likely significant effects of the proposed development on land, soils and hydrogeology are discussed, and the measures to mitigate adverse impacts are described. Adverse impacts are those that result in a detrimental effect to the current environment, i.e. deterioration in groundwater quality, contamination of soils. The effects are assessed terms of Quality, Significance, Magnitude, Probability, Duration, and Types. This approach considers both the importance of each environmental receptor and the magnitude of the potential environmental impacts arising from the proposed project on that receptor and the significance of the impact.

The attributes and impacts assessed were:

- Excavation and Earthworks, Surplus and Unsuitable Soils (extent of topsoil and subsoil cover and the potential use of this material on site or requirement to remove it off-site as waste for disposal or recovery).

- Karst Features.
- Classification (regionally important, locally important) and extent of aquifers underlying the study area perimeter and increased risks presented to them by construction and operation related activities associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
- Groundwater resources. Dewatering and local groundwater supplies.
- Groundwater quality. Vulnerability to contamination.
- Reduction in Recharge area.
- Accidental Spillages - Contamination of Soils and Groundwater.
- Groundwater-fed ecosystems and the increased risk presented by the construction and operational phases of the proposed development both spatially and temporally.
- Landfills and contaminated land within and in the vicinity of the site.
- Economic Geology Quarry reserves.
- Geological Heritage.

7.2.2 Assessment Criteria

This assessment of impacts follows guidelines established by the TII/NRA in its *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009*).

The significance of impacts on specific receptors are considered in terms of the magnitude of the effect/impact of an element of the project on a receptor and the importance of that receptor.

The Criteria for rating the importance of Environmental Attributes are shown in **Table 7-2**.

Table 7-2: Criteria for Rating Importance of Site Attributes - (NRA 2009)

Importance	Criteria	Typical Example
Geology		
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit. Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or high fertility soils Moderately sized existing quarry or pit. Marginally economic extractable mineral resource

Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils Uneconomically extractable mineral resource.
Hydrogeology		
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – e.g. NHA status. Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes. Potable water source supplying <50 homes.

The magnitude of the effect/impact can be assessed based on the criteria shown in **Table 7-3** and the significance of the impact which is a combination of impact magnitude and attribute importance is show in **Table 7-4**.

Table 7-3: Estimation of Magnitude of Impact

Magnitude of Impact	Criteria
Large Adverse	Results in loss of attribute and / or quality and integrity of attribute
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity

Table 7-4: Rating of Significant Environmental Impacts

Importance of Attribute	Magnitude of Impact			
	Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/ Moderate

7.3 Baseline Scenario (Existing Environment)

7.3.1 Site Description

It is proposed to construct a new residential development with associated services, access roads and underground car parking. The site is located at off Northwood, Santry, Dublin 9 to the east of Gulliver's Retail Park. The Santry River flows in an easterly direction to the north of the proposed development. The proposed development can be accessed from the west via Ballymun Road and Northwood Avenue and from the east via Swords Road and Northwood Avenue. The site was originally a greenfield site and part of the site is being used as a temporary carpark for construction workers on the Northwood – adjacent development currently being built. This adjacent development is due to be completed during Q 4, 2019.

The Huntstown Quarry, which is operated by Roadstone Dublin Ltd., is located approximately 4.5km to the west of the site.

7.3.2 Geology

7.3.2.1 Regional Bedrock Geology

The Regional Bedrock Geology is shown in **Figure 7-1**. The site is underlain by the Lucan Formation comprising dark shaley limestone known as Calp. The Lucan Formation contains regularly NW/SE trending faults and is bounded to the north by the by the Tober Colleen Formation (on the opposite side of the M50. The Tober Colleen Formation is made up of calcareous shale, limestone conglomerate. These carboniferous rocks are overlain by low permeability limestone derived glacial tills known as the Dublin Boulder Clay.

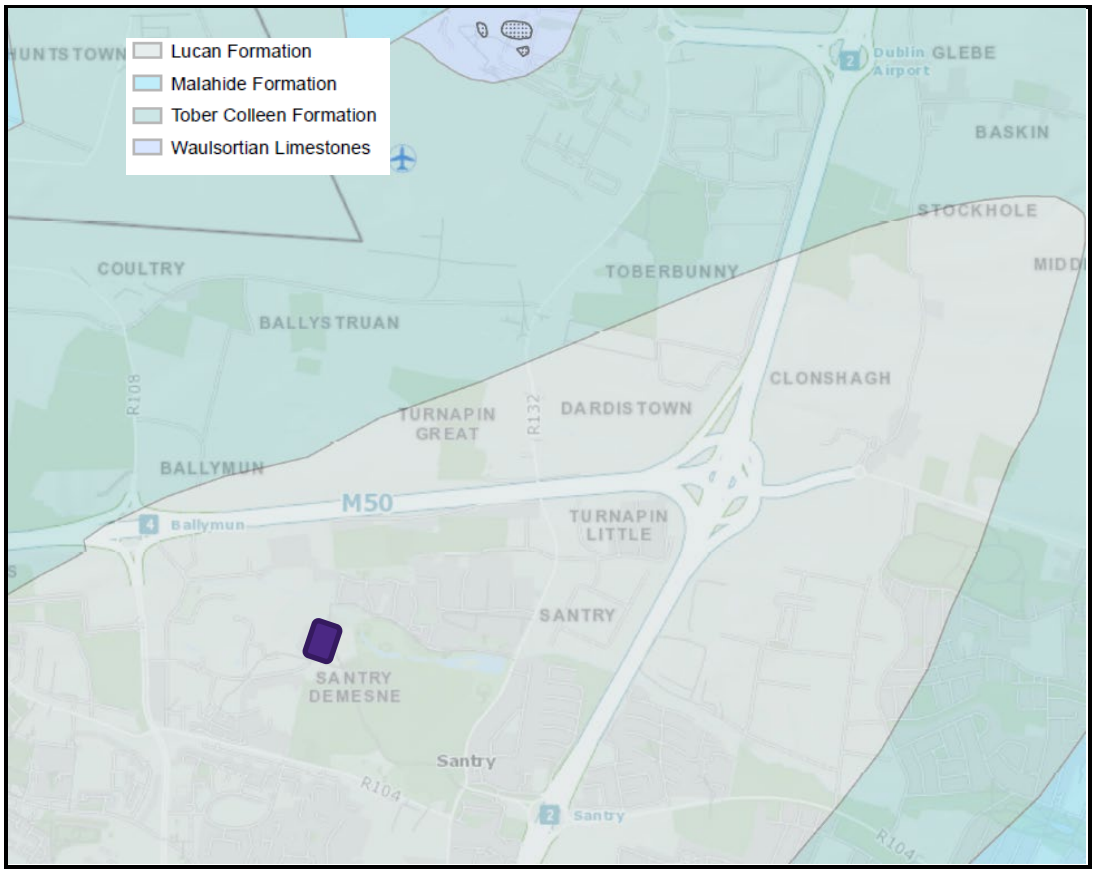

Figure 7-1: Bedrock Geology (GSI web-mapping online viewer www.gsi.ie)

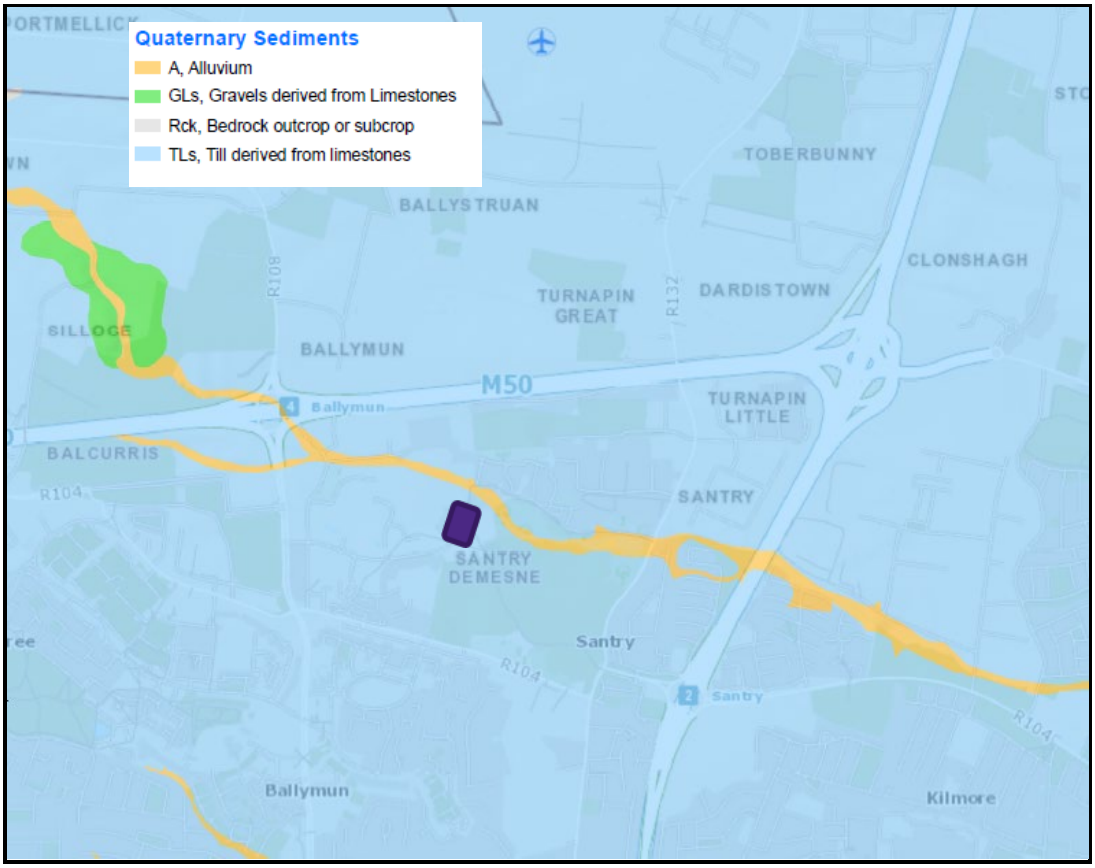

Figure 7-2: Quaternary Geology (GSI web-mapping online viewer www.gsi.ie)

7.3.2.2 Encountered Bedrock Geology

Site investigations were undertaken in 2019 and the report is contained in **Volume 3, Appendix 7.1** of this EIAR. The works included 4 No. Cable Percussion boreholes drilled to a maximum depth of 8.00m BGL. The locations of these site investigation points are shown on **Figure 7-3**. The drilling confirmed that the site is underlain by Dublin Boulder Clay.

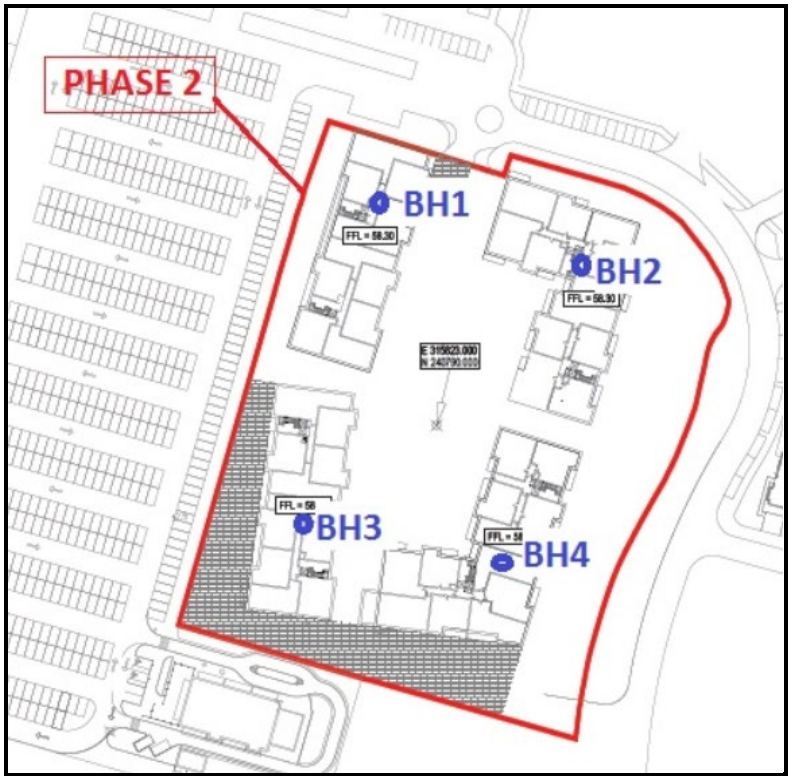

Figure 7-3: Location of Site Investigations points

7.3.2.3 Quaternary Deposits

The GSI Quaternary Geology Map of Ireland (**Figure 7-2)** indicates that the northern portion of the site is underlain by poorly drained limestone tills to the northwest and by well drained limestone tills to the southeast. Further information was provided by the cable percussive boreholes drilled as part of the 2019 site investigations.

Topsoil / Surfacing

Topsoil or Tarmacadam was encountered in all the exploratory holes and was present to a maximum depth of 0.20m BGL.

Made Ground

As the area has been partially developed, there are areas where roads and other made ground is present. Made ground deposits were encountered in all the exploratory holes beneath the Topsoil/Surfacing and was present to a relatively consistent depth of between 0.40m and 0.90m BGL. These deposits were described generally as *grey fine to coarse angular Gravel Fill* and *brown slightly sandy Clay with rare red brick fragments.*

Cohesive Glacial Tills

Cohesive deposits were encountered beneath the Made Ground in all the exploratory holes. They were described typically as *soft/firm brown sandy slightly gravelly CLAY* overlying a *stiff grey slightly sandy gravelly CLAY with occasional cobbles* and finally a *stiff dark grey/black slightly sandy gravelly CLAY with occasional cobbles*. The strength of the cohesive deposits typically increased with depth and was stiff below 2.60m BGL in all the exploratory holes. These deposits had occasional cobble and boulder content where noted on the exploratory hole logs.

Excavations for the underground car park for the adjacent development element of the development encountered stiff cohesive boulder clay. No groundwater inflows were observed and no dewatering was required.

Firm to stiff cohesive glacial material is considered suitable for building foundations. Any soft organic cohesive till material beneath the proposed building foundations or roads should be excavated to a depth where suitable soils are encountered. No such soft material was encountered.

7.3.2.4 Contaminated Soils

Environmental testing, consisting of the Rilta suite for assessing sample contaminants was carried out as part of the Site Investigation. No evidence of soil contamination or illegal dumping was indicated by these analyses.

7.3.3 Summary of Ground Conditions

Using the subsurface information from geotechnical investigations and published data, an inferred conceptual site model has been developed to characterise the soil and rock strata and is presented in **.**

Table 7-5. Based on the regional and site-specific information available the type of Geological / Hydrogeological Environment as per the IGI Guidelines is:

Type A – Passive geological / hydrogeological environment. (passive geological environments – areas of thick low permeability subsoils).

Table 7-5: Conceptual Site Model

Unit	Material	Description	Depth to Top of Unit (m bgl)	Range of Unit Thickness* (m)
1	Topsoil	Soft slightly gravelly SILT	0.0	0.2
2	Tarmacadam		0	0.1
3	Fill	Grey fine to coarse angular Gravel Fill	0.1 – 0.2	0.2
4	Made ground (possible)	Light brown slightly sandy Clay with rare red brick fragments	0.2-0.4	0.0-0.5
4	Cohesive Glacial Tills	Boulder clay	0.4 – 0.9	>6.1 – >7.5
6	Bedrock		Unproven	Unproven

7.3.4 Karst Features

Karst is the name given to a landscape characterised by remarkable surface and underground forms, created from the action of the water on the permeable limestones. Surface and underground features occur where fissures and fractures have been widened by dissolution to allow the passage of groundwater. As

groundwater flows through fissures and fractures, the rock is dissolved to form caves and caverns of varying sizes that are referred to as ‘solution features’.

A review of the GSI karst database indicated there are no karst features within 5 km of the proposed site

7.3.5 Economic Geology

There are no active quarries within 4km of the site.

7.3.6 Geological Heritage

A review of the GSI’s Geological Heritage Sites, indicated that there are no County Geological Sites (CGS) identified within 4 km of the site.

7.3.7 Radon

The EPA Radon map indicates estimated less than 1% of dwellings will exceed the Reference Level of 200 Bq/m3. This is an extremely low level and indicates that there is no risk from Radon on the proposed site.

7.3.8 Land Use

The area of the proposed development site is 1.49 ha. Approximately 50% provides a temporary car park for the construction of adjacent development. The remaining area is undeveloped land that is not being used for any particular purpose.

7.3.9 Hydrogeology

Aquifer classification and groundwater vulnerability classifications are sourced (and refined using site specific SI data) from the GSI Groundwater mapping program and refined using the site-specific SI data.

7.3.9.1 Aquifer Classification

The GSI mapping indicates that the proposed site is underlain by the Lucan Formation. The overall GSI aquifer classification (**Figure 7-4**) for this formation is "Li" (locally important aquifer moderately productive only in local zones). The aquifer has no primary porosity and flow is fracture controlled.

The underlying Groundwater Body (GWB) is the Dublin Groundwater Body (EU code: IE_EA_G_008). This GWB is described as a poorly productive bedrock aquifer. The water quality status of this GWB is “good” and it is not considered at risk of deterioration.

The area is served by public supply water mains and it is unlikely that the aquifer will be developed for public water supply.

The locally important bedrock aquifer in the Lucan Formation (Calp) is confined by the Dublin Boulder Clay. The low permeability boulder clay deposits above bedrock represent “aquitards” which limit infiltration and restrict percolating water from reaching the bedrock aquifer.

The boulder clay does not constitute an aquifer due to its very low permeability. Boreholes constructed during the site investigations did not encounter any groundwater inflows. There were no groundwa6ter inflows noted during the excavations associated with the adjacent development.

The importance of the locally important aquifer is classified as low/moderate.

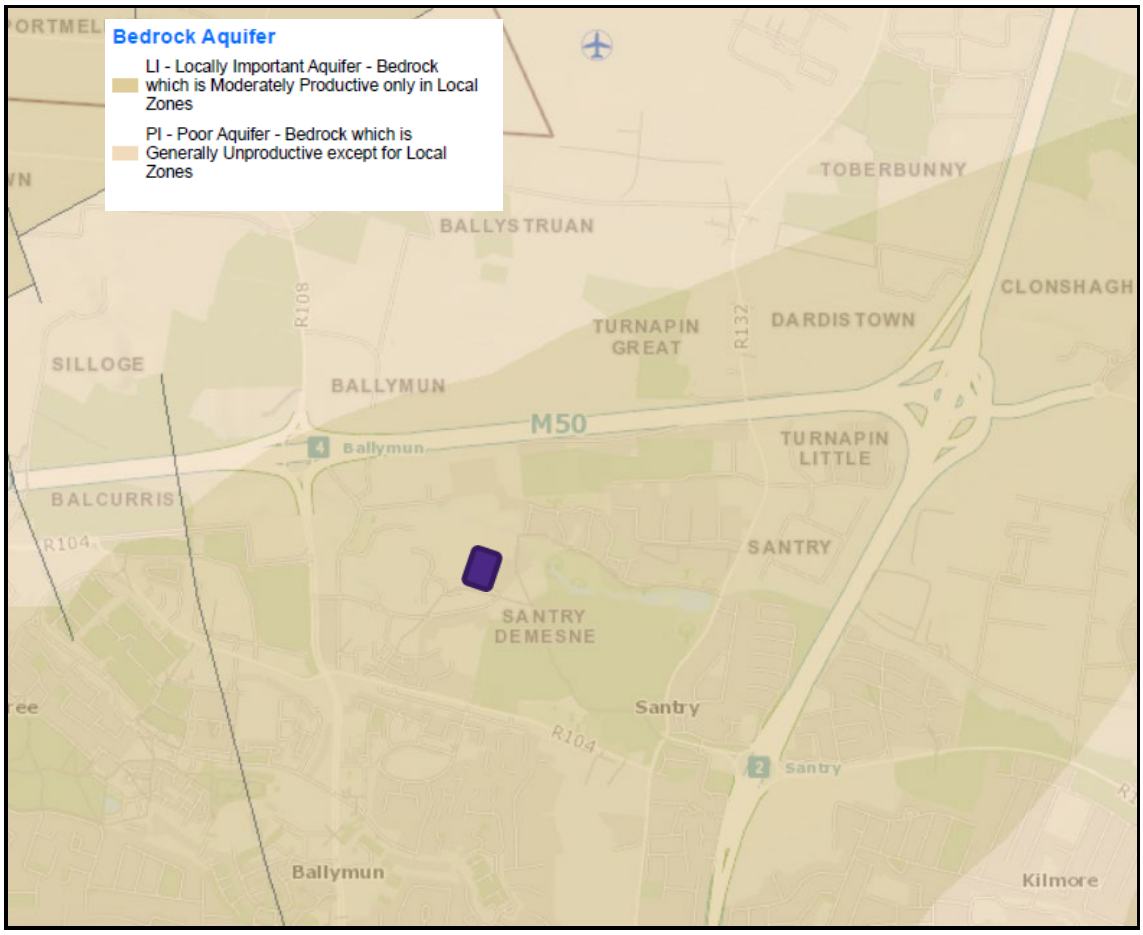

Figure 7-4: Bedrock Aquifers (GSI web-mapping online viewer www.gsi.ie)

7.3.9.2 Groundwater Dependent Terrestrial Ecosystems

There are no groundwater dependent terrestrial ecosystems within 15 km of the proposed site.

7.3.9.3 Groundwater Vulnerability

Groundwater vulnerability provides an indication of the ease at which potential contaminants can migrate downwards from the surface to the underlying aquifer. The GSI groundwater mapping website indicates that the vulnerability (**Figure 7-5**) is classified as being “low” (<10m of low permeability overburden).

Table 7-6: GSI Vulnerability Mapping Guidelines

Vulnerability Classification	Subsoil Permeability (Type & Thickness)			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. sandy subsoil)	Low permeability (e.g. clayey subsoil, clay, peat)	(Sand / Gravel Aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 – 3.0m	0 – 3.0m	0 – 3.0m	-
High (H)	>3.0m	3.0 - 10.0m	3.0 – 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 – 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

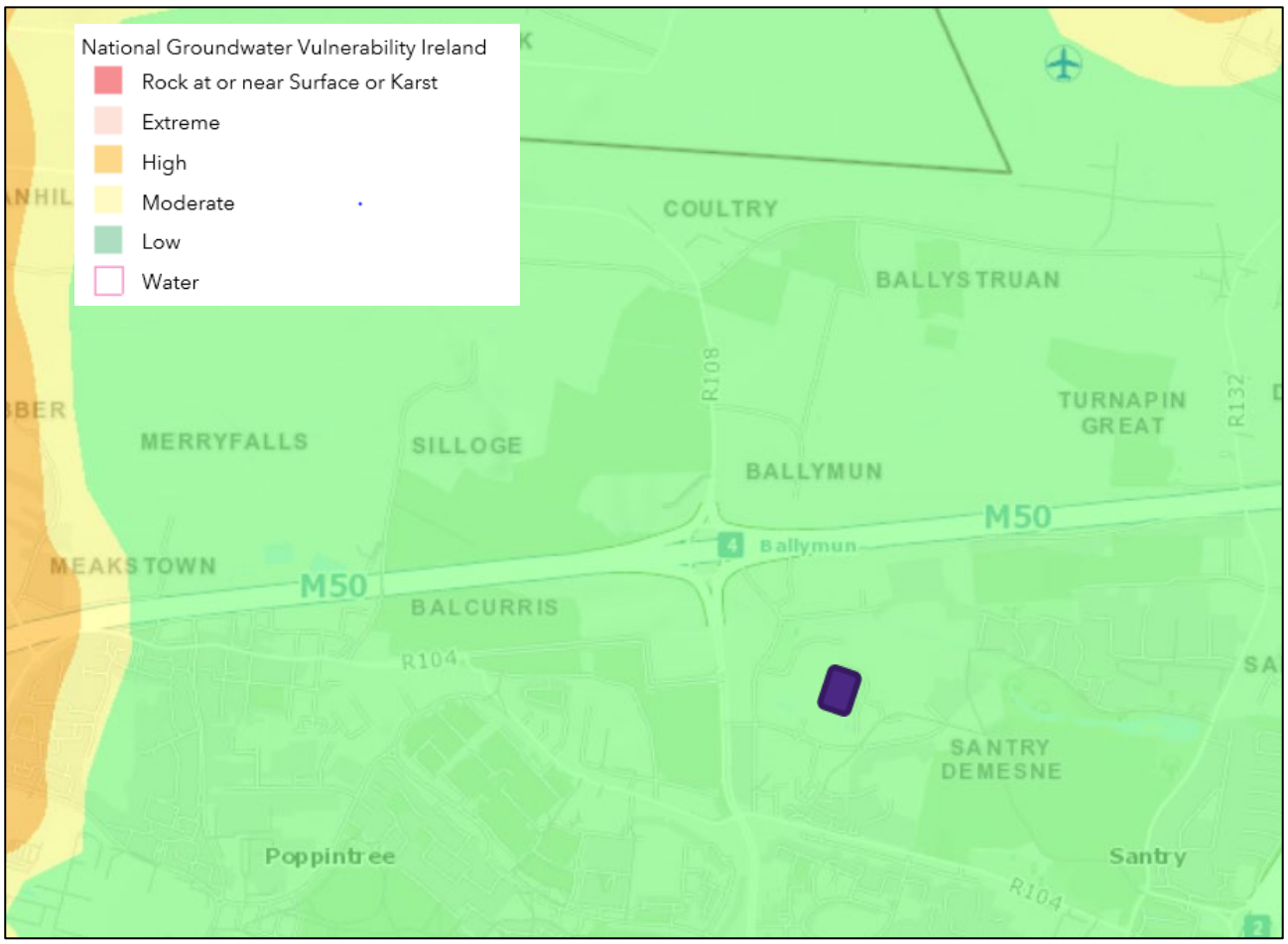

Figure 7-5: Groundwater Vulnerability (GSI web-mapping online viewer www.gsi.ie)

7.3.9.4 Groundwater Users

There are no public groundwater supply wells within 10 km of the site and consequently there are no associated groundwater source protection schemes within 10 km.

The area is served by public water mains and therefore it is unlikely that there are any water supply wells in the area. The GSI groundwater mapping data base does show some wells in the vicinity. However, there is no record of groundwater wells within 500 km of the site (**Figure 7-6**). The nearest recorded groundwater wells are on the far side of the M50.

The depths of these wells range from 35 to 92 metres below ground level. Bedrock was encountered from between 10 – 23m bgl. The well yields are reported to be between 87 and 300 m^3/day.

7.3.9.5 Groundwater Quality

The groundwater of the Dublin GWB is classified as having 'Good Status. The WFD risk score is 2b, 'Expected to achieve good status'. The samples analysed as part of the site investigation undertaken in 2019 show no evidence of contamination. The results are listed in the Site Investigations report in the **Volume 3 Appendix 7.1**.

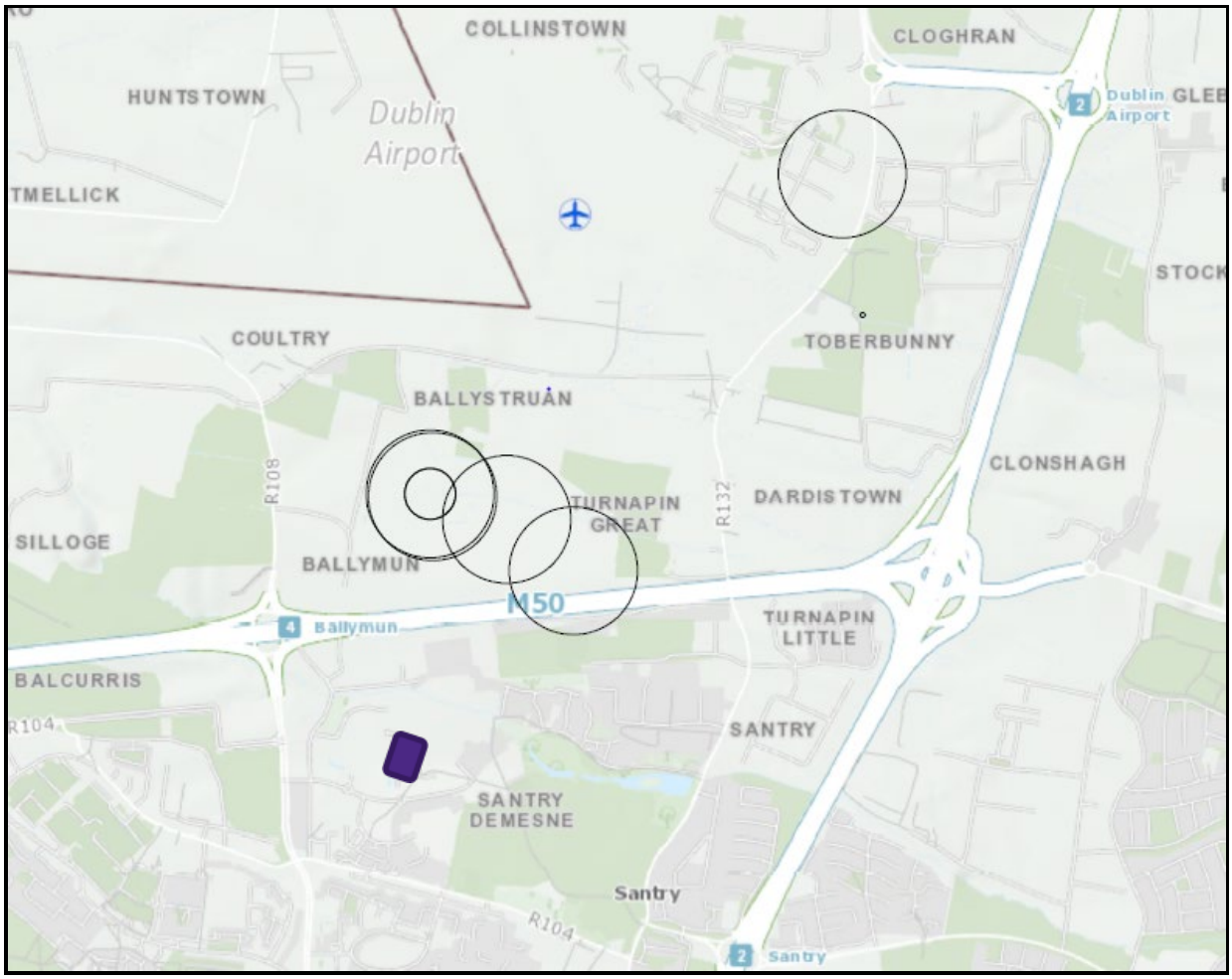

Figure 7-6: Groundwater Wells from GSI Data Base (GSI web-mapping online viewer www.gsi.ie)

7.4 Characteristics of the Project

The proposed development will consist of 331 apartments in four separate blocks, with mixed use commercial units and a childcare facility at ground floor level over basement car parking, and all associated site works including roads, footpaths, landscaping, site services, SUDS measures and sundry related works.

The following are the aspects of the project that interact with the Land and Soils environment.

7.4.1 Earthworks

The development of the project will interact with the land, soils and hydrogeological environments during the earthworks undertaken during the construction stage. Soil will be routinely excavated to a depth of approx. 4.0 metres below ground level to build the underground car park and the site recontoured to accommodate the foundations and construction of the buildings. No dewatering will be required. Sampling undertaken during the site investigation showed no evidence of contaminated soil. The soil samples were classified as inert.

7.4.2 Water Supply

The water needs of the development will be provided by mains water.

7.4.3 Wastewater Disposal

The wastewater generated by the proposed development will be collected and piped to a public sewer.

7.4.4 Drainage

Runoff will be collected in a purpose designed drainage system. Objective SW04 of the Fingal County Development Plan 2017-2023 states: "*Require the use of sustainable drainage systems (SUDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks*". The drainage systems will be designed in accordance with the report entitled "*The Planning System and FRM Guidelines for Planning Authorities"* (2009). Surface drainage will be attenuated to greenfield runoff rates and will make allowance for climate change.

The rainfall runoff collected will be attenuated in a stormwater attenuation system prior to discharging to the Santry River. All runoff from paved areas will pass through a hydrocarbon interceptor. There will be no discharge to ground.

7.5 Impact Assessment

The effects on the Land, Soils and Hydrogeological Environments are assessed in the following sections for the construction and operation of the proposed development.

This assessment of impacts follows guidelines established by the TII / NRA in its *"Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009)".*

The significance of impacts on specific receptors are considered in terms of the magnitude of the effect / impact of an element of the project on a receptor and the importance of that receptor.

7.5.1 Do Nothing

The 'do nothing' alternative describes the circumstance where no development occurs. There will be no impact on the land, soils, geology and hydrogeology if the 'do nothing' scenario is followed.

7.5.2 Potential Impacts (Construction)

There are a number of elements associated with the development which have the potential to impact the land, soils, geological and hydrogeological environment.

7.5.2.1 Excavation and Earthworks, Surplus and Unsuitable Soils.

Excavation and removal of subsoils (to an approximate depth of 4.0 metres) will be required to accommodate construction of the underground car park, the foundations of the buildings and levelling of the site. The excavation will be in boulder clay and there will be no rock excavation required.

No soft or organic material considered not suitable as a bearing stratum for foundations is anticipated or was encountered in the Site Investigations or in the excavations for the adjacent development car park.

The soil underlying the site was subject to the Rilta suite of analyses for assessing sample contaminants Waste Acceptance Criteria (WAC). There is no evidence of soil contamination. The WAC analyses classifies the soil as inert and can be disposed of in appropriately licenced facility.

The removal of waste from the site will be carried out in accordance with Waste Regulations, Regional Waste Plan and Waste Hierarchy/Circular Economy Principals.

Disposal of waste to waste management facilities is governed by the Landfill Directive Council Directive 1999/31/EC on the landfill of waste, which classifies landfills by waste type:

- Inert;
- Non- Hazardous; and

- Hazardous.

There are suitably licenced facilities with available capacity within the Greater Dublin Area.

All excavated soils shall be disposed of in accordance with all relevant legislation including the Department of the Environment and Local Government (DoELG) (1996 to 2008), Waste Management Acts, the DoELG (1998) Waste Management (Permit) Regulations and the NRA (2008) Guidelines for the Management of Waste from National Road Construction Project. Material to be disposed of will be treated in accordance with the Landfill Directive (2003/33/EC).

All waste shall be removed by waste contractors authorised under the (Waste Management (Collection Permit) Regulations, 2007 and the Waste Management Collection Permit) (Amendment) Regulations, 2008.

Registration as a By-Product

The design of the proposed development does not facilitate the beneficial re-use of suitable excavated material on site. Consequently, the excavated material constitutes a waste and will be recovered and/or disposed off-site at appropriately authorised waste facilities. However, under the Waste Hierarchy principals, the re-use of the excavated soils is preferred to the disposal to landfill.

If the material is removed off-site for reuse as a by-product (and not as a waste), it will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. Article 27 requires that certain conditions are met and that by-product decisions are made to the EPA via their online notification form. Consequently, once a suitable project can be identified where the uncontaminated soil can be reused (infill for roads, quarry reinstatement etc) it is proposed to register the surplus soil as a by-product with the EPA.

As part of the registration with the EPA, the developer will demonstrate that the excavated soils meets the 4 by-product conditions:

a) further use of the soil and stone is certain;
b) the soil and stone can be used directly without any further processing other than normal industrial practice;
c) the soil and stone is produced as an integral part of a production process; and
d) further use is lawful in that the soil and stone fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

If EPA accepts the soils as a by-product the soils no longer constitutes a waste.

Imported Fill and Soils

If imported fill material is required, the use of local quarries or locally available material will be prioritised.

Alternatively, fill material (soils stone) from another site that has been registered as a by-product (and not a waste) in accordance with Article 27 of the Waste Directive Regulations. will be used if it is available. This will conform to the Waste Hierarchy and divert waste from landfill.

The disposal of excavated material is considered to have low importance and the magnitude of the impact on the environment is predicted to be neutral, temporary, negligible. The significance of the impact is imperceptible.

Accidental spillages could result in soil being contaminated.

7.5.2.2 Groundwater Quality

Potential impacts during the construction phase include the leakage or spillage of construction related materials on site. For example, raw or uncured concrete and grouts, wash down water from exposed

aggregate surfaces, cast-in-place concrete from concrete trucks, fuels, lubricants and hydraulic fluids for equipment used on the development site, bitumen and sealants used for waterproofing concrete surfaces can all potentially impact on soils and groundwater during construction stage. However, the vulnerability classification of the underlying aquifer has been classified as “Low”. During construction, aquifer vulnerability may be slightly increased due to a reduction in depth of overburden in areas of excavation which may increase the potential for migration of contaminants (from accidental spills) to the underlying bedrock aquifer. However, due to the thickness and the low permeability of the boulder clay overburden the impact of the reduction in overburden depth on the groundwater quality is predicted to be negligible in magnitude and imperceptible in significance, temporary in duration and unlikely.

7.5.2.3 Karst Features

There will be no impact on karst features.

7.5.2.4 Temporary Construction Dewatering and Groundwater Users

No temporary dewatering will be required to construct the underground carpark. Consequently, there will be no alteration of the existing groundwater flow regime and no impact on the available groundwater resource.

7.5.3 Potential Impacts (Operational)

There will be no direct discharges to or abstractions from the soil and hydrogeological environment during the operational phase.

7.5.3.1 Economic Geology

The loss of a high proportion of future quarry or pit reserves would be considered a significant impact, However, exploitation of rock reserves it is not considered economically viable for the Northwood site. There would be no measurable change in quarry reserves. Therefore, the impact on quarry reserves is assessed as negligible in magnitude and imperceptible in significance.

7.5.3.2 Geological Heritage

There are no geological heritage sites within 4 km of the site. The development of the proposed project will have no impact on geological heritage.

7.5.3.3 Reduction in Recharge area.

The proposed development will incorporate approximately 1.4 hectares of impermeable surfaces (roofs, roads and hardstanding areas). This will result in a reduction in recharge to the aquifer. The site is underlain by low permeability overburden which will severely restrict recharge. When compared to the overall recharge area to the aquifer, which amounts to thousands of hectares, the reduction in recharge area is insignificant. Taking into account the fact that the aquifer is only locally important and that there are very few groundwater users, the overall impact on the groundwater resource due to loss in recharge area will be imperceptible.

7.5.3.4 Accidental Spillages – Contamination of Soils and Groundwater

During the operational phase the leakage or spillage of fuels, lubricants and hydraulic fluids for equipment can all potentially impact on soils and groundwater. However, the vulnerability classification of the underlying aquifer has been classified as “Low” and is known to be low permeability boulder clay. The impact on groundwater water quality is predicted to be negligible in magnitude and imperceptible in significance, temporary in duration and unlikely.

7.5.3.5 Groundwater-fed ecosystems.

There are no groundwater dependent terrestrial ecosystems (GDTE) within 4 km of the site. There is no hydraulic connection between the surface of the site and any GDTE. The development of the proposed project will have no impact on groundwater fed ecosystems.

7.5.3.6 Radon

The EPA Radon map indicates estimated less than 1% of dwellings will exceed the Reference Level of 200 Bq/m3. This extremely low level and indicates that there is no risk from Radon on the proposed site.

7.5.3.7 Land Use

The area of the proposed development site is 1.49 ha. Approximately 50% provides a temporary car park for the construction of the adjacent development. The remaining area is undeveloped land that is not being used for any particular purpose. The site is not presently agricultural land. The impact of the development on land use development of the site will be permanent, small positive in magnitude and slight in significance.

7.6 Mitigation Measures

7.6.1 Construction Phase

As no significant impacts were predicted, no specific mitigation measures are proposed. However, in advance of work starting on site the works Contractor will prepare a Construction Environment Management Plan (CEMP) which will include the schedule of any mitigation measures included with this EIAR. The plan will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site, CIRIA 2005. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIAR and any subsequent conditions relevant to the proposed development.

The following mitigation measures have been identified which will form part of a Construction Environmental Management Plan (CEMP) which will include measures for reduction or elimination of pollution and the schedule of mitigation measures in this EIAR:

- Contractor Guidance set out in the Control of Water Pollution from Construction Sites (CIRIA, 2001) shall be adhered to. Good construction management practices will be employed. During the construction stage, all potentially harmful substances (e.g. oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds.
- Designated impermeable cement washout areas must be provided.
- All oils and fuels will be stored in bunded tanks with the provision of a storage/retention capacity of 110% of tank storage. Care and attention will be taken during refuelling and maintenance operations.
- Adequate means to absorb or contain any spillages of these chemicals will be available at all times.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996-2012.

7.6.2 Operational Phase

As there is no operational interaction or impacts on the land, soils and hydrogeological environments, no mitigation is proposed apart from good practice.

7.7 Monitoring Measures (Construction and Operational)

As all the impacts are predicted to be neutral/imperceptible, no monitoring is proposed.

7.8 Residual Impacts

The predicted overall residual impact of the proposed development on land, soils, geology and hydrogeology both during construction and operational stage will be neutral.

7.9 Cumulative Impact

As the impacts are neutral and unlikely to interact with the impacts of other existing or permitted projects, there are no cumulative impacts predicted.

7.10 Residual Impact

The predicted overall residual impact of the proposed development on land, soils, geology and hydrogeology both during construction and operational stage will be neutral.

7.11 References

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8 WATER AND HYDROLOGY

8.1 Introduction

This chapter of the EIAR will address the likely effects on Water, on all natural surface water bodies which may be effected by the construction of the proposed development. Environmental impacts related to water interact with many other topics also.

Kieran O'Dwyer is an Associate Director with J. B. Barry and Partners Limited responsible for the environmental and hydrogeological and land and soils elements of development projects. He holds a degree in civil engineering from University College Dublin (1981). He has over 35 years' experience in environmental and hydrogeological consultancy (J. B. Barry and Partners Limited (JBB), WYG and K. T. Cullen) and has managed the environmental element of numerous infrastructure projects throughout Ireland (including the Ringsend Wastewater Treatment Plant (WwTP) Upgrade Project and the Associated Regional Biosolids Facility (Land and Soils and Water), The Lesotho Highlands Water Project, the N81 Route Selection Study and Moville Greencastle Sewerage Scheme Planning Application and EIAR). He carried out the hydrology and hydrogeology assessment for the Greater Dublin Drainage EIAR (and oral hearing) and has presented specialist evidence at numerous other oral planning hearings. He has also provided expert witness testimony relating to hydrogeological issues in the High Court and District Court. He has presented technical papers on groundwater to Engineers Ireland and the International Association of Hydrogeologists (IAH) as well as providing workshops on groundwater vulnerability and source protection to various local authorities and the Environmental Protection Agency .

This section should be read in conjunction with the site layout plans for the site and project description provided in **Chapter 4** of this EIAR.

8.1.1 Scoping

Scoping of the proposal identified the following issues for consideration in the EIAR:

- What is the current capacity of the local water supply and drainage?
- What is the current surface water regime at the site and environs?
- What are the anticipated waste waters and surface waters from the new buildings during the construction and operational stages?
- How does the subject site relate to Catchment Flood Risk Assessment and Management (CFRAM)?
- What are the anticipated effects on the hydrological/water environment?

8.2 Assessment Methodology

This section of the EIAR was prepared having regard to the following;

Guidelines:

- *Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);*
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);*
- *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) (EPA, August 2017);*
- *Advice Notes for Preparing Environmental Impact Statements (Draft) (EPA, September 2015); and*

- *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).*

Desk-top study:

Information on the hydrology and surface water environment has been obtained from the following sources:

- *Base maps – Ordnance Survey of Ireland;*
- *Topographical Survey;*
- *Office of Public Works flood mapping data (www.floodmaps.ie);*
- *Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports;*
- *Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB);*
- *Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council;*
- *Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0 (Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council);*
- *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001);*
- *The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));*
- *Catchments.ie - Water quality data;*
- *www.GSI.ie - Mapping;*
- *Water quality data from the Environmental Protection Agency website (https://gis.epa.ie/EPAMaps/);*
- *Water Services Report, prepared by JB Barry and Partners Limited;* and,
- *Site Specific Flood Risk Assessment Report, prepared by JB Barry and Partners Limited.*

8.2.1 Assessment Approach

The aspects of the project that interact with and effect the receiving / existing hydrological environment are examined.

The likely significant effects of the proposed development on hydrology are discussed, and the measures to mitigate adverse impacts are described. Adverse impacts are those that result in a detrimental effect to the current environment, i.e. deterioration in water quality. The effects are assessed terms of Quality, Significance, Magnitude, Probability, Duration, and Types. This approach considers both the importance of each environmental receptor and the magnitude of the potential environmental impacts arising from the proposed project on that receptor and the significance of the impact.

The baseline hydrological environment was reviewed on the basis of the following attributes:

- **Water Quality** – The WFD water quality status provides an indication of the importance of the water body and its biological health;

- **Potable Water Supplies from Surface Water Abstractions** – There are no potable water supply abstractions from the surface water bodies near the proposed development;

- **Area Prone to Flooding** – The review of existing datasets to determine if the site is prone to flooding. The OPW records of historical floods and the flood extent maps produced under Fingal East Meath (FEM) Catchment Flood Risk Assessment and Management Study (CFRAMS) and other CFRAMS projects were used to assess whether the Proposed Project sites and pipeline route options are at risk of flooding and whether extensive flooding (historical and/or predicted) occurs immediately upstream or downstream; and

- **Ecologically Important Surface Water Ecosystems** – European sites, such as Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), and nationally designated sites, such as Natural Heritage Areas (NHA) and proposed Natural Heritage Areas (pNHA). These are discussed in more detail in **Chapter 6** Biodiversity of this EIAR.

8.2.2 Assessment Criteria

This assessment of impacts follows guidelines established by the TII/NRA in its 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009)".

The significance of impacts on specific receptors are considered in terms of the magnitude of the effect / impact of an element of the project on a receptor and the importance of that receptor.

The Criteria for rating the importance of Environmental Attributes are shown in **Table 8-1**.

Table 8-1: Criteria for Rating Importance of Hydrological Site Attributes - (NRA 2009)

Importance	Criteria	Typical Example
Geology		
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations,1988
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes

Importance	Criteria	Typical Example
		Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

The magnitude of the effect/impact can be assessed based on the criteria shown in **Table 8-2** and the significance of the impact which is a combination of impact magnitude and attribute importance is show in **Table 8-3**.

Table 8-2: Estimation of Magnitude of Impact

Magnitude of Impact	Criteria
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity

Table 8-3: Rating of Significant Environmental Impacts

Importance of Attribute	Magnitude of Impact			
	Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight/ Moderate

8.2.3 Study Area

The study area for this assessment has been defined with reference to the area in which there is potential for environmental impacts as a result of the proposed development. The study area can be defined as follows:

- Surface Water – Santry River and Dublin Bay;
- Water Supply – North Fringe Watermain; and,
- Foul Effluent – North Fringe Sewer, Sutton Pumping Station and Ringsend Wastewater Treatment Plant.

The extent of the Study Area is shown in **Figure 8-1.**

8.3 Baseline Scenario (Existing Environment)

8.3.1 Site Description

It is proposed to construct a new residential development with associated services, access roads and underground car parking. The site is located off Northwood Avenue, Santry, Dublin 9 to the west of Gulliver's Retail Park. The site drains to the Santry River which forms the northern boundary of the proposed development. The proposed development can be accessed from the west via Ballymun Road and Northwood Avenue and from the east via Swords Road and Northwood Avenue. The site was originally a

greenfield site and is being used as a temporary carpark for construction workers on the adjacent residential development currently under construction and due for completion during Q 4, 2019.

8.3.2 Surface Water Hydrology

The site is located within the upper catchment of the Santry River (**Figure 7-2**).

The Santry River has its origins at Harristown and Dubber, south of St. Margaret's. It flows to the west of Dublin Airport and parallel to the main runway. From there, it flows through Silloge, under the M50 Motorway at Ballymun, through Santry Demesne. It then passes under the M1/M50 Motorway at Santry, through Kilmore, Edenmore, Raheny and under the Dublin/Belfast railway line before discharging to Dublin Bay at North Bull Island. The river drains an area of approximately 1400 hectares.

Figure 8-1: Proposed Development Site

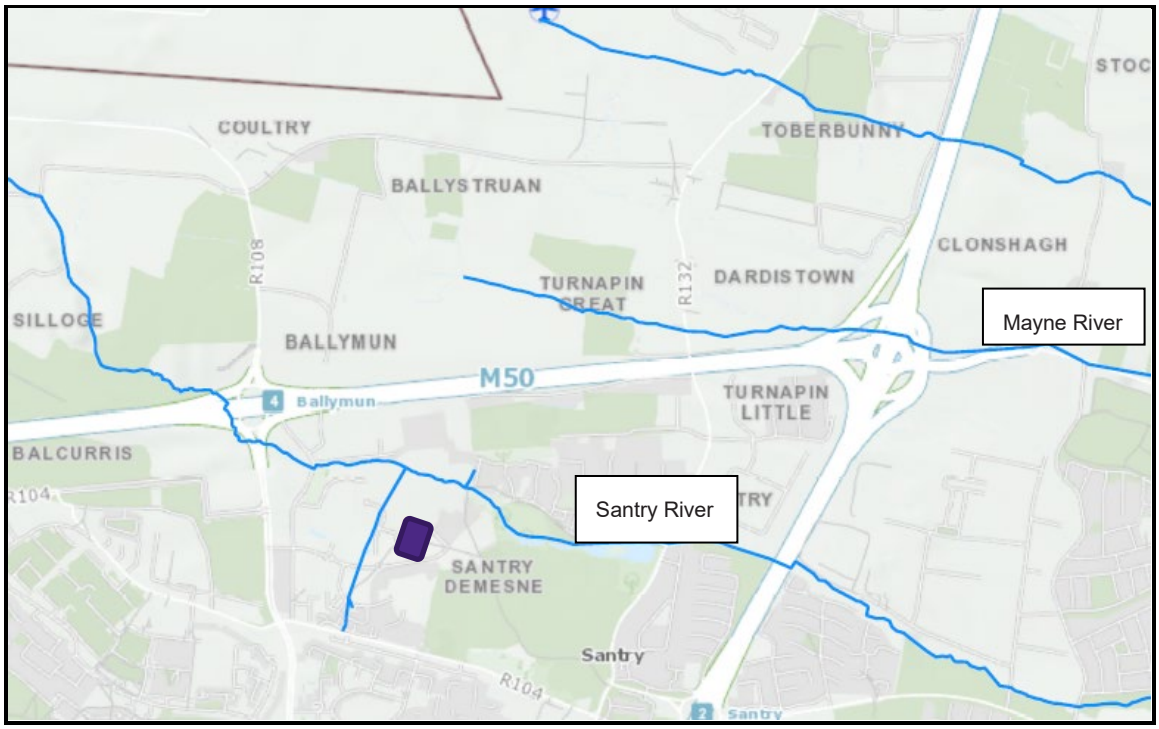

Figure 8-2: Local Rivers

8.3.3 Surface Water Quality

The EPA surveys and assesses approximately one-third of Ireland's principal rivers and their associated more important tributaries annually, which complies with the WFD Monitoring Programme (EPA 2018b). The results of the most current biological surveys are available as interactive maps on the EPA website (EPA 2018c).

The EPA assessment procedure examines four biological water quality classes, A, B, C and D, where the water quality ranges from the best or 'unpolluted' (A) to the worst or 'seriously polluted' (D. These classes, and their relationships with the Biotic Index (Q values), are presented in **Table 8-4**. Biotic indices ("Q Values") reflect average water quality at any location.

Table 8-4: EPA Scheme of Biotic Indices or Quality (Q) Values and its Relationship to Water Quality (EPA 2018d)

Biotic Index 'Q' Value*	WFD Status	Pollution Status	Condition**	Quality Class
Q5, Q4-5	High	Unpolluted	Satisfactory	Class A
Q4	Good	Unpolluted	Satisfactory	Class A
Q3-4	Moderate	Slightly Polluted	Unsatisfactory	Class B
Q3, Q2-3	Poor	Moderately Polluted	Unsatisfactory	Class C
Q2, Q1-2, Q1	Bad	Seriously Polluted	Unsatisfactory	Class D

* These Values are based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates (the young stages of insects primarily but also snails, worms, shrimps, etc.) resident at a river site.

** 'Condition' refers to the likelihood of interference or potential beneficial uses.

The WFD came into force in 2000. The WFD was enacted into Irish Law through the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) and amendments. The WFD established a framework

for the protection of all waterbodies including, rivers, lakes, groundwater, estuarine and coastal waters and their dependent wildlife/habitats. Some key objectives of the WFD are to:

- Protect all waters, including rivers, lakes, groundwater, estuarine and coastal waters;
- Achieve “Good” status in all waters by 2015, and maintain “High” status where the status already exists; and
- Manage water bodies based on the River Basin Districts (catchments).

The EPA mapping tool, catchments website (EPA Catchments 2018), provides data on the current quality and status of the water bodies.

The WFD Status for the Santry_010 River Water Body is “Poor” and “at risk” of not achieving “Good” status.

8.3.4 Flood Risk

In accordance with the guidelines produced by the DEHLG (Department of Environment Heritage and Local Government) “The Planning System and Flood Risk Management: Guidelines for Planning Authorities” (2009) (referred to hereafter as the FRM Guidelines), a Flood Risk Assessment (FRA) has been undertaken for the proposed development. The FRM Guidelines define three Flood Zones (refer to **Figure 8-3**: Indicative Flood Zone Map (Extract from the FRM Guidelines) namely:

- **Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% AEP or 1 in 100 year for river flooding or 0.5% AEP or 1 in 200 for coastal flooding);
- **Flood Zone B** – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1,000 year and 1% AEP or 1 in 100 year for river flooding and between 0.1% AEP or 1 in 1,000 year and 0.5% AEP or 1 in 200 year for coastal flooding); and
- **Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1,000 for both river and coastal flooding).

It is important to note that Flood Zone C covers all areas which are not in Flood Zones A and B.

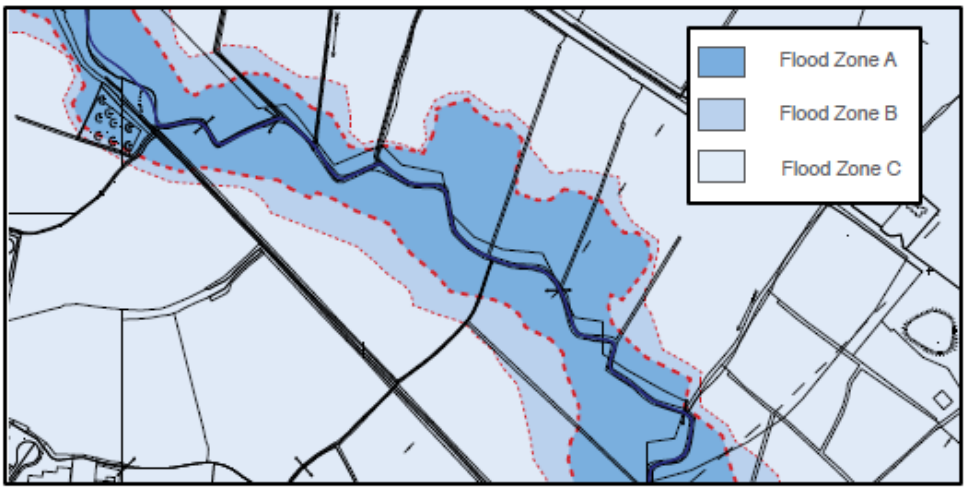

Figure 8-3: Indicative Flood Zone Map (Extract from the FRM Guidelines)

The OPW preliminary flood risk assessment (PFRA) flood extent map and FCC strategic flood risk assessment (SFRA) Flood Map indicates that the existing site lies within Flood Zone C. The national flooding website www.floodmaps.ie does not have any record of historic flooding at the site.

The CFRAMS fluvial flood extent maps indicates that the site lies within Flood Zone C, and hence is at low risk of flooding. The map indicates that the 1% AEP and 0.1% AEP fluvial flood levels adjacent to the site are **+54.53mOD** and **+54.63mOD** respectively. Existing ground level on the proposed site ranges between approximately 57 and 58 mOD.

The site of the proposed development lies outside of the 1% (Flood Zone A) and 0.1% (Flood Zone B) AEP fluvial flood extents and thus is deemed to be in Flood Zone C.

8.4 Characteristics of the Project

The proposed development will consist of 331 apartments in four separate blocks, with mixed use commercial units and a childcare facility at ground floor level over basement car parking, and all associated site works including roads, footpaths, landscaping, site services, SUDS measures and sundry related works.

The following are the aspects of the project that interact with the hydrological environment.

8.4.1 Earthworks

The development of the project will interact with the hydrological environments during the earthworks undertaken during the construction stage. Soil will be routinely excavated to a depth of approx. 4.0 metres to build the underground car park and the site recontoured to accommodate the foundations and construction of the buildings.

8.4.2 Water Supply

The water needs of the development will be provided by mains water.

8.4.3 Wastewater Disposal

The wastewater generated by the proposed development will be collected and piped to a public sewer.

8.4.4 Drainage

The proposed development will incorporate the construction of roofs and podium, paved areas, internal roads and carparks, the runoff from which will be collected in a purpose designed drainage system.

The proposed surface water drainage will be designed to incorporate SUDS devices, in the form of permeable paving and a Green Roof system over 60% of the apartment roof and central courtyard areas to limit any potential pollutants in runoff prior to discharge to the Santry River. The drainage systems will be designed in accordance with the report entitled "*The Planning System and FRM Guidelines for Planning Authorities"* (2009). Surface drainage will be attenuated to greenfield runoff rates and will make allowance for climate change.

The surface water runoff from all hardstanding areas including the roof, podium, private roads, hardstandings and associated footpaths has the potential of passing through a minimum of two SUDS measures.

Stormwater runoff from the development will drain via the Green Roof system to the existing surface water Infrastructure (including the attenuation tank) prior to discharging to the Santry River in the north-east corner of the existing development. The proposed permeable paving has storage (attenuation) capacity to cater for the 1:100 year critical storm event plus 20% for climate change with restricted outflows limited to 2l/sec to the surface water system if necessary. In addition, there is capacity in the existing Attenuation Tank to cater for the peak flow of 368.5l/sec generated from the 1 in 100 year + 20% for climate change from the proposed development ensuring that the runoff from the entire site including this phase of the development will be restricted to the required green field runoff rate.

All surface water discharge from the proposed site will pass through suitably sized hydrocarbon interceptors.

8.5 Impact Assessment

The effects on the hydrological environment is assessed in the following sections for the construction and operation phases of the proposed development.

This assessment of impacts follows guidelines established by the TII/NRA in its 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009)".

The significance of impacts on specific receptors are considered in terms of the magnitude of the effect/impact of an element of the project on a receptor and the importance of that receptor.

8.5.1 Do Nothing

The 'do nothing' alternative describes the circumstance where no development occurs. There will be no impact on hydrology if the 'do nothing' scenario is followed.

8.5.2 Potential Impacts (Construction)

There are a number of elements associated with the development which have the potential to impact the hydrological environment.

The potential hydrological Impacts include:

- Risk of Flooding to the proposed development site;
- Risk of Flooding to surrounding area;
- Impacts on the water quality of nearby watercourses; and
- Impacts on Hydromorphology.

8.5.2.1 Flood Risk to Development Site

As all the works associated with the proposed development will be located in Flood Zone C, there are no predicted impacts in relation to flooding of the proposed development site.

8.5.2.2 Flood Risk to Surrounding Area

If the runoff from the site is uncontrolled during the construction stage, there is a potential to increase the risk of flooding downstream. The magnitude of the impact is assessed to be "Small Adverse" on an attribute of "Moderate" importance. The significance of this potential impact is "slight", negative in quality and temporary in duration.

8.5.2.3 Water Quality

Potential impacts to water quality in local water courses during the construction stage in the absence of control measures are:

- The main potential impact on the receiving water in the absence of control measures is an increase in sediment concentration in watercourses during the construction phase. Sedimentation is the deposition of fine sediment either within the gravel or directly on the substrate surface of an aquatic system. The site is relatively flat and runoff will be gentle. Much of the sediment will settle on the ground before entering the water channel. Consequently, the magnitude of the impact is assessed to be "Small Adverse" on an attribute of "Medium" importance. The significance of this potential impact is "slight", negative in quality and temporary in duration.
- Chemical pollutants such as hydrocarbons and other chemicals used in the construction process may enter the surface waters in the event of accidental release and have implications for the area,

particularly those sources located down-stream of the proposed development. The volumes of hydrocarbons that could potentially spill during the construction phase will be small. Spills will gather on site rather than discharge directly to the water course. The magnitude of the impact is assessed to be "Small Adverse" on an attribute of "Medium" importance. The significance of this potential impact is "Slight", negative in quality and temporary in duration.

- Sanitary waste from inadequate containment and treatment of on-site toilet and washing facilities could lead to contamination of receiving waters. The flatness of the site will restrict rapid runoff to the water course. The magnitude of the impact is assessed to be "Negligible" on an attribute of "Moderate" importance. The significance of this potential impact is "Imperceptible", negative in quality and temporary in duration.

8.5.2.4 Hydromorphology

Alterations to the shape or route of the receiving water channel are not proposed. No culverting is proposed. There will be no temporary damming of surface water channels during construction. Consequently, there are no hydromorphological impacts predicted.

8.5.3 Potential Impacts (Operational)

8.5.3.1 Flood Risk to Development Site.

The site lies within Flood Zone C and is not at risk of flooding. The 1% AEP and 0.1% AEP fluvial flood levels adjacent to the site are **+54.53mOD** and **+54.63mOD** respectively. The proposed Finished Floor Levels (FFL's) of the development range from +58.30mOD to +58.53mOD thus ensuring that the FFL is significantly above the 0.1% AEP fluvial flood level of +54.63mOD. Consequently, the risk of the site flooding is minimal.

8.5.3.2 Flood Risk to Surrounding Area.

The development site lies over 3 metres above the 0.1 AEP flood level. The development of the site will not alter the flood plain or the conveyance channel of the Santry River and therefor the hydraulics of the river will not be altered in the vicinity of the development site.

The proposed drainage designs will incorporate SUDS measures (embedded mitigation) to ensure the runoff from the site (including the adjacent development) to the Santry River will not exceed greenfield runoff rates. Consequently, there will be no increase in risk of flooding in the receiving waters.

8.5.3.3 Water Quality

SUDS measures will be incorporated into drainage design – refer to J. B. Barry and Partners Limited *Water Services Report*.

Potentially the most serious source of contamination to a water course associated with the development are accidental spillages.

Chemical pollutants such as hydrocarbons and other chemicals may enter the surface waters in the event of accidental release and have implications down-stream of the proposed development. The volumes of hydrocarbons that could potentially spill during the operational phase will be small. Spills will gather on site rather than discharge directly to the water course. The magnitude of the impact is assessed to be "Small Adverse" on an attribute of "Medium" importance. The significance of this potential impact is "Slight", negative in quality and temporary in duration.

8.5.3.4 Hydromorphology

Alterations to the shape or route of the receiving water channel are not proposed. Consequently, there are no hydromorphological operational impacts predicted.

8.6 Mitigation Measures

8.6.1 Construction Phase

In advance of work starting on site the works Contractor will prepare a Construction Environment Management Plan (CEMP) and a Construction and Demolition and Waste Management Plan (CDWMP) which will include the schedule of any mitigation measures included with this EIAR. The plan will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site, CIRIA 2005. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIAR and any subsequent conditions relevant to the proposed development.

8.6.1.1 Flood Risk to Surrounding Areas

- The attenuation storage and the required outlet control to attenuate the discharge flow will be constructed as early as possible in the construction stage; and
- During construction the surface runoff will be directed through the existing storm water storage. This will ensure that the discharge to the Santry River shall not exceed greenfield runoff rates.

Following implementation of mitigation, no significant residual impacts are predicted.

8.6.1.2 Water Quality

The following mitigation measures have been identified which will form part of a Construction Environmental Management Plan (CEMP) which will include measures for reduction or elimination of pollution and the schedule of mitigation measures in this EIAR:

- Contractor Guidance set out in the Control of Water Pollution from Construction Sites (CIRIA, 2001) shall be adhered to. Good construction management practices will be employed. During the construction stage, all potentially harmful substances (e.g. oils, diesel, herbicides, pesticides, concrete etc.) will be stored in accordance with the manufacturer's guidelines regarding safe and secure buildings/compounds.
- Foul drainage from all site facilities will be to a public sewer.
- When cast in-place concrete is required, all work must be done in the dry and effectively isolated from any flowing water (or water that may enter rivers or streams) for a period sufficient to ensure no leachate from the concrete.
- No direct discharges to be made to waters where there is potential for cement or other contaminant residues in discharges.
- Designated impermeable cement washout areas must be provided.
- Within the site boundary fence, temporary earth bunds will be constructed to contain surface water run-off and channel it to a silt trap or settlement pond before discharge to the drainage network.
- Any excavated vegetation, soil and subsoil will be temporarily stockpiled away at least 20 m from any surface water features in order to reduce the likelihood of any suspended solids reaching them.
- Discharge points to the drainage network will entail a mechanism for containment of runoff in the event of accidental spillage, to enable clean-up and appropriate disposal through licensed facilities.
- Any soil contaminated from an accidental spillage will be contained and treated appropriately and disposed of in accordance with the Waste Management Act 1996-2012.

Following implementation of mitigation, the significance of the impact on water quality will be imperceptible.

8.6.2 Operational Phase

Potential operational impacts are substantially mitigated through avoidance by the implementation of good management systems and sensible practices.

8.6.2.1 Flooding

The design of the drainage system has inbuilt mitigation as outlined Section 8.4.4. No flooding of the site and surrounding area are predicted. Consequently, no further mitigation is proposed.

8.6.2.2 Water Quality

The incorporation of hydrocarbon interceptors will ensure that any spill is contained before reaching the Santry River.

Following implementation of mitigation, the significance of the impact on water quality will be imperceptible

8.7 Monitoring Measures (Construction and Operational)

As all the impacts are predicted to be neutral/imperceptible, no monitoring is proposed.

8.8 Cumulative Impact

The stormwater attenuation system is designed to accommodate both phases of the development. As the impacts are imperceptible and unlikely to interact with the impacts of other existing or permitted projects, there are no cumulative impacts predicted.

8.9 Residual Impacts

The predicted overall residual impact of the proposed development on hydrology both during construction and operational stage will be imperceptible.

8.10 References

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European Communities (Water Policy) Regulations 2003 – S.I. No. 722 of 2003.

European Communities (Water Policy) (Amendment) Regulations 2005 – S.I. No. 413 of 2005.

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Local Government (Water Pollution) Act 1990.

9 AIR QUALITY AND CLIMATE

9.1 Introduction

This chapter assesses the likely air quality and climate impacts, if any, associated with the proposed development. A full description of the development can be found in Chapter 4 of this EIAR.

This chapter has been prepared by Claire Flynn of AWN Consulting. She is a Senior Air Quality Consultant with over 9 years of experience in assessing air quality and climate impacts for a wide range of projects. She holds a BA (Hons) in Environmental Science from Trinity College Dublin and has completed an MSc in Applied Environmental Science in UCD. She specialises in the fields of air dispersion modelling, ambient air monitoring and EIA co-ordination. She is a Full Member of the Institute of Air Quality Management (MIAQM).

9.2 Assessment Methodology

When considering a development of this nature, the potential air quality and climate impact on the surroundings must be considered for each of two distinct stages:

- Construction phase, and;
- Operational phase.

During the construction stage the main focus in relation to air quality impacts will be from potential fugitive dust emissions from site activities. Emissions from construction vehicles and machinery have the potential to impact climate. The construction phase impacts will be short-term in duration.

The primary potential sources of air and climatic emissions during the operational phase of the proposed development are deemed long-term and will involve a change in traffic flows on road links nearby the proposed development.

9.2.1 Assessment Approach

9.2.1.1 Local Air Quality Assessment – Impact from Road Traffic (DMRB Assessment)

The air quality assessment has been carried out following procedures described in the publications by the EPA (2015, 2017) and using the methodology outlined in the guidance documents published by the UK DEFRA (2016a; 2016b). The assessment of air quality was carried out using a phased approach as recommended by the UK DEFRA (2016b). The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standards. In the current assessment, an initial scoping of possible key pollutants was carried out and the likely location of air pollution "hot-spots" identified. An examination of recent EPA and Local Authority data in Ireland (EPA, 2019) has indicated that SO_2, smoke and CO are unlikely to be exceeded in the majority of locations within Ireland and thus these pollutants do not require detailed monitoring or assessment to be carried out. However, the analysis did indicate potential issues in regard to nitrogen dioxide (NO_2), PM_{10} and $PM_{2.5}$ at busy junctions in urban centres (EPA, 2019). Benzene, although previously reported at quite high levels in urban centres, has recently been measured at several city centre locations to be well below the EU limit value (EPA, 2018). Historically, CO levels in urban areas were a cause for concern. However, CO concentrations have decreased significantly over the past number of years and are now measured to be well below the limits even in urban centres (EPA 2018; 2019). The key pollutants reviewed in the assessments are NO_2, PM_{10}, $PM_{2.5}$, benzene and CO, with particular focus on NO_2 and PM_{10}.

Key pollutant concentrations will be predicted for nearby sensitive receptors for the following scenarios:

- The Existing Scenario, for model verification;
- Opening Year Do-Nothing Scenario (DN), which assumes no development in place;

- Opening Year Do-Something Scenario (DS), which assumes the proposed development is in place;
- Design Year Do-Nothing Scenario (DN), which assumes no development is in place; and
- Design Year of the Do-Something Scenario (DS), which assumes the proposed development is in place.

The assessment methodology involved air dispersion modelling using the UK DMRB Screening Model (Version 1.03c, July 2007), the NO_x to NO_2 Conversion Spreadsheet (Version 6.1, October 2017) (UK DEFRA, 2017), and following guidance issued by the TII (2011), UK Highways Agency (2007), UK DEFRA (2016a; 2016b; UK DETR 1998) and the EPA (2015; 2017).

The TII guidance (2011) states that the assessment must progress to detailed modelling if:

- Concentrations exceed 90% of the air quality limit values when assessed by the screening method; or
- Sensitive receptors exist within 50m of a complex road layout (e.g. grade separated junctions, hills etc).

The UK DMRB guidance (UK Highways Agency, 2007), on which the TII guidance was based, states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment:

- Road alignment change of 5 metres or more;
- Daily traffic flow changes by 1,000 AADT or more;
- HGV flows change by 200 vehicles per day or more;
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.

Concentrations of key pollutants are calculated at sensitive receptors that have the potential to be affected by the proposed development. For road links which are deemed to be affected by the proposed development and within 200 m of the chosen sensitive receptors inputs to the air dispersion model consist of: road layouts, receptor locations, Annual Average Daily Traffic movements (AADT), percentage of heavy goods vehicles, annual average traffic speeds and background concentrations. The UK DMRB guidance states that road links at a distance of greater than 200 m from a sensitive receptor will not influence pollutant concentrations at the receptor. Using the input data the model predicts the road traffic contribution to ambient ground level concentrations at the worst-case sensitive receptors using generic meteorological data. The DMRB model uses conservative emission factors, the formulae for which are outlined in the DMRB Volume 11 Section 3 Part 1 – HA 207/07 Annexes B3 and B4. These worst-case road contributions are then added to the existing background concentrations to give the worst-case predicted ambient concentrations. The worst-case predicted ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with those standards.

The TII Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011) detail a methodology for determining air quality impact significance criteria for road schemes, which can be applied to any project that causes a change in traffic flows. The degree of impact is determined based on both the absolute and relative impact of the proposed development. The TII significance criteria have been adopted for the proposed development and are detailed in **Volume 3**, **Appendix 9.2 Table B1** to **Table B3**. The significance criteria are based on PM_{10} and NO_2 as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3). However, the criteria have also been applied to the predicted 8-hour CO, annual benzene and annual $PM_{2.5}$ concentrations for the purposes of this assessment.

9.2.1.1.1 Update to NO_2 Projections using DMRB

In 2011 the UK DEFRA published research on the long-term trends in NO_2 and NO_X for roadside monitoring sites in the UK. This study marked a decrease in NO concentrations between 1996 and 2002, after which the concentrations stabilised with little reduction between 2004 and 2010. The result of this is that there now exists a gap between projected NO_2 concentrations which UK DEFRA previously published and monitored concentrations. The impact of this 'gap' is that the DMRB screening model can under-predict NO_2 concentrations for predicted future years. Subsequently, the UK Highways Agency (HA) published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years.

9.2.1.1.2 Conversion of NO_x to NO_2

NO_x (NO + NO_2) is emitted by vehicles exhausts. The majority of emissions are in the form of NO, however, with greater diesel vehicles and some regenerative particle traps on HGVs the proportion of NO_x emitted as NO_2, rather than NO is increasing. With the correct conditions (presence of sunlight and O_3) emissions in the form of NO, have the potential to be converted to NO_2.

Transport Infrastructure Ireland states the recommended method for the conversion of NO_x to NO_2 in "Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes"(2011). The TII guidelines recommend the use of DEFRAs NO_x to NO_2 calculator (2017) which was originally published in 2009 and is currently on version 6.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability of O_3 and proportion of NO_x emitted as NO for each local authority across the UK. O_3 is a regional pollutant and therefore concentrations do not vary in the same way as concentrations of NO_2 or PM_{10}.

The calculator includes Local Authorities in Northern Ireland and the TII guidance recommends the use of 'Armagh, Banbridge and Craigavon' as the choice for local authority when using the calculator. The choice of Craigavon provides the most suitable relationship between NO_2 and NO_x for Ireland. The "All other Urban UK Traffic" traffic mix option was used.

9.2.1.2 Regional Impact Assessment (Including Climate)

The impact of the proposed development at a national / international level has been determined using the procedures given by Transport Infrastructure Ireland (2011) and the methodology provided in Annex 2 in the UK Design Manual for Roads and Bridges (2016a). The assessment focused on determining the resulting change in emissions of volatile organic compounds (VOCs), nitrogen oxides (NO_x) and carbon dioxide (CO_2) associated with the proposed development. The Annex provides a method for the prediction of the regional impact of emissions of these pollutants from road schemes and can be applied to any development that results in a change in traffic volumes. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds.

9.2.1.3 Ecological Assessment

For routes that pass within 2 km of a designated area of conservation (either Irish or European designation) the TII requires consultation with an Ecologist (2011). However, in practice the potential for impact to an ecological site is highest within 200 m of the proposed scheme and when significant changes in AADT (>5%) occur.

Transport Infrastructure Ireland's *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (2009) and Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DEHLG, 2010) provide details regarding the legal protection of designated conservation areas.

If both of the following assessment criteria are met, an assessment of the potential for impact due to nitrogen deposition shall be conducted:

- A designated area of conservation is located within 200 m of the proposed development; and

- A significant change in AADT flows (>5%) will occur.

There are no designated areas of conservation within 200m of the proposed development site, therefore, an assessment of the impact of the proposed development on NO_x concentrations and nitrogen deposition is not required.

9.2.2 Definition of Study Area

The study area for the construction phase impacts on air quality is limited to 500m from the site boundary in line with guidance from the IAQM (2016) with the majority of impacts likely to occur within the first 50m from the site boundary.

The study area for the operational phase impacts on air quality is limited to road links which are deemed to be affected by the proposed development as per the criteria outlined within the DMRB guidance documents and potential sensitive receptors within 200m of the affected road links.

9.2.3 Assessment Criteria and Background Information

9.2.3.1 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see **Table 9-1** and **Volume 3, Appendix 9.1**).

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate EU Directive 2008/50/EC, which has set limit values for NO_2, PM_{10}, $PM_{2.5}$, benzene and CO (see **Table 9-1**). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see **Volume 3 Appendix 9-1**).

Table 9-1: Ambient Air Quality Standards

Pollutant	Regulation Note 1	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3
Benzene	2008/50/EC	Annual limit for protection of human health	5 µg/m^3
Carbon Monoxide	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg /m^3 (8.6 ppm)

Note 1 EU 2008/50/EC – Clean Air For Europe (CAFÉ) Directive replaces the previous Air Framework Directive (1996/30/EC) and daughter directives 1999/30/EC and 2000/69/EC

9.2.3.2 Dust Deposition Guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$) and the EU ambient air quality standards outlined in **Table 9-1** have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland. Furthermore, no specific criteria have been stipulated for nuisance dust in respect of this development.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Health & Local Government (DOEHLG, 2004) apply the Bergerhoff limit value of 350 mg/(m^2*day) to the site boundary of quarries. This limit value can also be implemented with regard to potential dust impacts from construction of the proposed development.

9.2.3.3 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002 (UNFCCC, 1997; UNFCCC, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, in June 1998, Ireland agreed to limit the net growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 (ERM, 1998; European Commission, 2014).

The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP24) took place in Katowice, Poland from the 4th to the 14th of December 2018 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement was agreed by over 200 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, in October 2014, agreed the “2030 Climate and Energy Policy Framework”(EU 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under “Renewables and Energy Efficiency”, an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

9.2.3.4 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO_2 (67% below 2001 levels), 65 kt for NO_X (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH_3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$.

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG, 2004; 2007). Data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO_2, VOCs and NH_3 but failed to comply with the ceiling for NO_X (EEA, 2012). Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC" was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH_4. In relation to Ireland, 2020 emission targets are 25 kt for SO_2 (65% on 2005 levels), 65 kt for NO_X (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 85% below 2005 levels for SO_2, 69% reduction for NO_x, 32% reduction for VOCs, 5% reduction for NH_3 and 41% reduction for $PM_{2.5}$.

9.3 Baseline Scenario (Existing Environment)

9.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM10, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than PM2.5) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM2.5 - PM10) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport which is located less than 2km north of the site. For data collated during five representative years (2014 - 2018), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds (see **Figure 9-1**).

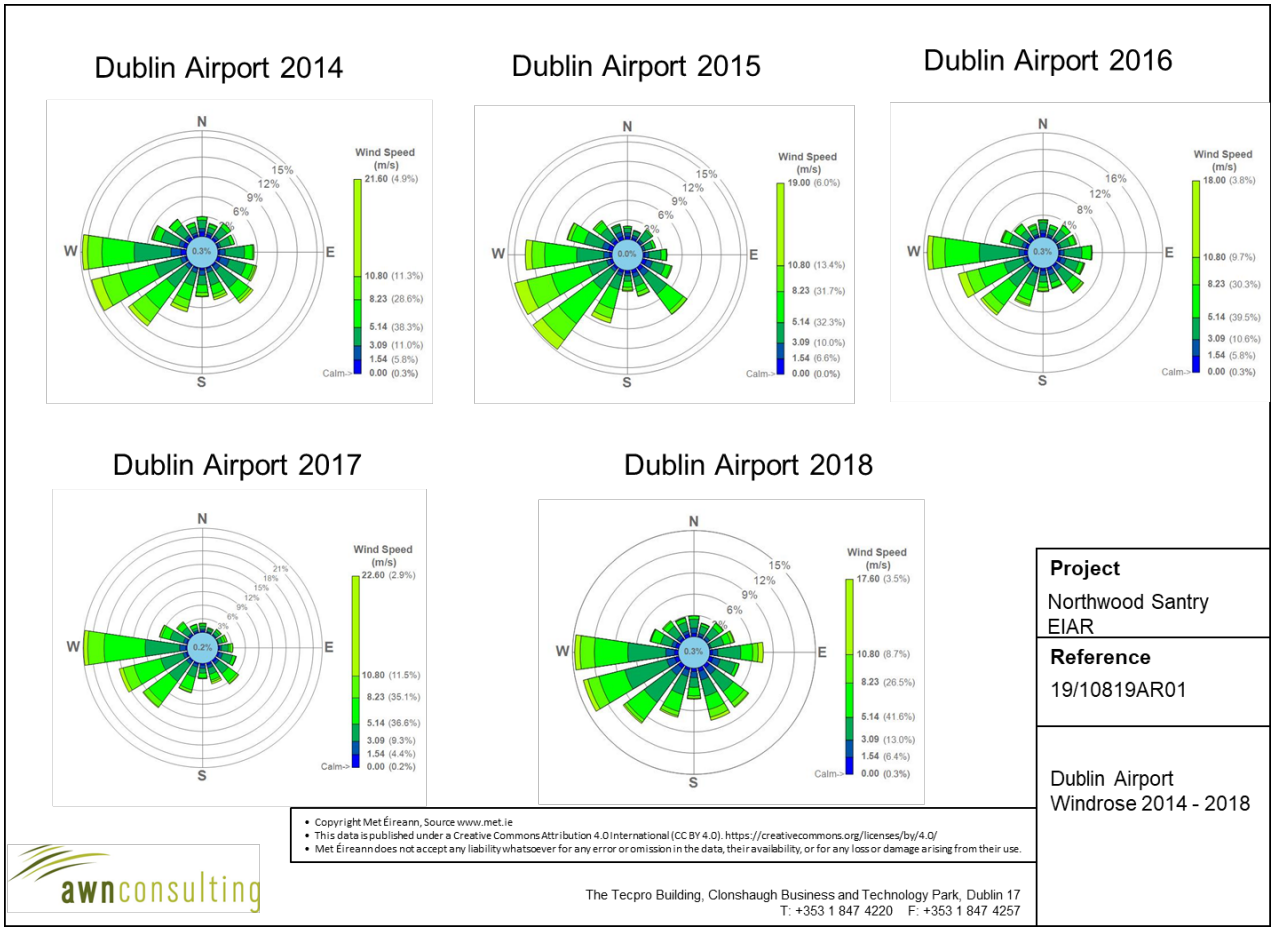

Figure 9-1: Dublin Airport Windroses, 2014 – 2018

9.3.2 Trends in Air Quality

Air quality is variable and subject to both significant spatial and temporal variation. In relation to spatial variations in air quality, concentrations generally fall significantly with distance from major road sources (WHO, 2006). Thus, residential exposure is determined by the location of sensitive receptors relative to major roads sources in the area. Temporally, air quality can vary significantly by orders of magnitude due to changes in traffic volumes, meteorological conditions and wind direction.

In assessing baseline air quality, two tools are generally used: ambient air monitoring and air dispersion modelling. In order to adequately characterise the current baseline environment through monitoring, comprehensive measurements would be required at a number of key receptors for PM_{10}, NO_2 and benzene. In addition, two of the key pollutants identified in the scoping study (PM_{10} and NO_2) have limit values which require assessment over time periods varying from one hour to one year. Thus, continuous monitoring over at least a one-year period at a number of locations would be necessary in order to fully determine compliance for these pollutants. Although this study would provide information on current air quality it would not be able to provide predictive information on baseline conditions (UK DETR, 1998), which are the conditions which prevail just prior to opening in the absence of the development. Hence the impacts of the development were fully assessed by air dispersion modelling (UK DETR, 1998) which is the most practical tool for this purpose. The baseline environment has also been assessed using modelling, since the use of the same predictive technique for both the 'do-nothing' and 'do-something' scenario will minimise errors and allow an accurate determination of the relative impact of the development.

9.3.3 Baseline Air Quality – Review of Available Background Data

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "Air Quality In Ireland 2017 – Indicators of Air Quality" (EPA, 2018). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments (EPA, 2019).

As part of the implementation of the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2018). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, Santry is within Zone A (EPA, 2018). The long-term EPA monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.).

With regard to NO_2, continuous monitoring data from the EPA (EPA, 2018), at suburban (non-roadside) Zone A locations in Ringsend, Dun Laoghaire, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 14 – 17 µg/m^3 in 2017 (see **Table 9-2**). Sufficient data is available for the stations in Ballyfermot, Dun Laoghaire and Swords to observe the long-term trend since 2013 (EPA, 2018) (see **Table 9-2**), with results ranging from 13 - 19 µg/m^3 and few exceedances of the one-hour limit value and with an average annual mean for Ballyfermot for this period (2013 - 2017) of 16 µg/m^3. Based on these results, an estimate of the background NO_2 concentration in the region of the proposed development is 18 µg/m^3.

Table 9-2: Trends in Zone A Air Quality - Nitrogen Dioxide (NO2)

Station	Averaging Period	Year				
		2013	2014	2015	2016	2017
Rathmines	Annual Mean NO_2 (µg/m^3)	19	17	18	20	17
	99.8th%ile 1-hr NO_2 (µg/m^3)	92	105	105	88	86
Ballyfermot	Annual Mean NO_2 (µg/m^3)	16	16	16	17	17
	99.8th%ile 1-hr NO_2 (µg/m^3)	82	93	127	90	112
Dun Laoghaire	Annual Mean NO_2 (µg/m^3)	16	15	16	19	17
	99.8th%ile 1-hr NO_2 (µg/m^3)	92	86	91	105	101
Swords	Annual Mean NO_2 (µg/m^3)	15	14	13	16	14
	99.8th%ile 1-hr NO_2 (µg/m^3)	87	137	93	96	79

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 1-hour limit value - 200 µg/m^3 as a 99.8th%ile, i.e. not to be exceeded >18 times per year (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Continuous PM_{10} monitoring carried out at the suburban locations of Ballyfermot, Rathmines, Tallaght, Phoenix Park and Dún Laoghaire showed 2013 - 2017 annual mean concentrations ranging from 9 - 17 µg/m^3 (**Table 9-3**), with at most 8 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year). The most representative locations are Dún Laoghaire and Ballyfermot which had average annual mean concentrations of 14 µg/m^3 and 12 µg/m^3, respectively, over the five year period. Based on the EPA data (**Table 9-3**) a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 15 µg/m^3.

Table 9-3: Trends in Trends In Zone A Air Quality - PM10

Station	Averaging Period	Year				
		2013	2014	2015	2016	2017
Ballyfermot	Annual Mean PM_{10} (µg/m^3)	12	11	12	11	12
	24-hr Mean > 50 µg/m^3 (days)	2	2	3	0	1
Dún Laoghaire	Annual Mean PM_{10} (µg/m^3)	17	14	13	13	12
	24-hr Mean > 50 µg/m^3 (days)	5	2	3	0	2
Tallaght	Annual Mean PM_{10} (µg/m^3)	17	15	14	14	12
	24-hr Mean > 50 µg/m^3 (days)	5	2	4	0	2
Rathmines	Annual Mean PM_{10} (µg/m^3)	17	14	15	15	13
	24-hr Mean > 50 µg/m^3 (days)	8	3	5	3	5
Phoenix Park	Annual Mean PM_{10} (µg/m^3)	14	12	12	11	9
	24-hr Mean > 50 µg/m^3 (days)	3	0	2	0	1

Note 1 Annual average limit value - 40 µg/m^3 (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011).

Note 2 24-hour limit value - 50 µg/m^3 as a 90.4th%ile, i.e. not to be exceeded >35 times per year (EU Council Directive 1999/30/EC & S.I. No. 180 of 2011).

Continuous $PM_{2.5}$ monitoring carried out at the Zone A location of Rathmines showed $PM_{2.5}/PM_{10}$ ratios ranging from 0.63 – 0.68 over the period 2013 - 2017. Based on this information, a conservative ratio of 0.7 was used to generate a background $PM_{2.5}$ concentration in the region of the proposed development of 10.5 µg/m^3.

In terms of benzene, the annual mean concentration in the Zone A monitoring location of Rathmines ranged from 0.92 – 1.0 µg/m^3 for the period 2013 – 2017. An upper average annual mean concentration of 0.95 µg/m^3 was observed for this period. This is well below the limit value of 5 µg/m^3. Based on this EPA data a conservative estimate of the background benzene concentration in the vicinity of the proposed development is 1.0 µg/m^3.

With regard to CO, annual averages at the Zone A, locations of Winetavern Street and Coleraine Street over the 2013 – 2017 period are low, peaking at 5% of the limit value (10 mg/m^3). Based on this EPA data, a conservative estimate of the background CO concentration in the region of the development is 0.5 mg/m^3.

Background concentrations for the opening (2021) and design (2036) years have been calculated using the current background concentrations and the year on year reduction factors provided by Transport Infrastructure Ireland in the "*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes"* and the UK Department for Environment, Food and Rural Affairs LAQM.TG (UK DEFRA 2016b).

9.4 Impact Assessment

9.4.1 Do Nothing

The Do Nothing scenario includes retention of the current site without the proposed residential development in place. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc). The “Do Nothing” scenario is modelled within the local air quality impact assessment, regional air quality impact assessment and climate impact assessment (see section 9.4.3.1) based on projected traffic data for the local road links assuming the proposed development is not in place in future years.

9.4.2 Construction Phase

9.4.2.1 Air Quality

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust and PM_{10}/$PM_{2.5}$ emissions. The proposed development can be considered moderate in scale and therefore there is the potential for significant dust soiling 50m from the source (TII 2011) (**Table 9-4**). While construction dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. There are a small number of sensitive receptors, predominantly residential properties and recreational areas in close proximity to the site. In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust minimisation plan. Provided the dust minimisation measures outlined in the plan (see **Volume 3 Appendix 9.3**) are adhered to, the air quality impacts during the construction phase will be short-term and not significant.

Table 9-4: Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place (TII, 2011)

Source		Potential Distance for Significant Effects (Distance From Source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation Effects**
Major	Large construction sites, with high use of haul roads	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites, with limited use of haul roads	25m	10m	10m

9.4.2.2 Climate

There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions. However, based on the short-term duration and moderate scale of the proposed development, the impact of the construction phase on climate is considered to be short-term and imperceptible.

9.4.2.3 Human Health

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the air quality impact of construction of the proposed development will be short-term and imperceptible with respect to human health.

9.4.3 Operational Phase

9.4.3.1 Local Air Quality

There is the potential for a number of emissions to the atmosphere during the operational phase of the development. In particular, the traffic-related air emissions may generate quantities of air pollutants such as NO_2, CO, benzene, PM_{10} and $PM_{2.5}$.

Cumulative effects have been assessed, as recommended in the EU Directive on EIA (Council Directive 97/11/EC) and using the methodology of the UK DEFRA (2016a, 2016b). Firstly, background concentrations (EPA 2019) have been included in the modelling study. These background concentrations are year-specific and account for non-localised sources of the pollutants of concern (EPA 2018). Appropriate background levels were selected based on the available monitoring data provided by the EPA (EPA 2018) (see Section 9.3.3). Traffic flow information was obtained from the traffic consultant for this project and has been used to model pollutant levels under various traffic scenarios and under sufficient spatial resolution to assess whether any significant air quality impact on sensitive receptors may occur. Projected traffic data used for the purpose of this assessment is based on conservative growth rates which account for growth in the surrounding area as a worst-case in order to ensure a robust assessment.

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of emissions of CO, benzene, NO_2, PM_{10} and $PM_{2.5}$ for the baseline, opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impact, to be determined.

The receptors modelled represent the worst-case locations close to the proposed development and were chosen due to their close proximity (within 200 m) to the road link (off Northwood Road) impacted by the proposed development. The projected traffic data used for the local air quality assessment is shown in **Table 9-5**, with the percentage of HGVs shown in parenthesis below the AADT. Two sensitive residential receptors (R1 and R2) in the vicinity of the proposed development have been assessed. Sensitive receptors have been chosen as they have the potential to be adversely impacted by the development. R1 corresponds to Unit No.1 in the Cedarview residential development. R2 corresponds to Bridgefield No. 1-30 block which includes a childcare facility as well as residential units.

Table 9-5: Traffic Data used in Modelling Assessment

Road Name	Base Year	Do-Nothing		Do-Something		Speed (kph)
	2018	2021	2036	2021	2036	
	AADT (% HGV)	AADT (% HGV)	AADT (% HGV)	AADT (% HGV)	AADT (% HGV)	
Local Road off Northwood Road	3,033 (1.3%)	3,116 (1.3%)	3,602 (1.3%)	4,578 (1.3%)	5,064 (1.3%)	50

9.4.3.1.1 Modelling Assessment

Transport Infrastructure Ireland *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (TII, 2011) detail a methodology for determining air quality impact significance criteria for road schemes and has been adopted for this assessment, as is best practice. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

9.4.3.1.2 NO_2

The results of the assessment of the impact of the proposed development on NO_2 in the opening year 2021 are shown in **Table 9-6** for the Highways Agency IAN 170/12 and **Table 9-7** using the UK Department for Environment, Food and Rural Affairs technique, respectively. The annual average concentration is within the limit value at all worst-case receptors using both techniques. Levels of NO_2 are 45% of the annual limit value in 2021 using the more conservative IAN technique, while concentrations are 41% of the annual limit value in 2021 using the UK Department for Environment, Food and Rural Affairs technique. The hourly limit value for NO_2 is 200 µg/m^3 and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO_2 concentration is not predicted to be exceeded using either technique (see **Table 9-8**).

The results of the assessment of the impact of the proposed development on NO_2 in the design year 2036 are shown in **Table 9-6** for the Highways Agency IAN 170/12 and **Table 9-7** using the UK Department for Environment, Food and Rural Affairs technique, respectively. The annual average concentration is within the limit value at all worst-case receptors using both techniques. Levels of NO_2 are 43% of the annual limit value in 2036 using the more conservative IAN technique, while concentrations are 34% of the annual limit value in 2036 using the UK Department for Environment, Food and Rural Affairs technique. The hourly limit value for NO_2 is 200 µg/m^3 and is expressed as a 99.8th percentile (i.e. it must not be exceeded more than 18 times per year). The maximum 1-hour NO_2 concentration is not predicted to be exceeded using either technique (see **Table 9-8**).

The impact of the proposed development on annual mean NO_2 levels can be assessed relative to "Do Nothing (DN)" levels in 2021 and 2036. Relative to baseline levels, some small increases in pollutant levels are predicted as a result of the proposed development. With regard to impacts at individual receptors, the greatest impact on NO_2 concentrations will be an increase of 1.1% of the annual limit value at Receptor 1. Thus, using the assessment criteria outlined in **Volume 3 Appendix 9.2, Tables B1 – B2**, the impact of the proposed development in terms of NO_2 is negligible. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term and imperceptible at both of the receptors assessed.

9.4.3.1.3 PM_{10}

The results of the modelled impact of the proposed development for PM_{10} in the opening year 2021 are shown in **Table 9-9**. Predicted annual average concentrations at the worst-case receptor in the region of the development are at most 38% of the limit value in 2021. It is predicted that the worst case receptors will not experience any exceedances of the 50 µg/m^3 24-hour mean limit value with or without the proposed development in place (35 exceedances are permitted per year) (see **Table 9-10**).

The results of the modelled impact of the proposed development for PM_{10} in the design year 2036 are shown in **Table 9-9**. Predicted annual average concentrations at the worst-case receptor in the region of the development are at most 38% of the limit value in 2036. It is predicted that the worst case receptors will not experience any exceedances of the 50 µg/m^3 24-hour mean limit value with or without the proposed development in place (35 exceedances are permitted per year) (see **Table 9-10**).

Relative to baseline levels, some imperceptible increases in PM_{10} levels at the worst-case receptors are predicted as a result of the proposed development. The greatest impact on PM_{10} concentrations in the region of the proposed development will be an increase of 0.21% of the annual limit value at Receptor 1. Thus, the magnitude of the changes in air quality are negligible at both receptors based on the criteria outlined in **Volume 3, Appendix 9.2, Tables B1 – B3**. Therefore, the overall impact of PM_{10} concentrations as a result of the proposed development is long-term and imperceptible.

9.4.3.1.4 $PM_{2.5}$

The results of the modelled impact of the proposed development for $PM_{2.5}$ are shown in **Table 9-11**. Predicted annual average concentrations in the region of the proposed development are 42% of the limit value in 2021 and 2036 at the worst-case receptor.

Relative to baseline levels, imperceptible increases in $PM_{2.5}$ levels at the worst-case receptors are predicted as a result of the proposed development. None of the receptors assessed will experience an increase in concentrations of over 0.24% of the limit value. Therefore, using the assessment criteria outlined in **Volume 3, Appendix 9.2, Tables B1 – B2**, the impact of the proposed development with regard to $PM_{2.5}$ is negligible at both of the receptors assessed. Overall, the impact of increased $PM_{2.5}$ concentrations as a result of the proposed development is long-term and imperceptible.

9.4.3.1.5 CO and Benzene

The results of the modelled impact of CO and benzene are shown in **Table 9-12** and **Table 9-13**, respectively. Predicted pollutant concentrations with the proposed development in place are below the ambient standards at all locations. Levels of benzene are 21% of the limit value in 2021 and 2036 with levels of CO reaching 26% of the limit value in 2021 and 2036.

Relative to baseline levels, some imperceptible increases in pollutant levels at the worst-case receptors are predicted as a result of the proposed development. The greatest impact on CO and benzene concentrations will be an increase of 0.28% of the CO limit and 0.13% of the Benzene limit value at Receptor 1. Thus, using the assessment criteria for NO_2 and PM_{10} outlined in **Volume 3, Appendix 9.2** and applying these criteria to CO and benzene, the impact of the proposed development in terms of CO and benzene is long-term and imperceptible.

9.4.3.1.6 Summary of Local Air Quality Modelling Assessment

Levels of traffic-derived air pollutants from the proposed development will not exceed the ambient air quality standards either with or without the proposed development in place. Using the assessment criteria outlined in **Volume 3, Appendix 9.2, Table B1 – B3**, the impact of the proposed development in terms of PM10, PM2.5, CO, NO2 and benzene is long-term, localised and imperceptible.

Table 9-6: Annual Mean NO2 Concentrations (µg/m3) (using IAN 170/12 V3 Long Term NO2 Trend Projections)

Receptor	Impact Opening Year 2021					Impact Design Year 2036				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	17.6	18.0	0.39	Imperceptible	Negligible Increase	16.6	17.0	0.43	Small	Small Increase
2	17.6	17.9	0.38	Imperceptible	Negligible Increase	16.5	16.9	0.42	Small	Small Increase

Table 9-7: Annual Mean NO2 Concentrations (µg/m3) (using Defra's Technical Guidance)

Receptor	Impact Opening Year 2021					Impact Design Year 2036				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	16.2	16.5	0.36	Imperceptible	Negligible Increase	13.4	13.7	0.35	Imperceptible	Negligible Increase
2	16.2	16.5	0.35	Imperceptible	Negligible Increase	13.3	13.7	0.34	Imperceptible	Negligible Increase

Table 9-8: 1 Hour 99.8th%ile NO2 Concentrations (µg/m3)

Receptor	IAN 170/12 V3 Long Term NO2 Trend Projections Technique				Defra's Technical Guidance Technique			
	Opening Year 2021		Design Year 2036		Opening Year 2021		Design Year 2036	
	DN	DS	DN	DS	DN	DS	DN	DS
1	61.6	63.0	58.0	59.5	56.6	57.9	46.8	48.1
2	61.5	62.8	57.8	59.3	56.5	57.8	46.7	47.9

Table 9-9: Annual Mean PM10 Concentrations (µg/m3)

Receptor	Impact Opening Year 2021					Impact Design Year 2036				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	14.9	15.0	0.08	Imperceptible	Negligible Increase	14.9	15.0	0.08	Imperceptible	Negligible Increase
2	14.9	15.0	0.08	Imperceptible	Negligible Increase	14.9	15.0	0.08	Imperceptible	Negligible Increase

Table 9-10: No. days with PM10 concentration > 50 µg/m3

Receptor	Opening Year 2021		Design Year 2036	
	DN	DS	DN	DS
1	0	0	0	0
2	0	0	0	0

Table 9-11: Annual Mean PM2.5 Concentrations (µg/m3)

Receptor	Impact Opening Year 2021					Impact Design Year 2036				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	10.4	10.5	0.06	Imperceptible	Negligible Increase	10.5	10.5	0.06	Imperceptible	Negligible Increase
2	10.4	10.5	0.06	Imperceptible	Negligible Increase	10.5	10.5	0.06	Imperceptible	Negligible Increase

Table 9-12: Maximum 8-hour CO Concentrations (mg/m3)

Receptor	Impact Opening Year 2021					Impact Design Year 2036				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	2.56	2.59	0.028	Imperceptible	Negligible Increase	2.57	2.60	0.028	Imperceptible	Negligible Increase
2	2.56	2.59	0.027	Imperceptible	Negligible Increase	2.57	2.59	0.027	Imperceptible	Negligible Increase

Table 9-13: Annual Mean Benzene Concentrations (µg/m3)

Receptor	Impact Opening Year 2021					Impact Design Year 2036				
	DN	DS	DS-DN	Magnitude	Description	DN	DS	DS-DN	Magnitude	Description
1	1.01	1.02	0.007	Imperceptible	Negligible Increase	1.02	1.02	0.007	Imperceptible	Negligible Increase
2	1.01	1.02	0.006	Imperceptible	Negligible Increase	1.02	1.02	0.006	Imperceptible	Negligible Increase

Table 9-14: Regional Air quality and Climate Impact Assessment

Year	Scenario	VOC	NO_X	CO_2
		(kg/annum)	(kg/annum)	(tonnes/annum)
2021	Do Nothing	33.6	88.3	56.9
	Do Something	49.4	129.7	83.6
2036	Do Nothing	38.7	101.6	65.8
	Do Something	54.4	142.9	92.5
Increment in 2021		15.8	41.4	26.7
Increment in 2036		15.7	41.3	26.7
Emission Ceiling (kilo Tonnes) 2021		**56.8**	**66.2**	**37,943**
Emission Ceiling (kilo Tonnes) 2036		**51.5**	**40.2**	**37,943**
Impact in 2021 (%)		0.00003 %	0.0001 %	0.0001 %
Impact in 2036 (%)		0.00003 %	0.0001 %	0.0001 %

9.4.3.2 Regional Air Quality Impact

The regional impact of the proposed development on emissions of NO_X and VOCs has been assessed using the procedures of Transport Infrastructure Ireland (TII 2011) and the UK Department for Environment, Food and Rural Affairs (2016b). The results (see **Table 9-14**) show that the likely impact of the proposed development on Ireland's obligations under the Targets set out by Directive EU 2016/2284 "On the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC" are imperceptible and long-term. For the opening year 2021, the predicted impact of the changes in AADT is to increase NO_x levels by 0.0001% of the NO_x emissions ceiling and increase VOC levels by 0.00003% of the VOC emissions ceiling to be complied with in 2020. For the design year 2036, the predicted impact of the changes in AADT is to increase NOx levels by 0.0001% of the NOx emissions ceiling and increase VOC levels by 0.00003% of the VOC emissions ceiling to be complied with in 2030.

Therefore, the impacts on regional air quality during the operational stage of the proposed development are predicted to be imperceptible and long-term.

9.4.3.3 Climate

The impact of the proposed development on emissions of CO_2 impacting climate were also assessed using the Design Manual for Roads and Bridges screening model (see **Table 9-14**). The results show that the impact of the proposed development will be to increase CO_2 emissions by 0.0001% of Ireland's EU Target in the opening year of 2021 and in the design year of 2036. Thus, the impact of the proposed development on national greenhouse gas emissions will be insignificant in terms of Ireland's obligations under the EU 2020 Target (EU, 2017).

Therefore, the impacts on climate during the operational stage of the proposed development are predicted to be imperceptible and long-term.

9.4.3.4 Human Health

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results, emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, the impact on human health will be long-term and imperceptible.

9.5 Mitigation Measures

9.5.1 Construction Phase

9.5.1.1 Air Quality

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the dust management plan. The key aspects of controlling dust are listed below. Full details of the dust management plan can be found in **Volume 3, Appendix 9.3.**

- The specification and circulation of a dust management plan for the site and the identification of persons responsible for managing dust control and any potential issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust management plan can be monitored and assessed;

- The specification of effective measures to deal with any complaints received.

At all times, the procedures within the plan will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

9.5.1.2 Climate

Construction traffic and embodied energy of construction materials are expected to be the dominant source of greenhouse gas emissions as a result of the construction phase of the proposed development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term nature and small scale of these works, the impact on climate will not be significant.

Nevertheless, some site-specific mitigation measures can be implemented during the construction phase of the proposed development to ensure emissions are reduced further. In particular the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

9.5.2 Operational Phase

No additional mitigation measures are required during the operational phase of the proposed development as it is predicted to have an imperceptible impact on ambient air quality and climate.

9.6 Monitoring Measures (Construction and Operational)

9.6.1 Construction Phase

Monitoring of construction dust deposition at the site boundary during the construction phase of the proposed development is recommended to ensure the mitigation measures are providing adequate dust minimisation. This shall be carried out using the Bergerhoff method in accordance with the requirements of the German Standard VDI 2119. The Bergerhoff Gauge consists of a collecting vessel and a stand with a protecting gauge. The collecting vessel is secured to the stand with the opening of the collecting vessel located approximately 2m above ground level. The applicable limit value is the TA Luft limit value of 350 mg/(m2*day) for a monitoring period of between 28 - 32 days.

9.6.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

9.7 Cumulative Impact

9.7.1 Construction Phase

9.7.1.1 Air Quality

As with the proposed development, the primary source of air quality impacts during the construction phase of other nearby developments will be the potential for nuisance dust impacts. The dust minimisation measures outlined for the proposed development are best practice measures which shall also be implemented at other nearby construction sites to avoid any nuisance dust impacts occurring. Once these minimisation measures are in place, the cumulative impact to air quality is considered short-term and not significant.

9.7.1.2 Climate

Construction machinery and vehicles have the potential to impact climate through the release of GHG emissions. However, the impact to climate is considered imperceptible due to the low volumes of machinery

and vehicles required for the construction of the proposed development as well as the construction of any similar scale developments in the vicinity of the site.

9.7.1.3 Human Health

The mitigation measures that will be put in place during construction of the proposed development are best practice measures which shall also be implemented at other nearby construction sites to ensure that the cumulative impacts comply with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the cumulative impact of construction of the proposed development with nearby developments is likely to be short-term and imperceptible with respect to human health.

9.7.2 Operational Phase

Traffic flow information was obtained from the traffic consultant for this project and has been used to model pollutant levels under various traffic scenarios and under sufficient spatial resolution to assess whether any significant air quality impact on sensitive receptors may occur. Projected traffic data used for the purpose of this assessment is based on conservative growth rates which account for growth in the surrounding area as a worst-case in order to ensure a robust assessment. Therefore, the predicted cumulative impacts on air quality and climate associated with the operational phase of the proposed development based on the conservative traffic data provided are deemed long-term and imperceptible

If further developments are proposed in the future in the vicinity of the proposed development, this has the potential to add further additional vehicles to the local road network. Future projects of a large scale would be required to conduct an EIA to ensure that no significant impacts on air quality will occur as a result of those developments including the cumulative effects with existing and permitted developments.

9.7.2.1 Operational Phase Monitoring

There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

9.8 Residual Impact

9.8.1 Construction Phase

9.8.1.1 Air Quality

When the dust minimisation measures detailed in the mitigation sections of this Chapter (**Section 9.5.1.1** and **Volume 3, Appendix 9.3**) are implemented, the impact of fugitive emissions of dust from the site will be short-term and not significant.

9.8.1.2 Climate

Impacts to climate during the construction phase are considered imperceptible and therefore no residual impacts of significance are predicted.

9.8.2 Operational Phase

The results of the air dispersion modelling study demonstrate that the impact of the proposed development on air quality and climate is predicted to be imperceptible with respect to the operational phase. Therefore, no residual impacts of significance for air quality and climate are predicted for the operational phase of the proposed development.

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UK Highways Agency (2007) *Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 - HA207/07* (Document & Calculation Spreadsheet).

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USEPA (1997) *Fugitive Dust Technical Information Document for the Best Available Control Measures*.

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World Health Organisation (2006) *Air Quality Guidelines - Global Update 2005* (and previous Air Quality Guideline Reports 1999 & 2000).

10 NOISE AND VIBRATION

10.1 Introduction

In terms of the site, noise and vibration will be considered in terms of two aspects. The first is the outward impact of the development (i.e. the potential impact of the buildings on existing sensitive receptors in the study area) and the inward impact of existing noise and vibration sources on the development itself (with particular focus on aircraft noise).

10.2 Assessment Methodology

10.2.1 Assessment Approach

The study has been undertaken using the following methodology:

- Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site;
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development, this is summarised in the following sections;
- Predictive calculations have been performed to estimate the likely noise emissions during the construction phase of the project at the nearest sensitive locations (NSL's) to the site;
- Predictive calculations have been performed to assess the potential impacts associated with the operation of the development at the most sensitive locations surrounding the development site;
- A schedule of mitigation measures has been proposed, where relevant, to control the noise and vibration emissions associated with both the construction and operational phases of the proposed development, and;
- The inward impact of noise in the surrounding environment into the proposed buildings has also been assessed to determine the requirements, for additional noise mitigation to provide suitable residential amenity.

10.2.2 Relevant Guidance and Adopted Criteria

10.2.2.1 Construction Noise and Vibration

10.2.2.1.1 Construction Noise

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the *British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.*

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

This document sets out guidance on permissible noise levels relative to the existing noise environment. **Table 10-1** sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228 – 1.

Table 10-1: Example of Threshold of Potential Significant Effect at Dwellings

Assessment Category & Threshold Value Period (L_{Aeq})	Threshold Value, in Decibels (dB)		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evening & Weekends Note D	55	60	65
Daytime (0700 to 19:00hrs) & Saturdays (07:00 to 13:00hrs)	65	70	75

Note A) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Note B) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.

Note C) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.

Note D) 19:00 – 23:00hrs weekdays; 13:00 – 23:00hrs Saturdays and 07:00 – 23:00hrs Sundays

It should be noted that this assessment method is only valid for residential properties.

This assessment process determines if a potential significant construction noise impact is likely. Notwithstanding the outcome of this assessment, the overall acceptable levels of construction noise which should not be exceeded at noise sensitive locations during the construction phase of the development, as set out in the Transport Infrastructure Ireland (TII) publication Guidelines for the Treatment of Noise and Vibration in National Road Schemes[23], are presented in **Table 10-2**.

Table 10-2: Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq,1hr}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Note – Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

In exceptional circumstances there may be a requirement that certain construction works are carried out during night time periods. Therefore, based on the above the following construction noise criteria are proposed for the site:

65dB $L_{Aeq,1hr}$ at noise sensitive location

75dB $L_{Aeq,1hr}$ at commercial property

23 Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 November 2004, Transport Infrastructure Ireland

10.2.2.1.2 Construction Vibration

10.2.2.1.2.1 Peak Particle Velocity (PPV)

Peak particle velocity (PPV) is commonly used to assess the structural response of buildings to vibration. Reference to the following documents has been made for the purposes of this assessment in order to discuss appropriate PPV limit values.

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

BS5228-2 and BS7385 advise that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero.

The recommended vibration limits in order to avoid cosmetic damage to buildings, as set out in both documents referred to above, are reproduced in **Table 10-3**. The documents note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented in **Table 10-6**. Major damage to a building structure is possible at vibration magnitudes greater than four times the values set out in the **Table 10-6**. It should be noted that these values refer to the base of the building.

Table 10-3: Transient Vibration Guide Values for Cosmetic Damage

Vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
4 to 15 Hz	**15 to 40Hz**	**40Hz and above**
15 mm/s	20 mm/s	50 mm/s

Human response to vibration stimuli occurs at orders of magnitudes below those associated with any form of building damage, hence vibration levels lower than those indicated in **Table 10-3** can lead to concern. BS5228-2 also provides a useful guide relating to the assessment of human response to vibration in terms of PPV. **Table 10-4** summarises the range of vibration values and the associated potential effects on humans.

Table 10-4: Guidance on Effects of Human Response to PPV Magnitudes

Vibration Level, PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1 mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.

The standard notes that single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. Where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 might be more appropriate to determine whether time varying exposure is likely to give rise to any degree of adverse comment.

10.2.2.1.2.2 Vibration Dose Value (VDV)

Guidance relating to human response to vibration is contained within BS 6472 Guide to evaluation of human exposure to vibration in buildings (2008): Part 1 - Vibration sources other than blasting.

BS 6472 uses the Vibration Dose Value (VDV) which is measured or forecast over the day or night-time periods in terms of m/s-1.75. The VDV parameter takes into account how people respond to vibration in terms of frequency content, vibration magnitude and the number of vibration events during an assessment period.

The following table, as set out in the standard, details the values of VDV where various comments from occupiers are possible. The standard notes that the values are applicable for both vertical and horizontal vibration with the appropriate weighting applied. The values in **Table 10-5** will be adopted for this assessment.

Table 10-5: VDV (m/s-1.75) above which Various Degree of Adverse Comment may be Expected in Residential Buildings

Building Type	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential building – Day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential building – Night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

10.2.2.2 Operational Noise & Vibration

10.2.2.2.1 BS 4142 2014

BS 4142:2014: Methods for rating and assessing industrial and commercial sound is the industry standard method for analysing building services plant sound emissions to residential receptors. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. It should also be noted that the EPA NG4 document indicates that this assessment methodology should be used in the assessment of complaints associated with a site's operations. While the current site will not be licenced the guidance contained therein needs to be given due regard.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background sound level (i.e. the LA90,T level measured in the absence of plant items) to the rating level (LAr,T) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS4142 advises that penalties be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that If the intermittency us readily is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied. The following definitions as discussed in BS 4142 as summarised below:

"*ambient sound level, $L_{Aeq,T}$*" equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.

"*residual sound level, $L_{Aeq,T}$*" equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.

"*specific sound level, $L_{Aeq,\ T}$*"	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
"*rating level, $L_{Ar,T}$*"	specific sound level plus any adjustment for the characteristic features of the sound.
"*background sound level, $L_{A90,T}$"*	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

In order to establish an initial estimate of impact, BS 4142 states the following:

> *"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following.*
>
> *a. Typically, the greater this difference, the greater the magnitude of the impact.*
>
> *b. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
>
> *c. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
>
> *d. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*
>
> *Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

The assessment methodology described above (i.e. comparison of rated sound level to background sound level) is quoted in BS4142 as representing a methodology to '*obtain an initial estimate'* of impact. It is important to note that BS4142 also comments that *'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'*. BS4142 provides a list of potential pertinent factors that can influence the *'initial estimate'*. The plant noise assessment conducted in the following sections has been carried out with consideration of the guidance contained in BS4142 as summarised above.

10.2.2.2.2 Assessment of Significance

The draft 'Guidelines for *Noise Impact Assessment'* produced by the Institute of Acoustics/Institute of Environmental Management and Assessment Working Party have been referenced in relation to the potential impact of changes in the ambient noise levels during the construction and the operational phases of the proposed development.

The findings of the Working Party are draft at present although they are of some assistance in this assessment. The draft guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise.

The draft 'Guidelines for Noise Impact Assessment' impact scale adopted in this assessment is shown in **Table 10-6** below. The corresponding significance of impact presented in the EPA Revised Guidelines on the Information to be contained in Environmental Impact Statements (Draft September 2015) is also presented.

Table 10-6: Noise Impact Scale

Noise Level Change dB(A)	Subjective Response	Impact Guidelines for Noise Impact Assessment Significance (Institute of Acoustics)	Impact Guidelines on the Information to be contained in EIS's (EPA)
0	No change	None	Imperceptible
0.1 – 2.9	Barely perceptible	Minor	Not Significant
3.0 – 4.9	Noticeable	Moderate	Slight, Moderate
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial	Significant
10.0 or more	More than a doubling or halving of loudness	Major	Very Significant/ Profound

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in the above table provide a good indication as to the likely significance of changes on noise levels in this case and have been used to assess the impact of operational noise.

10.2.2.3 Inward Noise Impact – Fingal Noise Action Plan

The Fingal Noise Action Plan (NAP) states the following with respect to assessing the noise impact on new residential development:

> *"In the scenario where new residential development or other noise sensitive development is proposed in an area with an existing climate of environmental noise, there is currently no clear national guidance on appropriate noise exposure levels. The EPA has suggested in the interim, that Action Planning Authorities should examine planning policy guidance notes, such as ProPG (2017). Such guidance notes have been produced with a view to providing practitioners with guidance on a recommended approach to the management of noise within the planning system."*

In addition, the following is provided

> *"In advance of any national guidance relating to noise in the planning process, the following actions relating to planning and development will be considered for implementation:*
>
> *a. To integrate Noise Action Plans into the County Development Plans.*
>
> *b. To develop guidelines relating to Noise and Planning for FCC. These guidelines should outline the considerations to be taken into account when determining planning applications for both noise-sensitive developments and for those activities which will generate noise. They should introduce the concept of a risk based approach to assessment of noise exposure, and for Good Acoustic Design to be encouraged as part of all new residential developments in FCC.*
>
> *c. To require developers to produce a noise impact assessment and mitigation plans, where necessary, for any new development where the Planning Authority considers that any new development will impact negatively on pre-existing environmental noise levels within their Council area.*

d. *To ensure that future developments are designed and constructed in such a way as to minimise noise disturbances in accordance with Department of the Environment, Community and Local Government planning guidelines such as the Urban Design Manual. e.g. the position, direction and height of new buildings, along with their function, their distance from roads, and the position of noise barriers and buffer zones with low sensitivity to noise,*

e. *To ensure that new housing areas and in particular brown field developments will be planned from the outset in a way that ensures that at least the central area is quiet. This could mean designating the centre of new areas as pedestrian and cycling zones with future developments to provide road design layouts to achieve low speed areas where appropriate.*

f. *To incorporate street design in new developments, which recognise that residential streets have multi-function uses (e.g. movement, recreation) for pedestrians, cyclists and vehicles, in that priority order. The noise maps will be used to identify and classify the priority areas and streets. In the design of streets, cognisance should be given to the Irish Manual for Roads and Streets 2013.*

g. *To require sound proofing for all windows, in all new residential developments, where noise maps have indicated undesirable high noise levels. This may also lead to a requirement to install ducted ventilation.*

h. *To advise during pre-planning meetings regarding site specific design, the orientation of sensitive rooms and balconies away from noise, designing the layout and internal arrangement in apartments to ensure that similar rooms in individual units are located above each other or adjoin each other and that halls are used as buffer zones between sensitive rooms and staircases."*

In accordance with this NAP policy, this EIAR contains an Acoustic Design Statement (ADS) that has been prepared to comply with the requirements of this policy.

10.2.2.4 Inward Noise Impact – ProPG: Planning & Noise (Inward Noise Impact)

The *Professional Guidance on Planning and Noise* (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a UK or Irish government document, since it's publication it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2 stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- Stage 2 – Involves a full detailed appraisal of the proposed development covering four "key elements" that include:
  a. Element 1 - Good Acoustic Design Process;
  b. Element 2 - Noise Level Guidelines;
  c. Element 3 - External Amenity Area Noise Assessment, and;
  d. Element 4 - Other Relevant Issues.

A key component of the evaluation process is the preparation and delivery of an Acoustic Design Statement (ADS) which is intended for submission to the planning authority. This document is intended to clearly outline

the methodology and findings of the Stage 1 and Stage 2 assessments, so as the planning authority can make an informed decision on the permission. ProPG outlines the following possible recommendations in relation to the findings of the ADS:

A. *Planning consent may be granted without any need for noise conditions;*

B. *Planning consent may be granted subject to the inclusion of suitable noise conditions;*

C. *Planning consent should be refused on noise grounds in order to avoid significant adverse effects ("avoid"); or,*

D. *Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects ("prevent").*

Section 3.0 of the ProPG provides a more detailed guide on decision making to aid local authority planners on how to interpret the findings of an accompanying Acoustic Design Statement (ADS).

A summary of the ProPG approach is illustrated in **Figure 10-1**.

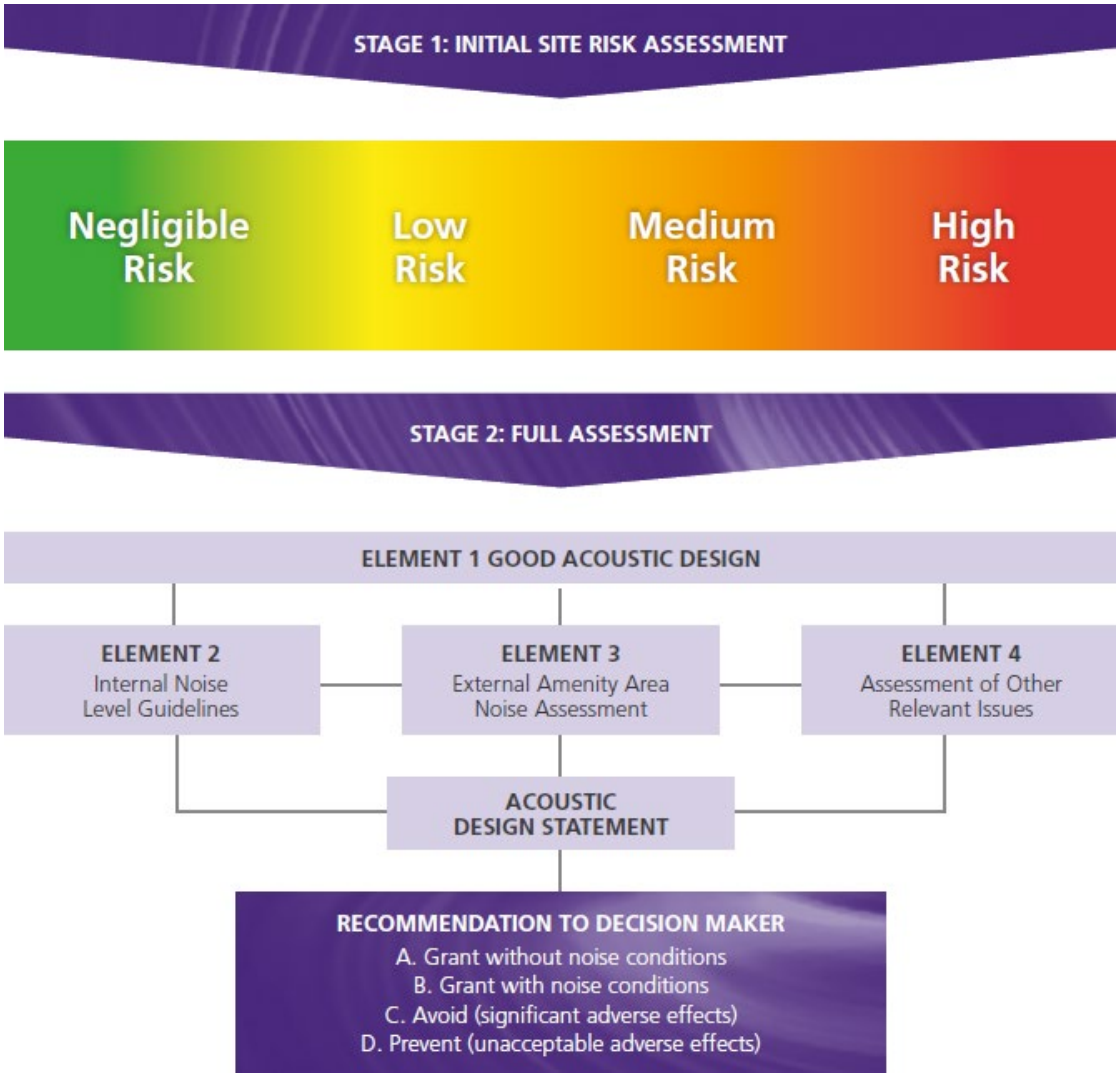

Figure 10-1: ProPG Approach (Source: ProPG)

10.3 Baseline Scenario (Existing Environment)

Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site and to establish the existing noise climate the nearest noise sensitive locations and across the development site itself.

The survey was conducted in general accordance with ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise. Specific details are set out below.

10.3.1 Choice of Measurement Locations

Unattended noise monitoring was undertaken at one location within the development site (A). An additional three attended monitoring locations (B to D) were undertaken within the site representative of the existing noise environment at the closest noise sensitive locations and the noise climate within the development site.

The locations are described below and illustrated in **Figure 10-2**.

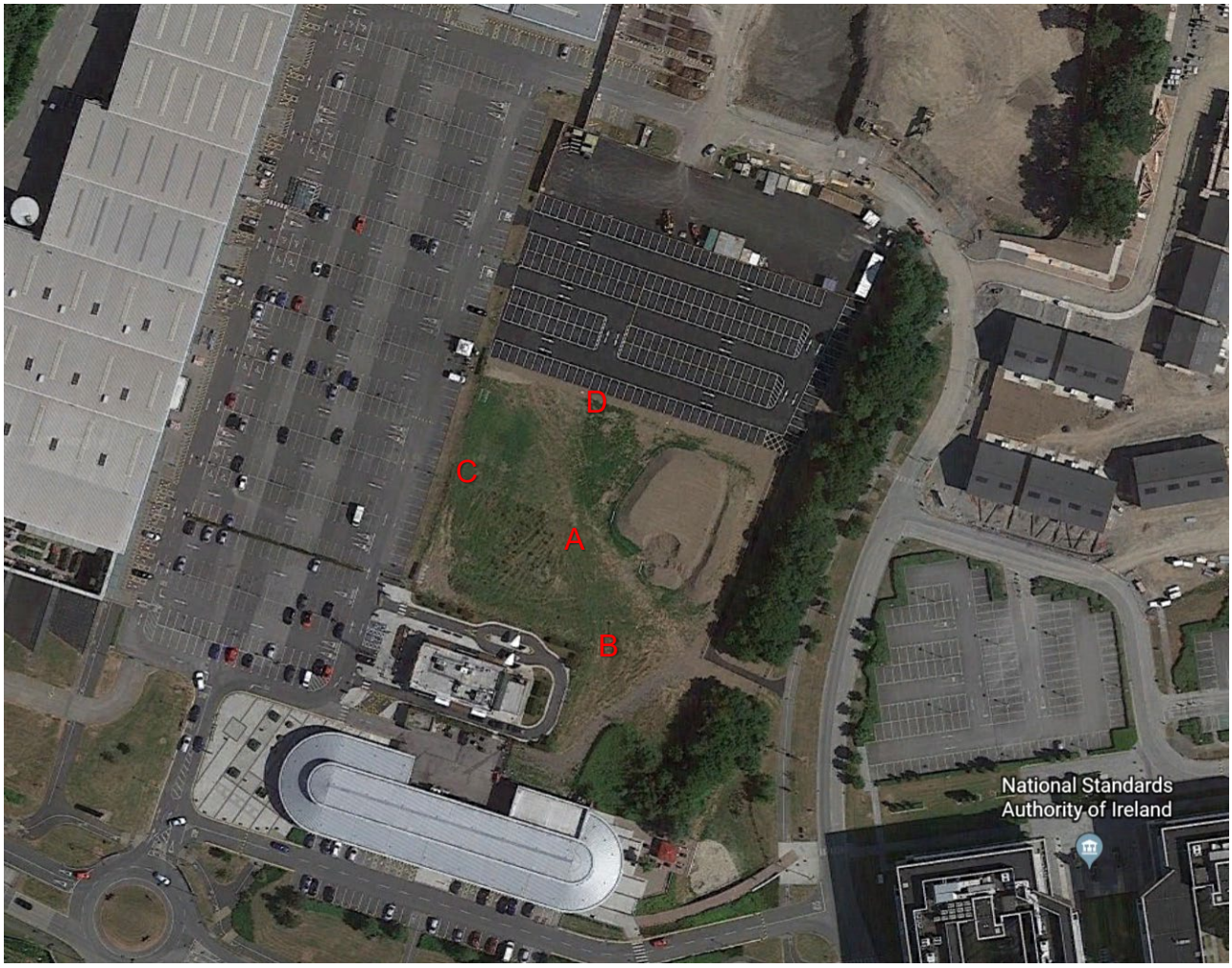

Figure 10-2: Noise Monitoring Locations

10.3.2 Survey Periods

The survey was undertaken over the following surveys periods:

- Unattended noise monitoring was undertaken at Location A between 15:22hrs on 12 November 2018 and 10:00hrs on 15 November 2018; and,

- Attended noise monitoring was undertaken at Locations B to D between 14:50 to 16:35hrs on 12 November 2018.

10.3.3 Monitoring Equipment

The surveys were undertaken using the following monitoring equipment:

Table 10-7: Noise Monitoring Equipment

Location	Manufacturer	Model	Serial Number
A	Rion	NL-42	186671
B - D	Brüel & Kjaer	2250	2446897

Measurement Parameters

The noise survey results are presented in terms of the following parameters.

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{AFmax} is the instantaneous maximum sound level measured during the sample period using the 'F' time weighting.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

10.3.4 Survey Results

The results of the noise monitoring completed at the various locations are discussed in the following sections.

10.3.4.1 Location A

Table 10-8 reviews the measured noise levels at Location A.

Table 10-8: Noise Monitoring Results Location A

Date	Period	dB $L_{Aeq(T)}$	dB $L_{A90(T)}$
12 Nov 2018	Day (07:00 – 23:00)	56	53
	Night (23:00 – 07:00)	53	50
13 Nov 2018	Day (07:00 – 23:00)	55	52
	Night (23:00 – 07:00)	52	48
14 Nov 2018	Day (07:00 – 23:00)	55	52
	Night (23:00 – 07:00)	48	46
15 Nov 2018	Day (07:00 – 23:00)	55	54
Average	Day (07:00 – 23:00)	55	53
	Night (23:00 – 07:00)	51	48

In general, the following noise sources were noted across the site:

- Aircraft activity associated with Dublin Airport;
- M50 road traffic noise;
- A degree of construction noise from nearby sites (during daytime periods);
- Local traffic movements;
- Activity (typically reverse alarms and refrigeration plant) associated with the Compass Distribution Centre;
- Mechanical services associated with existing buildings in Northwood;
- Birdsong, and;
- A degree of wind generated noise.

Ambient noise levels averaged 55dB $L_{Aeq,16hr}$ over daytime periods and 51dB $L_{Aeq,8hr}$ during night time. Background noise levels averaged 53dB $L_{A90,16hr}$ and 48dB $L_{A90,8hr}$ during daytime and night time periods respectively.

The L_{AFmax} levels are also of an interest here, in particular in relation to night time periods. The L_{AFmax} values were measured at 15-minute intervals over the duration of the unattended monitoring survey. **Figure 10-3** presents the distribution of the magnitude of L_{AFmax} events during the night period at the noise monitoring location considered for this assessment.

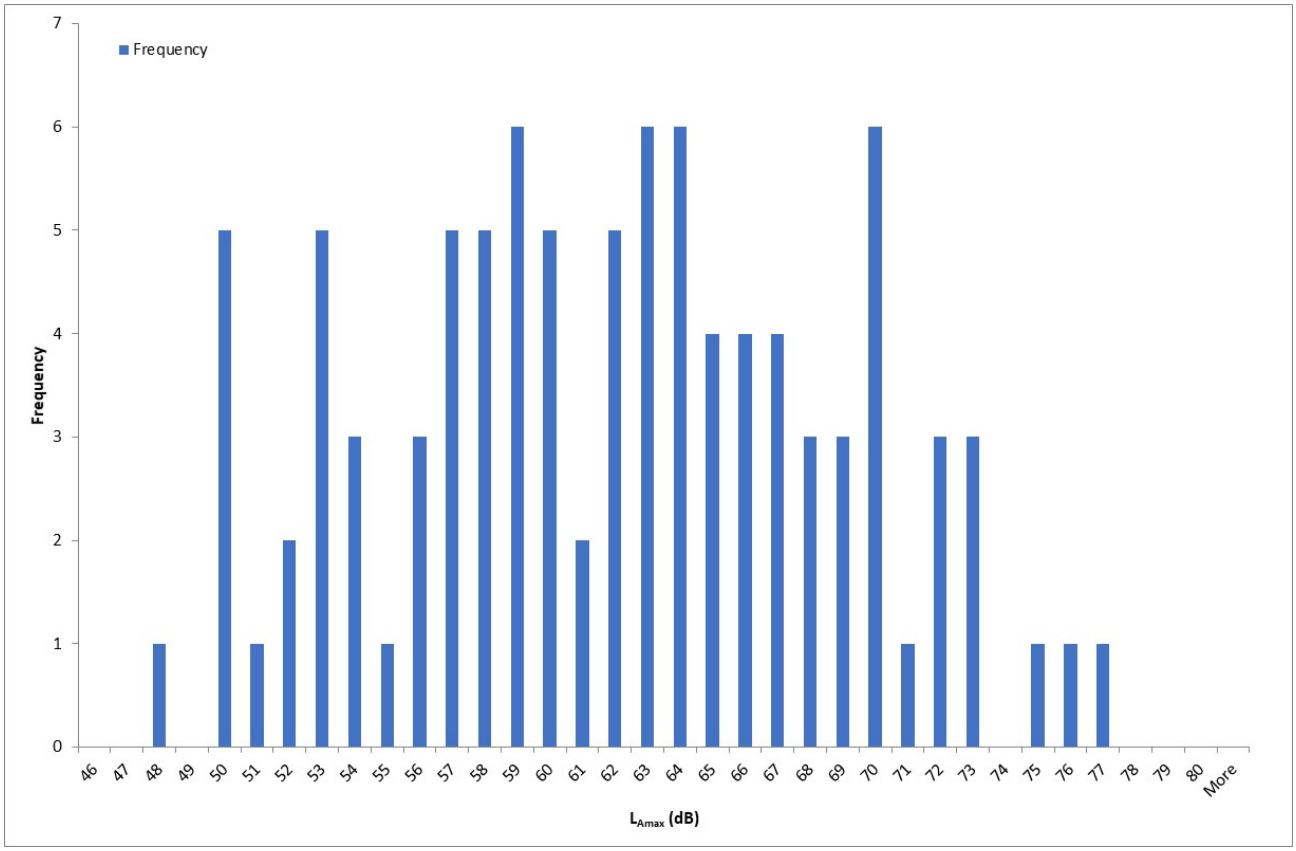

Figure 10-3: Review of LAFmax Events over Night Time Periods

These L_{Amax} levels will be discussed in detail in subsequent sections of this assessment.

No significant level of vibration was noted at this location during setup and removal of the equipment from site.

10.3.4.2 Location B

Table 10.9 presents the results of the noise monitoring completed at Location B.

Table 10-9: Noise Monitoring Results Location B

Date	Time	dB $L_{Aeq(T)}$	L_{Amax}	dB $L_{A90(T)}$
12/11/18	14:54 – 15:09	54	67	52
	15:45 – 16:00	54	66	52

A low level of construction noise from nearby sites, M50 and local traffic and aircraft noise were noted here along with activities associated with nearby retail operations. Noise levels were the order of 54dB $L_{Aeq,15min}$ and 52dB $L_{A90,15min}$.

No significant level of vibration was noted at this location during setup and removal of the equipment from site.

10.3.4.3 Location C

Table 10-10 presents the results of the noise monitoring completed at Location C.

Table 10-10: Noise Monitoring Results Location C

Date	Time	dB $L_{Aeq(T)}$	L_{Amax}	dB $L_{A90(T)}$
12/11/18	15:10 – 15:25	59	67	54
	16:01 – 16:16	56	72	53

A low level of construction noise from nearby sites, M50 and local traffic and aircraft noise were noted here along with activities associated with nearby retail operations. Noise levels were in the range of 56 to 59dB $L_{Aeq,15min}$ and 53 to 54dB $L_{A90,15min}$.

No significant level of vibration was noted at this location during setup and removal of the equipment from site.

10.3.4.4 Location D

Table 10-11 presents the results of the noise monitoring completed at Location D.

Table 10-11: Noise Monitoring Results Location D

Date	Time	dB $L_{Aeq(T)}$	L_{Amax}	dB $L_{A90(T)}$
12/11/18	15:28 – 15:33	56	69	53
	16:17 – 16:32	55	71	52

A low level of construction noise from nearby sites, M50 and local traffic and aircraft noise were noted here along with activities associated with nearby retail operations. Noise levels were in the range of 55 to 56dB $L_{Aeq,15min}$ and 52 to 53dB $L_{A90,15min}$.

No significant level of vibration was noted at this location during setup and removal of the equipment from site.

10.4 Characteristics of the Proposed Development

The proposed development comprises residential apartments. The development also includes ancillary developments including car and bicycle parking areas, internal road layouts and landscaping. A full description of the development can be found in **Chapter 5**.

The potential noise and vibration impact on the surroundings are considered for both the construction and operational phases of this development.

During the construction phase the main site activities will include site clearance, foundation works, building construction, road works, and landscaping. This phase has the greatest potential noise and vibration impacts on its surrounding environment, however this phase will be of short-term impact.

During the operational phase of the development, the primary source of outward noise in the operational context relates to any changes in traffic flows along the local road network and building services noise associated with commercial and office spaces.

The potential associated with construction and operation is assessed in the following sections.

10.5 Impact Assessment

10.5.1 Do Nothing

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and across the development site itself will remain largely unchanged. The noise and vibration levels measured/noted during the baseline studies are considered representative of the Do-Nothing scenario. The Do-Nothing scenario is therefore considered neutral impact.

10.5.2 Construction Phase

10.5.2.1 Construction Phase – Noise

A variety of items of plant will be in use for the purposes site clearance and construction. The type and number of equipment will vary between the varying construction phases depending on the phasing of the works. There will be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for the generation of elevated levels of noise.

The closest noise sensitive locations to the main building works will be the residential units to the east of the site which are at a distance of approximately 60m from the potential construction works. This distance relates to the closest boundary to the nearest residential noise sensitive locations. The remainder of works will take place across the site at varying distances of up to 150m. Reference to the noise baseline survey results (**Section 10.3.5**) and guidance contained in BS 5228 Part 1 for construction noise levels discussed in **Table 10.1**, the threshold for significance from constriction activities is set as follows for the closest residential noise sensitive locations:

Significance Category - A: ,

Daytime (08:00 – 19:00hrs)/ Saturdays (08:00 – 14:00hrs) **65dB $L_{Aeq,1hr}$**

Evening and Weekends **55dB $L_{Aeq,1hr}$**

An appropriate construction noise limit at the nearest commercial buildings is considered to be **75dB $L_{Aeq,1hr}$.**

For site clearance, building construction works and landscaping works (excavators, loaders, dozers, concreting works, mobile cranes, generators), noise source levels are quoted in the range of 70 to 80dB L_{Aeq} at distances of 10m within BS 5228-1. For the purposes of this assessment, a combined sound power value

of 115dB L_w(A) has been used for construction noise calculations. This would include, for example, 5 no. items of construction plant with a sound pressure level of 80dB L_{Aeq} at 10m operating simultaneously along the closest works boundary.

Given, the type and number of construction equipment will vary over the course of the construction phase, noise levels have been calculated at the closest noise sensitive locations assuming the construction noise levels and distances noted above. For the purpose of the assessment, a standard site hoarding of 2.4m high has been included in the calculations for noise sensitive boundaries. The calculations also assume that the equipment will operate for 66% of the working time. **Table 10-12** summarises the result of this assessment.

Table 10-12: Indicative Construction Noise Levels at Nearest Noise Sensitive Locations

Date	Sound Power at construction works, dB L_w(A)	Calculated noise levels at varying distances, dB $L_{Aeq,1hr}$					
		20m	30m	50m	60m	100m	200m
Site Clearance General Construction Landscaping	115	71	68	63	62	57	51

The predicted noise levels detailed in the **Table 10-12** above indicate that during the main construction phase including site clearance, building construction works etc. assuming up to 5 items of plant are operating simultaneously at the closest noise sensitive boundaries, there is potential for the residential significance threshold to be exceeded at distances of up to 30m. Considering the closet residential noise sensitive locations to the development lands are some 60m distant, and based on the predicted noise levels above, the associated construction noise impact is not considered significant.

In terms of the nearest commercial properties the predicted noise levels are the order of the significance threshold of 75dB $L_{Aeq,1hr}$. Again, the predicted associated construction noise impact is not considered significant.

A schedule of best practice noise mitigation measures is included in **Section 10.6**.

10.5.2.1.1 Construction Traffic

In terms of the additional construction traffic on local roads that will be generated as a result of this development the following comment is presented. Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction phase associated with various phases of the development, as outlined in the relevant sections of this EIAR will not result in a significant noise impact.

10.5.2.2 Review of Impacts

In terms of noise associated with these construction activities the associated effect is stated to be:

Quality	Significance	Duration
Negative	Slight	Short Term

10.5.2.3 Construction Phase – Vibration

Potential for vibration impacts during the construction phase programme are likely to be limited given the ground breaking, piling and excavations required. There is potential for piling to be used for building and basement foundations for apartment buildings. For the purposes of this assessment the expected vibration

levels during piling assuming augured or bored piles have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2: Vibration, publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- 0.54mm/s at a distance of 5m, for auguring;
- 0.22mm/s at a distance of 5m, for twisting in casing;
- 0.42mm/s at a distance of 5m, for spinning off, and;
- 0.43mm/s at a distance of 5m, for boring with rock auger.

Considering the low vibration levels at very close distances to the piling rigs, vibration levels at the nearest buildings are not expected to pose any significance in terms of cosmetic or structural damage. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of nearby buildings.

In this instance, taking account of the distance to the nearest sensitive off-site buildings, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in **Table 10-3** to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants, as set out in **Table 10.4**. The potential vibration impact during the construction phase if of short-term, neutral and imperceptible impact.

In terms of vibration due to the distance of activities from the site to the nearest sensitive locations and controlling vibration levels to those detailed in **Table 10.6** in terms of these construction noise the associated effect is stated to be

Quality	Significance	Duration
Neutral	Imperceptible	Short Term

10.5.3 Operational Phase

10.5.3.1 Operational Phase – Noise

Once the development is operational, the potential noise impacts to the surrounding environment are minimal. The residential aspect of the development is not expected to generate any significant noise sources over and above those which form part of the existing environment at neighbouring residential areas (road traffic noise, estate vehicle movements, children playing etc.) and hence no significant impact are expected from this area of the development site.

The main potential noise impact associated with the proposed development is considered therefore to relate to the generation of additional traffic to and from the site as a result of the new residential buildings. Potential noise impacts also relate to operational plant serving the apartment buildings, where relevant.

Once operational, there are no vibration sources associated with the development site.

10.5.3.1.1 Additional Vehicular Traffic on Surrounding Roads

In terms of the additional traffic on local roads that will be generated as a result of this development the following comment is presented. Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to this development will not result in a significant noise impact.

In summary, the predicted increase in noise levels associated with vehicles at road junctions in the vicinity of the proposed development is of long-term imperceptible impact.

10.5.3.1.2 Building Services Plant

Once operational, there will be building services plant items required to serve the residential aspect of the development. These will typically be limited to heating and cooling plant and extract units, depending on the building design and user requirements. Given the use of these buildings, the majority of plant items are likely to be required during daytime hours only, however, there may be requirement for night-time operational plant, depending on specific requirements.

The location or type of building services plant has not yet been established, therefore it is not possible to calculate noise levels to the surrounding environment. In this instance, is it best practice to set appropriate noise limits that will inform the detailed design during the selection and layout of building services for the development,

These items will be selected at a later stage, however, they will be designed and located so that there is no negative impact on sensitive receivers within the development itself. The cumulative operational noise level from building services plant at the nearest noise sensitive location within the development (e.g. apartments, etc.) will be designed/attenuated to meet the relevant BS 4142 noise criteria for day and night-time periods as set out in this assessment. Based on the baseline noise data collected for this assessment it is considered an appropriate design criterion is the order of 40dB $L_{Aeq,15min}$. This limit is set in order to achieve acceptable internal noise levels within residential spaces based on prevailing noise levels in the area.

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site.

In terms of noise associated with day to day activities the associated effect is stated to be as follows:

Quality	Significance	Duration
Neutral	Imperceptible	Long Term

10.5.3.2 Operational Phase – Vibration

There are no sources of vibration associated with the day to day operation of the development that will give rise to impacts at nearby noise sensitive locations. In terms of these the operational phase of the development the associated effect is stated to be:

Quality	Significance	Duration
Neutral	Imperceptible	Long Term

10.5.4 Inward Noise Impact

The development lands in question are in proximity to the outer noise contour associated with Dublin Airport operations. The operation of this and other transport elements (e.g. M50) are potential noise sources to the residential developments proposed for the site itself.

10.5.4.1 Existing Noise Climate

The existing noise and vibration climate within the development lands was surveyed and the results summarised in **Section 10.3.5** of this report. The results of the survey have indicated that local traffic, traffic on the M50 and aircraft/airport noise, contribute to the noise levels at the measurement locations across the site.

In order to determine the inward noise impact for noise sensitive properties proposed as part of the development, it is necessary to determine the internal noise levels within the proposed buildings. These can then be compared against appropriate internal noise criteria from ProPG, as discussed in **Section 10.2.2.4.**

10.5.4.1.1.1 Stage 1 – Noise Risk Assessment

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. **Figure 10-4** presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site. It should be noted that a site should not be considered a negligible risk if more than 10 LAFmax events exceed 60 dB during the night period and the site should be considered a high risk if the LAFmax events exceed 80 dB more than 20 times a night.

Paragraph 2.9 of ProPG states that:

> *"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future."*

In this instance reference is made to baseline noise surveys undertaken at the site Noise monitoring completed on the site during daytime periods indicate average noise levels of some 55dB $L_{Aeq,16hr}$. Night time noise levels are the order of 51dB $L_{Aeq,8hr}$ across the site.

ProPG states the following with respect to the initial risk assessment:

> *"The risk assessment should not include the impact of any new or additional mitigation measures that may subsequently be included in development proposals for the site and proposed as part of a subsequent planning application. In other words, the risk assessment should include the acoustic effect of any existing site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development proceeds."*

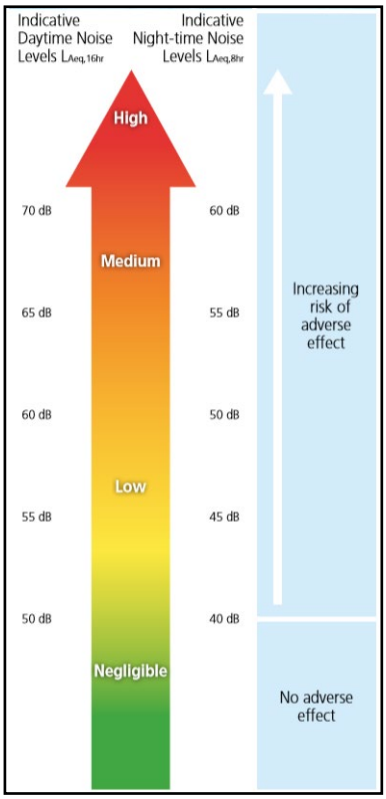

Figure 10-4: ProPG Stage 1 – Initial Noise Risk Assessment

Consideration also needs to be given to the fact that the noise environment across the site may change in future years. In terms of developments that are likely to take place in the environs of the site it is considered that the development of the Northern Parallel Runway at Dublin Airport and/or future air traffic volume growth has the greatest potential to affect the existing noise climate.

Reference is therefore made to the *Draft Dublin Airport Local Area Plan (Fingal Development Plan 2017 to 2023)* that presents various 'noise zones' in the vicinity of the airport based on future developments including the potential operation of the Northern Parallel Runway.

Fig. 9.1 Dublin Airport Proposed Noise Zones

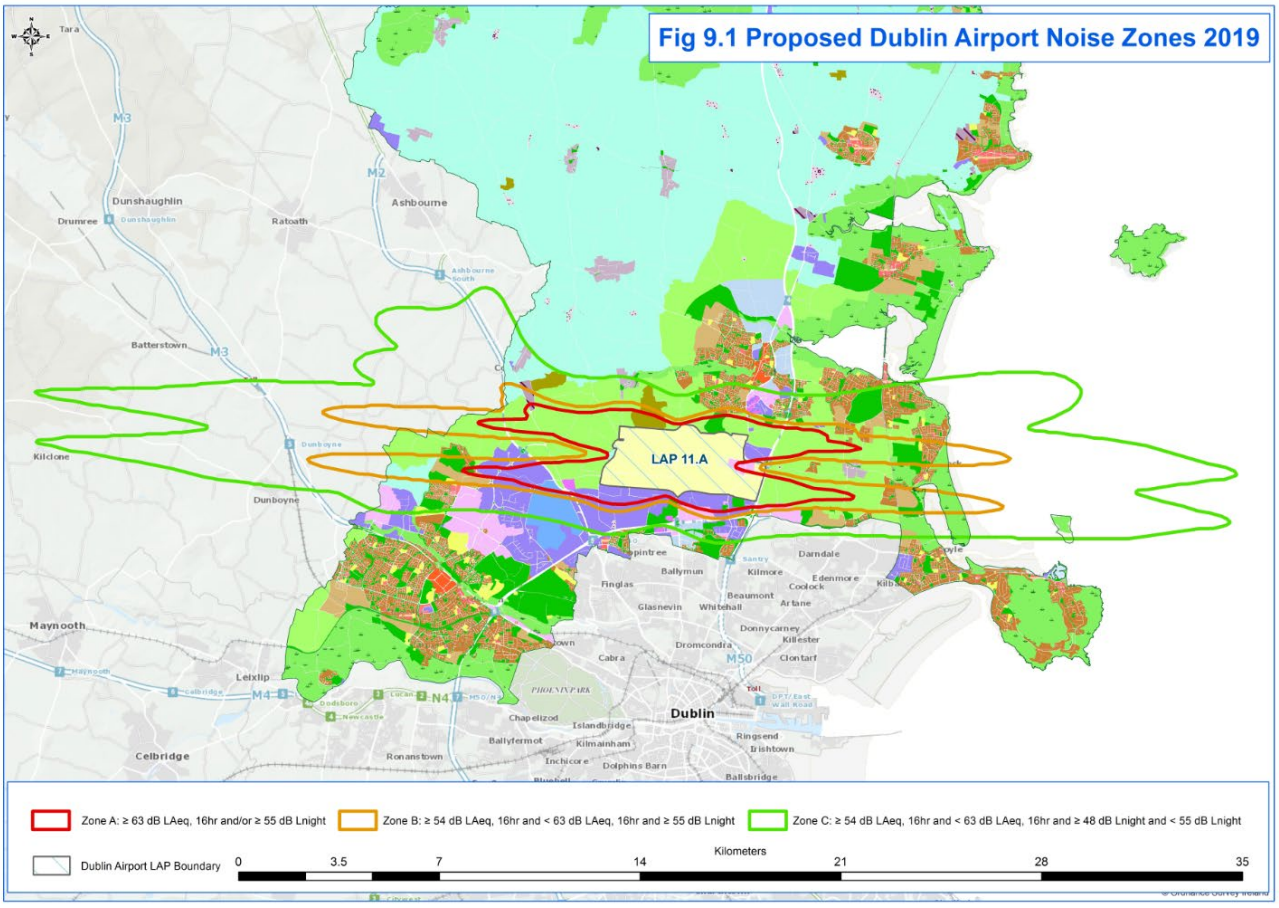

Figure 10-5: Proposed Dublin Airport Noise Zone 2019

Figure 10-5, as extracted from the *Draft Dublin Airport Local Area Plan* provides noise contour maps for airport. The site in question is located between the Zone B (Orange) and Zone C (Green) contours. Based on this information the aircraft noise levels within this zone are predicted to be as follows:

- Daytime (07:00 to 23:00hrs) ≥54 to <63dB LAeq,16hr
- Night (23:00 to 07:00hrs) ≥55dB LAeq,16hr

This site in question is located in closer proximity to the Zone C (Green) contour than the Zone B (Orange) as indicated in **Figure 10-6**.

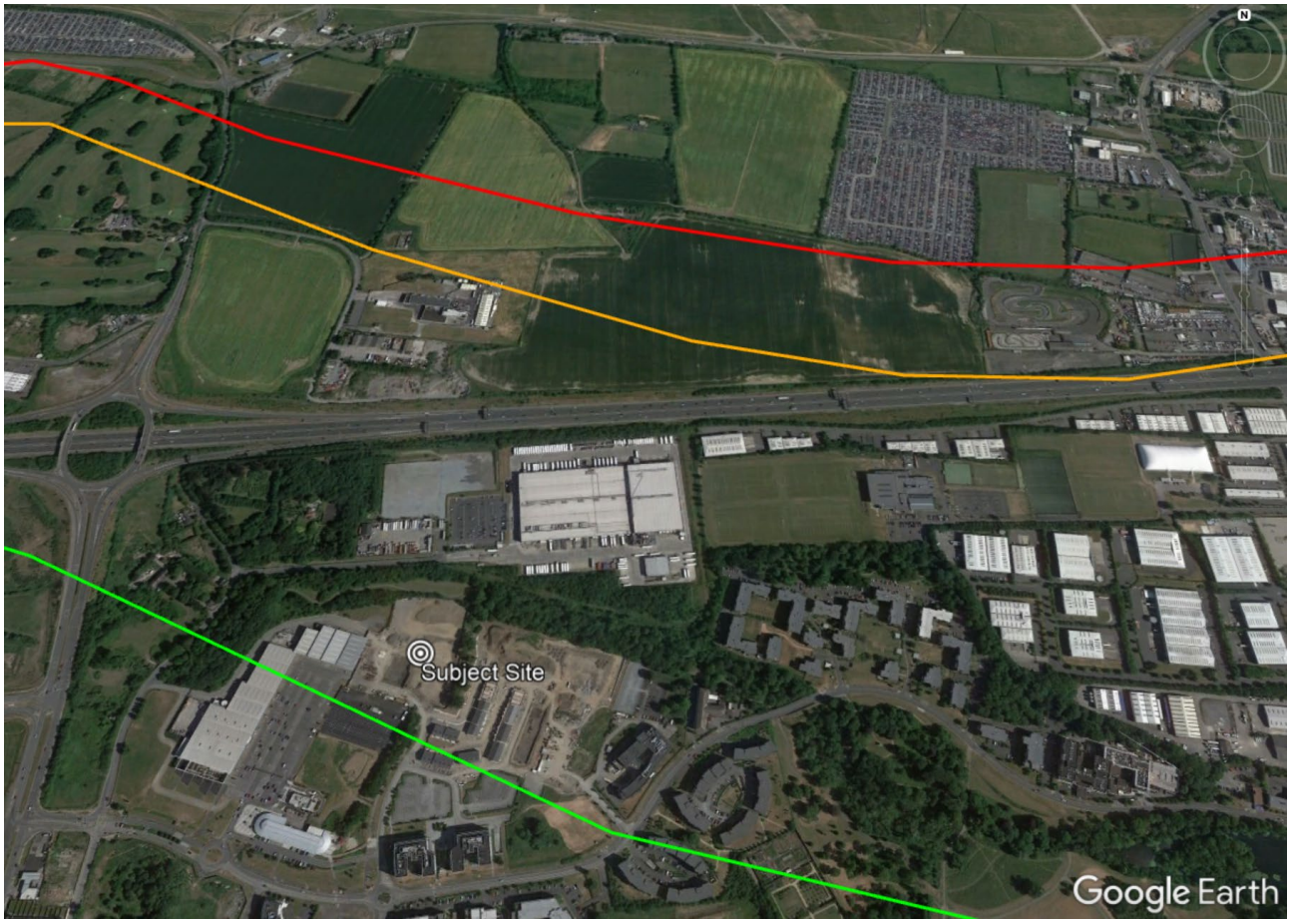

Figure 10-6: Location of Site in Context of Noise Zones

In this instance an average daytime level of some 60dB $L_{Aeq,16hour}$ and levels of the order of 55dB $L_{Aeq,8hrs}$ during night time periods are indicated across the majority of the site.

Giving consideration to the measured and potential future noise levels presented in the previous sections, the initial site noise risk assessment has concluded that the level of risk across the site varies from low medium noise risk.

Additionally, the Stage 1 Noise Risk Assessment requires analyses of the L_{AFmax} noise levels. In the case of the AWN survey the L_{AFmax} noise levels typically measured up to 77dB during the night. ProPG guidance considers 20 night events over 80dB to be a high risk, therefore this site would be considered a medium risk in terms of maxima events.

ProPG states the following with respect to low and medium risks:

Low Risk	*At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.*
Medium Risk	*As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.*

Given the above it can be concluded that the development site may be categorised as *Low to Medium Risk* and as such an Acoustic Design Strategy will be required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impact will be avoided in the final development.

It should be noted that ProPG states the following with regard to how the initial site noise risk is to be used,

> *"2.12 It is important that the assessment of noise risk at a proposed residential development site is not the basis for the eventual recommendation to the decision maker. The recommended approach is intended to give the developer, the noise practitioner, and the decision maker an early indication of the likely initial suitability of the site for new residential development from a noise perspective and the extent of the acoustic issues that would be faced. Thus, a site considered to be high risk will be recognised as presenting more acoustic challenges than a site considered as low risk. A site considered as negligible risk is likely to be acceptable from a noise perspective and need not normally be delayed on noise grounds. A potentially problematical site will be flagged at the earliest possible stage, with an increasing risk indicating the increasing importance of good acoustic design."*

Therefore, following the guidance contained in ProPG does not preclude residential development on sites that are identified as having medium risk noise levels. It merely identifies the fact that a more considered approach will be required to ensure the developments on the higher risk sites are suitable designed to mitigate the noise levels. The primary goal of the approach outlined in ProPG is to ensure that the best possible acoustic outcome is achieved for a particular site.

10.5.4.1.1.2 Stage 2 – Full Acoustic Assessment

Element 1 – Good Acoustic Design Process

ProPG Guidance

In practice, good acoustic design should deliver the optimum acoustic design for a particular site without adversely affecting residential amenity or the quality of life or occupants or compromising other sustainable design objectives. Section 2.23 of the ProPG outlines the following checklist for Good Acoustic Design:

- Check the feasibility of relocating, or reducing noise levels from relevant sources;
- Consider options for planning the site or building layout;
- Consider the orientation of proposed building(s);
- Select construction types and methods for meeting building performance requirements;
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc;
- Assess the viability of alternative solutions; and,
- Assess external amenity area noise.

In the context of the proposed development, each of the considerations listed above have been addressed in the following subsections.

Relocation of Reduction of Noise from Source

Noise sources incident upon the development site have been determined to be low to medium. With regards to aircraft and road noise sources, these sources are located outside the redline boundary of the site and therefore it is beyond the scope of this development to introduce any noise mitigation at source.

Planning, Layout and Orientation

Due to major noise source of concern in relation to the site being aircraft noise, planning, layout and orientation changes will not have any material impact on aircraft noise levels incident on the proposed buildings.

Select Construction Types for meeting Building Regulations

The designs of all buildings are required to meet with all relevant parts of the Building Regulations. The specific detail of which will be completed at detailed design stage. In terms of the building sound insulation, the glazed elements and any required ventilation paths to achieve compliance with Part F of the Building Regulations will be the weakest elements in the façade.

Consideration will therefore be given to the provision of sound insulation performance for glazing and ventilation, where required to achieve suitable internal noise levels within the development. Achievement of acceptable internal ambient noise levels does not form part of building regulation requirements; however, this will be incorporated into the building design in line with best practice and compliance with the guidance set out in ProPG.

Impact of noise control measures on fire, health and safety etc.

The good acoustic design measures that have been implemented on site, e.g. glazing specifications are considered to be cost neutral and do not have any significant impact on other issues.

Assess Viability of Alternative Solutions

The main noise sources incident on the site are aircraft and road traffic. These sources are largely mitigated by the distance to the building, screening by the on-site building and orientation of building layouts to avoid overlooking of sensitive spaces to the main noise sources. All the measures listed above aid in the control of noise intrusion to the residential buildings across the development site.

Assess External Amenity Area Noise

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

Noise levels across external amenity areas is addressed in the following paragraphs.

Summary

Considering the constraints of the site, insofar as possible and without limiting the extent of the development area, the principles of Good Acoustic Design have been applied to the development.

Element 2 – Internal Noise Levels

Internal Noise Criteria

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in **Table 10-13** and are based on annual average data.

Table 10-13: ProPG Internal Noise Levels

Activity	Location	(07:00 to 23:00hrs)	(23:00 to 07:00hrs)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8h}$

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external WHO guidelines, then a relaxation of the internal LAeq values by up to 5dB can still provide reasonable internal conditions.

Façade Noise Levels

Based on the reviews and noise measurements presented previously for the site, noise levels have been predicted across the development. The expected levels are cumulative, taking account of aircraft and road sources, where relevant, at specific buildings. **Table 10-14** summarises the calculated noise level at the most exposed buildings. For apartment buildings, the calculated levels from first to upper floors are included.

Table 10-14: Expected External Noise Levels on Site

Location	Daytime, $L_{Aeq, 16hr}$	Night-time, $L_{Aeq, 8hr}$
Across the Site	55 to 60	50

Internal Noise Levels with Open / Closed Windows

In the first instance, it is important to note the typical level of sound reduction offered by a partially open window is typically applied as 15dB[24] to 18dB. Considering the design goals outlined in **Table 10-14** and a sound reduction across an open window of 15dB, the free-field noise levels that would be required to ensure that internal noise levels do not exceed good (i.e. at or below the internal noise levels) or reasonable internal noise levels with windows open (i.e. 5 dB above the internal noise levels) have been summarised in **Table 10-15**.

Table 10-15: External Noise Levels Required to Achieve Internal Noise Levels with Windows Open

Location	Daytime, $L_{Aeq, 16hr}$	Night-time, $L_{Aeq, 8hr}$
Good (i.e. at or below the internal noise levels)	50 – 55dB	45dB
Reasonable (i.e. 5 dB above the internal noise levels)	55 – 60dB	50dB

[24] Section 2.33 of ProPG, additional information can be found in the DEFRA NANR116: *'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows'*

Reference to the expected noise levels within **Table 10-14**, is it possible to achieve good and reasonable internal daytime noise levels across the development buildings with an open window scenario.

During night-time periods, is it possible to achieve reasonable internal noise levels across the development buildings with an open window scenario.

Recommend Façade Treatment

The British Standard BS EN 12354-3: 2000: Building acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound provides a calculation methodology for determining the sound insulation performance of the external envelope of a building. The method is based on an elemental analysis of the building envelope and can take into account both the direct and flanking transmission paths.

The Standard allows the acoustic performance of the building to be assessed taking into account the following:

- Construction type of each element (i.e. windows, walls, etc.);
- Area of each element;
- Shape of the façade, and;
- Characteristics of the receiving room.

The principals outlined in BS EN 12354-3 are also referred to in BS8233 and Annex G of BS8233 provide a calculation method to determine the internal noise level within a building using the composite sound insulation performance calculated using the methods outlined in BS EN 12354-3. The methodology outlined in Annex G of BS8233 has been adopted here to determine the required performance of the building facades. This approach corrects the noise levels to account for the frequency content of the source in question. In this instance, rail and road traffic noise, depending on the buildings in question. For properties with cumulative impacts from both rail and road, the frequency content of the dominant source has been used for calculations.

As is the case in most buildings, the glazed elements of the building envelope are typically the weakest element from a sound insulation perspective. In this instance the facades will be provided with glazing that achieves the minimum sound insulation performance as set out in **Table 10-16**. For the purposes of this assessment it is assumed that the building with be ventilated by heat recovery units therefore removing the need to open windows to ventilate living spaces.

Table 10-16: Sound Insulation Performance Requirements for Glazing, SRI (dB)

Location	Octave Band Centre Frequency (Hz)						dB R_w
	125	250	500	1k	2k	4k	
Across Site	20	24	31	39	39	43	35
Penthouses	23	27	34	42	42	45	38

The typical glazing configurations and overall R_w outlined above are provided for information purposes only. The over-riding requirement is the Octave Band sound insulation performance values which may also be achieved using alternative glazing configurations. Any alternative system will be required to provide the same level of sound insulation performance set out in **Table 10-16** or greater.

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system. In the context of the acoustic performance specification the 'glazing system' is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

It is advised that the window supplier provides laboratory tests confirming the sound insulation performance, (to British Standard 2750 Part 3:1980 and British Standard 5821, or British Standard EN ISO 140 Part 3 1995 and British Standard EN ISO 717, 1997). It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing system when installed on site.

Wall Construction

In general, all wall constructions (i.e. block work or concrete) offer a high degree of sound insulation, much greater than that offered by the glazing systems. Therefore, noise intrusion via the wall construction will be minimal. The calculated internal noise levels across the building façade have assumed a minimum sound reduction index of 50 dB R_w for this construction.

Internal Noise Levels

Taking into account the external façade levels and the specified acoustic performance to the building envelope, the internal noise levels have been calculated. For all buildings within the development site, the good to reasonable internal noise levels are achieved with both windows open and closed.

Element 3 – External Amenity Areas

Based on the measured external noise levels noted during the site surveys it is expected that noise levels at balconies and external amenity areas across the development site will be within the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$. The objectives of achieving suitable external noise levels is achieved within the overall site.

10.6 Mitigation Measures

10.6.1 Construction Phase

Best practice noise and vibration control measures will be employed by the contractor during the construction phase in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening, and;
- liaison with the public.

Further comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise monitoring, where required.

10.6.1.1 Selection of Quiet Plant

This practice is recommended in relation to static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the

site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

10.6.1.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. The following best practice migration measures should be considered:

- Site compounds should be located away from noise sensitive boundaries within the site constraints. The use lifting bulky items, dropping and loading of materials within these areas should be restricted to normal working hours.
- For mobile plant items such as cranes, dump trucks, excavators and loaders, maintaining enclosure panels closed during operation can reduce noise levels over normal operation. Mobile plant should be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system.
- For percussive tools such as pneumatic breakers, a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Erect localised screens around breaker or drill bit when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures should be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- For compressors, generators and pumps, these can be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

10.6.1.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard construction site hoarding (2.4m in height) with a mass per unit of surface area greater than 7 kg/m^2 can provide adequate sound insulation.

10.6.1.4 Liaison with the Public

A designated noise liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, prior to particularly noisy construction activity, e.g. piling, the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

10.6.1.5 Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration,

the working programme will be phased so as to ensure noise limits are not exceeded due to cumulative activities. This will be reviewed in relation to other potential cumulative works occurring on adjacent construction site in close proximity to noise sensitive properties which have the potential to lead to significant construction noise impacts.

10.6.2 Operational Phase

During the operational phase of the development, noise mitigation measures with respect to the outward impact of the development are not deemed necessary.

10.6.2.1 Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the outward impact of traffic from the development are not deemed necessary.

10.6.2.2 Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criterion adopted in this assessment is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

10.7 Monitoring Measures (Construction and Operational)

10.7.1 Construction Phase

Monitoring of construction noise and vibration levels at the site boundary during the construction phase of the proposed development is recommended during works stages that have the potential to general elevate levels of noise and vibration. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise and be located a distance of greater than 3.5m away from any reflective surfaces, e.g. walls, in order to ensure a free-field measurement without any influence from reflected noise sources. Vibration monitoring should be conducted in accordance with BS7385-1 (1990) Evaluation and measurement for vibration in buildings — Part 1: Guide for measurement of vibrations and evaluation of their effects on buildings or BS6841 (1987) Guide to measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock.

10.7.2 Operational Phase

There is no monitoring recommended for the operational phase of the development as impacts in relation to noise and vibration are predicted to be not significant.

10.8 Cumulative Impact

The proposed development combined with other permitted developments in the area have the potential to result in cumulative noise or vibration impacts at surrounding noise sensitive locations during the construction and operational phases of the development.

The baseline scenario as measured, takes into account existing road traffic, aircraft noise and operational noise from the existing commercial operations in the vicinity of the development.

Potential operational cumulative impacts relate to increased traffic flows resulting from other developments and any building services plant from other sources. Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to the construction and operational phases associated with various phases of the development, as outlined in the relevant sections of this EIAR will not result in a significant noise impact.

10.9 Residual Impact

10.9.1 Construction Phase

During the construction phase of the project there is the potential for temporary noise impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits and hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum as far as practicable.

During periods when construction works are occurring at distances of up to 30m from the nearest noise sensitive locations to the site boundary, there is potential for temporary, negative, moderate to significant noise impacts to occur.

For the remainder of construction periods, construction noise impacts will be short-term, negative, slight to moderate.

Vibration impacts during the construction phase will be short-term and negligible.

10.9.2 Operational Phase

The predicted change noise levels associated with additional traffic is predicted to be of imperceptible impact along the existing road network. In the context of the existing noise environment, the overall contribution of induced traffic is considered to be of neutral, imperceptible and long-term impact to nearby residential locations.

Noise levels associated with building services plant are expected to be well within the adopted day and night-time noise limits at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise impact from this source will be of neutral, imperceptible, long term impact.

10.10 References

Fingal Noise Action Plan 2018 – 2023 (NAP).

Draft Dublin Airport Local Area Plan (Fingal Development Plan 2017 to 2023).

BS 8233: 2014: Guidance on sound insulation and noise reduction for buildings.

British Standard BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.

Design Manual for Roads & Bridges – Volume 11 Section 3.

British Standard BS 5228 (2009 +A1 2014): Code of Practice for Control of Noise and Vibration on Construction and Open Sites *Part 1: Noise & Part 2: Vibration.*

British Standard BS 7385 (1993): *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*.

Calculation of Road Traffic Noise, Department of Transport Welsh Office, HMSO, 1988.

EPA: *Guidance Note for Noise – Licence Applications, Surveys and Assessments in Relation to Scheduled Activities NG4* (2012).

ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.*

ISO 9613 (1996): *Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.*

11 CULTURAL HERITAGE

11.1 Introduction

Cultural Heritage is defined by UNESCO as “the legacy of physical artefacts and intangible attributes of a group or society that are inherited from past generations, maintained in the present and bestowed for the benefit of future generations” (www.unesco.org/new/en/cairo/culture/tangible-cultural-heritage). In terms of the present project, Cultural Heritage is assumed to include all humanly created features on the landscape, including portable artefacts, which might reflect the prehistoric, historic, architectural, engineering and/or social history of the area.

The Cultural Heritage of the area of the proposed development was examined through an Archaeological, Architectural, and Historical study. The Archaeological and Architectural studies involved a documentary / cartographic search and focussed field inspection of the area, while the historical study involved a documentary search.

The report discusses the receiving environment from a Cultural Heritage perspective. It provides information with respect to previously identified baseline data and assesses the impact of the proposals on identified sites and areas of Cultural Heritage interest and/or potential.

This section should be read in conjunction with the site layout plans for the site and project description provided in **Chapter 5** of this EIAR.

This chapter has been prepared by Martin Byrne MA, Dip. EIA Mgmt, MIAI, an archaeologist with over twenty years working experience and a founder of Byrne Mullins Archaeology Consultants.

11.1.1 Scoping

Scoping of the proposal did not identify any significant issues with respect to Cultural Heritage for consideration in the EIAR.

Further to this, no principal issues were identified through stakeholder feedback (see **Chapter 2** for details of consultation undertaken) for consideration under Cultural Heritage.

11.2 Assessment Methodology

The Cultural Heritage components of the study comprise the results of a survey and evaluation of selected sites of archaeological and architectural heritage architectural potential within, and in the immediate environs of, the proposed development area. The work consists of the results of the paper survey and the field inspection.

Desk-top study:

As part of a documentary/cartographic search, the following principal sources were examined from which a list of sites and areas of Cultural Heritage interest/potential was compiled:

- Record of Monuments and Places – Co. Dublin (RMP).
- Sites and Monuments Record of the Archaeological Survey of Ireland (SMR) – www.archaeology.ie
- Topographical Files of the National Museum of Ireland.
- Annual Archaeological Excavations Bulletin – www.excavations.ie
- Dublin Archaeological Data – www.heritagemaps.ie
- Aerial Photographic & Cartographic Archive of the Ordnance Survey of Ireland – www.osi.ie

- National Inventory of Architectural Heritage – Survey of the Architectural Heritage of Fingal County (NIAH) – www.buildingsofireland.ie
- Placenames Commission – www.logainm.ie
- Documentary and cartographic sources in Fingal County Library.
- Fingal Development Plan 2017-2023 (FDP).
- Dublin City Council Development Plan 2016-2022 (DCDP).
- National Folklore Collection (The School's Collection) – www.duchas.ie

Site Visit:

Following completion of the preceding paper survey, a field survey was undertaken in early-April 2019. This entailed a surface reconnaissance of the subject lands and inspections of the surrounding lands, where possible.

An attempt was also made to identify previously unrecorded sites of cultural heritage potential within, and in the immediate environs of, the proposed development area.

Sites/features of cultural heritage potential identified on the basis of the paper survey were inspected in an attempt to confirm their locations on the ground and to determine, if possible, their likely extent.

11.2.1 Assessment Approach

The assessment approach is based on professional judgement and the evidence baseline established in the initial Scoping Report and based on the Desk-top study

11.2.2 Definition of Study Area

The subject development lands (red-line boundary) and an area of 500m surrounding such lands were determined to be the Study Area for Cultural Heritage. The extent of the Cultural Heritage Study Area was chosen to reflect an appropriate context for the development, beyond which it was considered that a development of this nature would have no direct/indirect impacts.

11.2.3 Assessment Criteria

Impacts are defined as 'the degree of change in an environment resulting from a development' (Environmental Protection Agency 2017).

They are generally described as profound, significant or slight impacts on cultural heritage assets. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent. Impacts can be identified from detailed information about a project, the nature of the area affected and the range of cultural heritage assets potentially affected.

Development can affect the cultural heritage resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of cultural heritage assets, particularly archaeological remains and deposits, or physical loss to the setting of archaeological monuments and to structures and garden infrastructure of architectural heritage interest and to the physical coherence of the landscape.
- Cultural heritage assets, especially possible subsurface archaeological remains can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy

machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.

- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.

- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments/structures and historic landscape elements as well as their visual amenity value.

- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.

- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.

- Disruption due to construction also offers in general the potential for adversely affecting cultural heritage assets, including unknown subsurface archaeological remains and features within the curtilage of historic gardens and structures of architectural heritage interest. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to cultural heritage assets, especially archaeological monuments, and the increased level of knowledge of a monument, architectural heritage structure or historic landscape as a result of assessment and fieldwork.

The severity of a given level of land-take for development or visual intrusion varies with the type of cultural heritage monument, structure or landscape features and its existing environment.

Severity of impact can be judged taking the following into account:

The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost.

Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;

11.3 Baseline Scenario (Existing Environment)

11.3.1 Historical Background

The subject development lands form part of the townland of Santry Demesne, in the barony of Coolock and the civil parish of Santry (O.S. 6” Map – Dublin Sheet 14). The name Santry derives from the Irish Seantrabh – the ‘old tribe’ (Placenames Commission – www.logainm.ie), although Burnell (2006, 340) suggests that it may mean the ‘old dwelling’.

Santry parish is associated with St. Pappin, the son of Aengus McNathfraid, the first Christian King of Munster and the brother of saints Colman, Folloman, Jernoe and Naal. St. Pappin is believed to have flourished in the fifth and sixth centuries. The feast of St. Pappin was celebrated on 31st July at Poppintree. The name 'Poppintree' is a corruption of the Pattern or feast of St. Pappin. The Pattern was held under the branches of an ancient tree, which was thought to stand somewhere near the crossroads where the Dublin to Naul Road (Ballymun Road) met Santry Avenue, probably in the townland of Balcurris. The Pattern was discontinued sometime after 1846.

The subject lands are located within the general ancient boundaries of Fingal, the regional name applied to the northern half of County Dublin. According to Ball (1920) the name Fingal is used to denote the district into which predatory excursions were made by the Vikings. In the ninth century, a colony of Ostmen, or Northmen, was established in Dublin, ultimately settling in the tract of lands lying northwards along the coast. This area subsequently became known as Fine Gall – 'the territory of the Galls or strangers'. Before the battle of Clontarf, Brian Boru is said to have raided the region of Fingal and set fire to large areas of land.

The first written record of the area dates to the ninth century, when the Annals of the Four Masters record the death in 827 AD of 'Cormac, son of Muirgheas, Abbot of Seantrabh'. The area of Santry witnessed a number of battles between the Vikings and native Irish, as well as between native Irish clans. The neighbourhood was plundered in the twelfth century by Murchada Ua Maelseachlainn, king of Meath, in revenge for the death of his son at the hands of the MacGiolla Mocholmóg, chiefs of Fingal.

Following the Anglo-Norman invasions, the lands in the region were granted to Hugh de Lacy, who in turn granted the area of Santry to Adam de Feipo or Phepoe who erected a church in the area sometime in the thirteenth century. It appears that de Phepoe wished that this 'new' church be dedicated to the French St. Poppo or Poppon, the Abbot of Stavelot. This is a different saint altogether from the Irish St. Pappin who lived in the parish in the sixth century. The manor of Santry seems to have remained in the possession of the de Phepoe family until about 1375, when Johanna de Phepoe married Thomas Marewood, at which time the manor of Santry passed to her husband.

In the fifteenth and early sixteenth century, Santry formed part of the extensive lands of the Cistercian Abbey of St. Mary, Dublin. The last Abbot of St. Mary's, William Landey, surrendered all the estates of the Abbey, including those at Santry, to Henry VIII on 28th October 1539. In 1534 when John Barnewall was indicted for high treason for his part in the Kildare rebellion (Silken Thomas rebellion), his lands in Ballymun and Coolock were forfeited to the king. In 1641 the village of Santry was attacked and burnt by parliamentary forces after a party of royalist forces took up a position in the village.

The Barry family, a Protestant branch of the Cork Barrymore family, acquired the lands in the area after they had been confiscated from the Catholic Barnewall family in the 1620s. The first member of the Barry family to live at Santry was James Barry (1603-1672/3), the son of Richard Barry, a Protestant alderman and sometime Lord Mayor of Dublin. James was created Justice of the King's Bench with the title first Baron of Santry (1660-1). This was in recognition of his services at the time of the Restoration of the Monarchy. Portions of the large Santry Estate were already in James Barry's possession before 1641 and he was granted the remainder as forfeited land in the early 1650s.

The Down Survey Map of 1655-6 (**Figure 11-1**) illustrates the extent of the parish of Santry (*Santrie*) at that time. The accompanying 'terrier' to the map notes that *"the Soyle thereof is Indifferent good but the west is much better than the east it is for the most part Arrable and Furrz & Pasture there is but little Meadow therein: The inhabitants of this Barony have no other ffyreing but only ffurzz. The Chiefe towne in this Barony for Antiquity is Coolock from whence the Barony takes its name but at present it is much inferior to many others the Chiefest place Built are Mallahide and Donsoghly through this Barony Lyes the High Roade from Dublin to Swordes and so the province of Vlster"*. The Civil Survey (a.k.a. the Down Survey; (www.downsurvey.tcd.ie) notes that Santry was owned by Sir James Barry in 1641 and 1670; a census in 1659 notes that these lands contained 41 English and 16 Irish. The Survey notes that the estate comprised 250 acres – 200 arable; 20 meadow; 14 pasture; 10 shrub-wood and 6 ash-wood) and contained a dwelling house of stone with a barn and an old stable, together with walls of as house, a garden and two orchards.

In 1702, the 3rd Baron Barry of Santry (1680-1734), at the time of his marriage to Bridget Domville, commenced construction of Santry Court. The 3rd Lord Barry had perhaps the greatest influence on the economic and manorial development of Santry and at his instigation the Protestant Church in the townland of Santry was erected entirely at his expense.

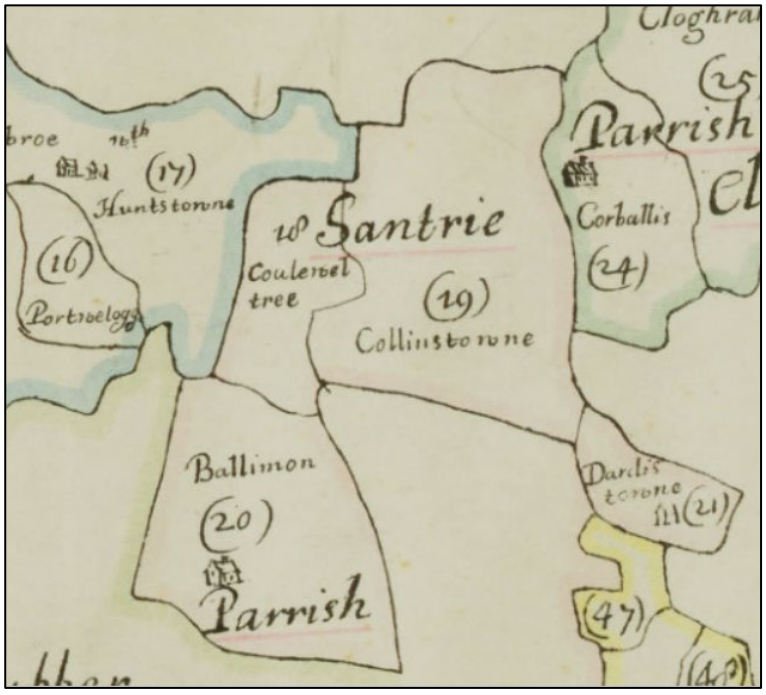

Figure 11-1: Extract from Down Survey Map (1655-6)

The estate remained largely intact and in the direct possession of the Barry family until 1751, when Lord Henry Barry, fourth Baron Barry of Santry, died without a male heir. Lord Henry was a member of the Hellfire Club but is best remembered for the tragic events of August 1738 at Palmerstown Fair. The Fair, also referred to as 'Saturnalia', was held annually in August. It was only surpassed by Donnybrook Fair for its merriment, drinking and carousing. It drew huge crowds from all sections of Dublin society. On the morning of 9th August 1738, Lord Barry, a young man of twenty-eight years, had ridden-out with a party from Dublin. On reaching Palmerstown the party dined at a local inn. The remainder of the story of that fateful day is recorded in his trial for murder which took place on 27th April 1739. He chose to be tried by his peers so that his trial took place in front of the Irish House of Lords at the 'new Parliament House' (now Dublin Castle), instead of in the Law Courts before a jury. This was the first trial for murder to take place and one of only three trials before the Irish House of Lords in Dublin Castle. Lord Barry was charged with the murder of Laughlin Murphy, who was described as 'a person who with a good deal of industry and difficulty maintained himself, a wife, and three small children, by being employed as a porter, and carrying letters and messages'. Lord Barry had been drinking at the inn for a considerable time when he began to argue with another man called Humphreys. Barry was too drunk to draw his sword from its scabbard, which seems to have made him angrier. He swore that he would kill the next man who spoke to him. The unfortunate Laughlin Murphy apparently passed Lord Barry in a passageway in the inn, and excused himself as he passed by. Lord Barry in a fit of drunken rage stabbed him. In fact, Murphy did not die for another six weeks, which was used in Lord Barry's defence, but to no avail**. The Irish peers found him guilty of murder, and he was sentenced to execution by the sword (decapitation). Lord Barry is reputed to have commissioned an expert swordsman from France to carry out his execution, so that death would be relatively swift and painless. He signed his own death warrant at Dublin Castle on 28th April 1739 and the date of the execution was fixed for 22nd June the following year. In the event, he was not executed, but received a pardon under the Great Seal of the Kingdom of Ireland in 1739, and a re-grant of his estates in 1741. His reprieve was certainly due to the threat by his uncle Sir Compton Domville, who threatened to cut-off Dublin City's entire supply of drinking water, if Lord Barry was executed. This was no idle threat since the rivers that passed through his Templeogue Estate supplied much of Dublin's drinking water.

From as early as the 1740s the Parish of Santry had been well served by educational establishments. One of the oldest of these was the Santry Charter School erected on adjacent Ballymun Road. The School House was originally a mill built in about 1700. The Incorporated Society for Promoting English Protestant Schools in Ireland, better known as the Charter Schools, was established by George II's Royal Charter in Ireland in 1733. The Charter School in the Parish of Santry was one of the most prominent and long-lived Charter Schools in Ireland. The Santry or Ballymun Charter School was built in 1739 and was initially an all-girls school. It was patronised by Dublin Corporation and Luke Gardiner who granted the land on which the

school was built. The girls who lived at the school, besides being provided with a rudimentary education, 'were employed in winding silk and spinning cotton'. It was widely reported by contemporary observers and inspectors alike, that the Santry Charter School was the best of its kind in the country. The School ceased to operate in the 1840s and in 1900 became known as 'Santry Lodge'.

After the death of Lord Henry Barry in 1751, the Barry lands were inherited by his uncle, Sir Thomas Compton Domville, after which the Santry Estate, including Santry Court, demesne and nearly 5,000 acres of land remained in the Domville family's hands for almost 200 years (1751-1935). Much of the historical records for the Santry Estate date from the time of Sir Thomas Compton Domville's inheritance, perhaps, maybe because he needed to know exactly what land, tenants and estate workers he had inherited from his nephew. There is some evidence that the Santry Estate was experiencing financial difficulties partly due to the expenses incurred building Santry Court, but also because of the spendthrift habits of the fourth Baron. Amongst the earliest surviving records of the Santry Estate is the '*Wages Book for Santry Estate, c.1740-1750'*. This shows the employees of the estate, together with their weekly wages. The manuscript also records other expenses connected with the Estate, including the names of Sir Compton Domville's horses, the frequency with which they needed to be shod and the costs involved. The horses had names such as Muke, Squeeker, Sandford, Sniper, Santry Mare and Button. The Wages Book recorded that the daily wage for the Santry Estate workers was six-pence. This shows that it cost the Estate almost as much to shoe a horse as to employ an estate worker for a week.

Rocque's map of 1760 (*An actual survey of the county of Dublin*; **Figure 11-2**) illustrates that the layout of Santry Demesne at this time. It includes a tree-line avenue (Santry Avenue) running east from the Ballymun-Naul Road (present R108) leading to Santry House (Santry Court), with extensive formal planting to the rear (north) of the house including two square walled-gardens; additional internal paths/trackways are indicted within the estate and a trapezoidal-shaped planted area with internal path/tack positioned to the west of the main residential and associated planted area. The Santry River is indicated along the northern boundary of the estate and the (Santry) Charter School is indicated outside the estate and on the western side of the Ballymun-Naul road, adjacent the river.

Like his nephew the last Baron Barry of Santry, Sir Thomas Compton Domville died without a male heir. In a provision made in his will of 1761, Thomas ensured that the Santry Estate would stay in the family's possession. He bequeathed it to Charles Pocklington, his nephew. Pocklington had to adopt the name 'Domville' before he was allowed to inherit Santry Estate.

Figure 11-2: Extract from Rocque – 1760 (North to right)

Taylor & Skinner's *Maps of the Roads of Ireland* of 1777 (**Figure 11-3**) indicate both Santry House, with associated demesne planting, and the Charter School on the Naul Road leading to Drogheda

Figure 11-3: Extract from Taylor & Skinner – 1777 (Sheet 40)

An attack on the Northern Mail Coach below the walls of the Santry Estate on 23rd May 1798 was the climax of rebel activity in the area. According to eyewitness accounts, the hold-up of the mail coach was the 'Signal for the Outbreak' of the Rising in County Dublin and more than 3,000 rebels were gathered there at the time. Although the mail coach was stopped and burned, the newspapers reported that nobody was ill-treated, and no possessions were taken from the passengers of the coach.

When Sir Charles Pocklington Domville died the Santry Estate became the property of his eldest son, Sir Compton Pocklington Domville. In 1816 Sir Compton Pocklington Domville's application for the Lordship of Santry was granted. The family motto, *Qui Stat Caveat ne Cadat* ('Let the man who is standing be careful that he does not fall'), appeared on his grant of arms.

Lewis (1837) noted that the parish of Santry or Santreff contained 1159 inhabitants at that time, of which 125 resided in the village of Santry; he describes the land as being of good quality, chiefly in pasture and meadow, with fertile tillage an improving system of agriculture. He further notes that the village of Santry was pleasantly situated on the road to Swords and that it contained twenty-five 'neatly built' houses and that a station of the city police was located nearby; 30 children were 'clothed, maintained and educated' in the Charter School, while about 30 other children were educated in two other public schools. He described Santry House as a 'stately mansion of brick, containing many spacious apartments ornamented with numerous family portraits, a valuable collection of historical and scriptural paintings by the best masters, and many specimens of the fine arts'; the demesne, comprising more than 140 acres, was 'tastefully laid out in gardens and pleasure-grounds, richly embellished with timber, and commanding some beautiful scenery and some extensive mountain and sea views'.

The Ordnance Survey map of 1837 (**Figure 11-4**) indicates the layout and extent of Santry Demesne at that time, including Santry House and associated formal demesne planting, internal roads, tracks and paths, together with field divisions; A road (Santry Avenue) along the southern boundary of the estate, linking Ballymun Road to Santry Village, had been established by this time. The subject development lands are located to the northwest of a forested area – Black Wood – and, as indicated in **Figure 11-5**, incorporated a partially planted field division boundary in the eastern area and a former trackway in the north.

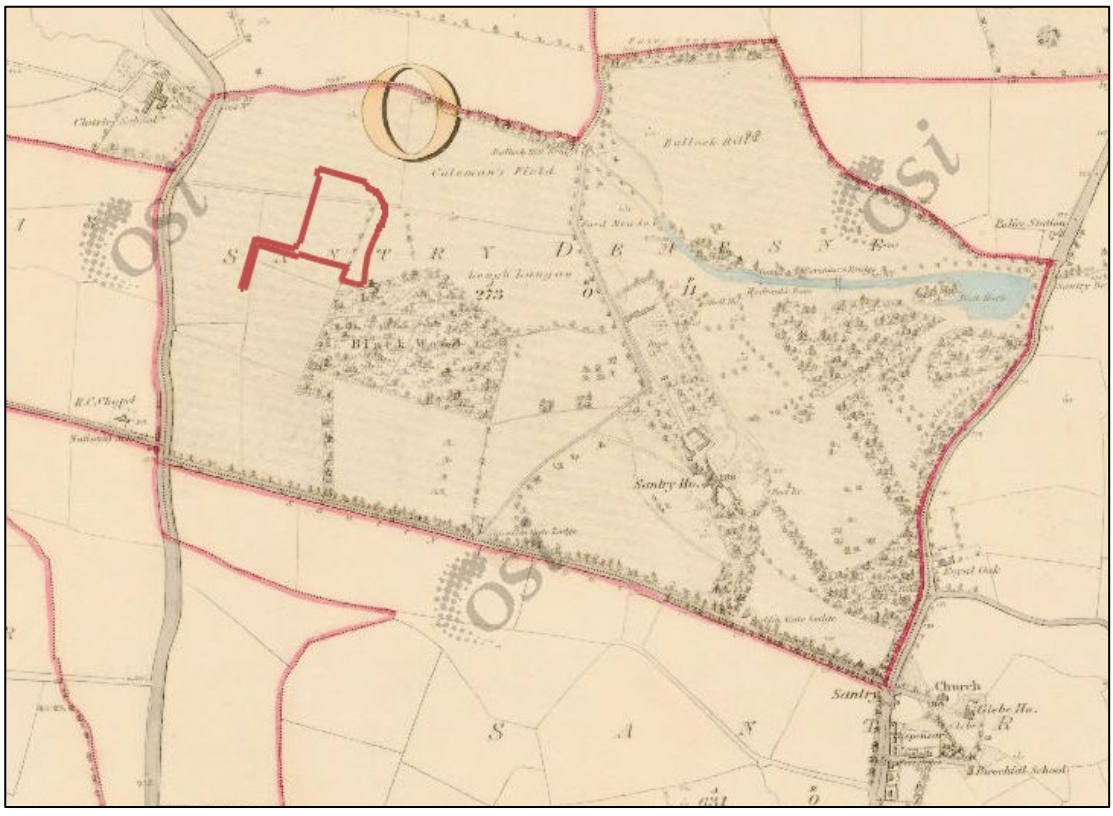

Figure 11-4: Extract from Ordnance Survey Map of 1837 (Dublin Sheet 14)

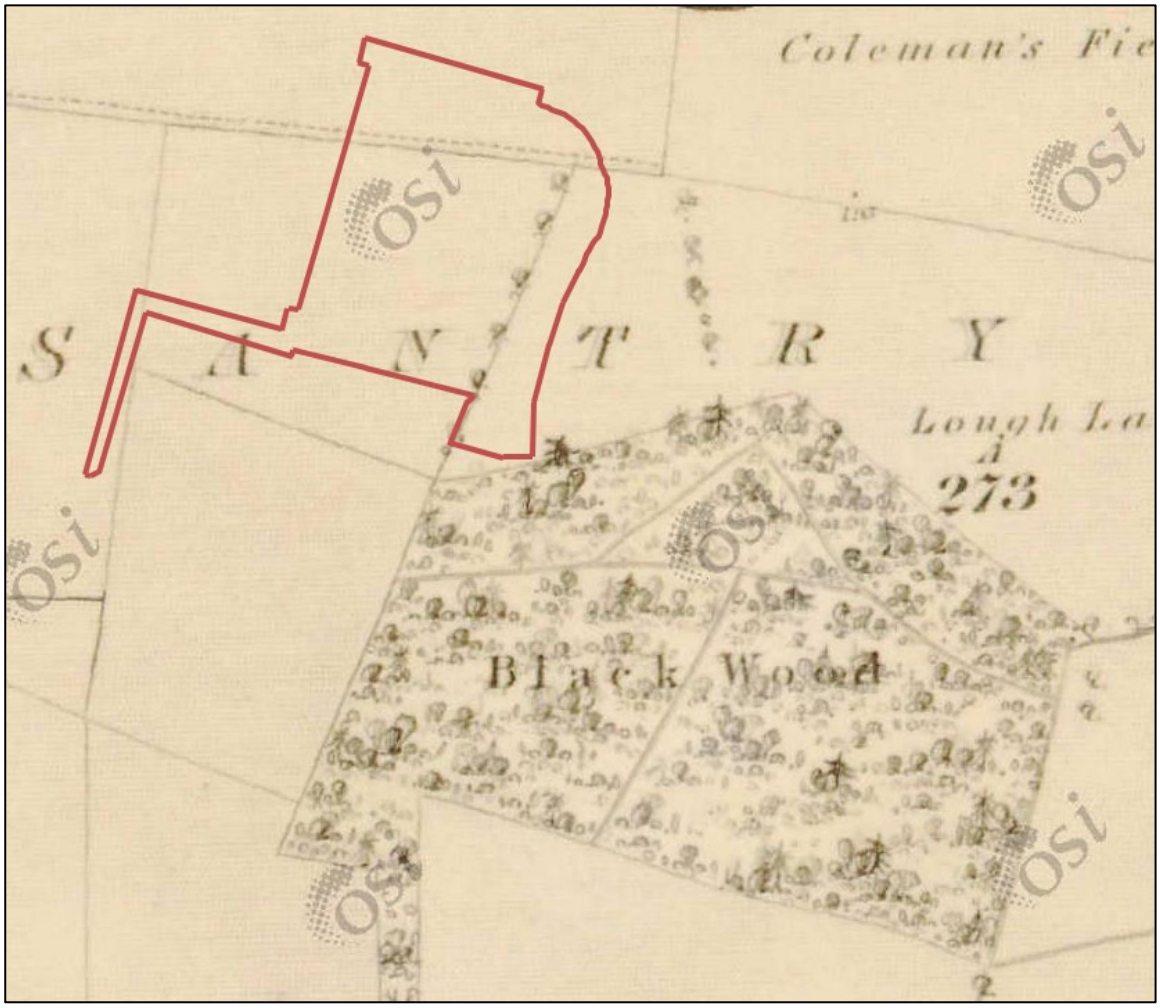

Figure 11-5: Extent of subject site superimposed on 1837 O.S. map

Griffith's Valuation (*Primary Valuation of Ireland 1848-64*) of 1853 notes that the western area of Santry Demesne, comprising a little over 52 acres, was occupied by Catherine Coghlan (sic); the subject development lands are located in this area.

Sir Charles Compton William Domville (1822-84) was the third son of Sir Compton Pocklington Domville and inherited Santry Court, demesne and estate in 1857. He immediately set-about a large renovation and building programme (gardens and house) that the Santry Estate. The 130 rooms were redecorated, the gardens and out offices restored, a water supply was laid on to the house from the river and ornamental gas lamps lit the avenue to a replica of the Phoenix monument erected in the grounds Domville chose Ninian Niven (1799-1879), probably the best known Irish landscape gardener at the time, to redesign the gardens at Santry as well as the family estate at Templeogue. The improvements led to the planting of many new trees and the creation of a 'pleasure ground' at Santry. Visiting the demesne in 1883 the Reverend Benjamin Adams, the Church of Ireland rector and historian of Santry parish, was particularly impressed by the gas lights, which lit the main approach to Santry Court. These were spaced at regular intervals on both sides of the main entrance avenue and were an expensive indulgence on the part of Sir Charles. During his visit Adams also remarked on the large deer-park which was punctuated with pillars and vases in the memory of some of the Domvilles' favourite horses.

Sir Charles was the last member of the Domville family to reside permanently at Santry. He married Lady Margaret Frances St. Lawrence, a daughter of the third and last Earl of Howth. They had no children and Sir Charles died on 10th July 1884. After the death of Sir Charles, Santry House passed briefly to his brother, Sir William Compton Domville, and then to the Pöe family who were relatives of the Domville's by marriage.

The Ordnance Survey map of 1910 **Figure 11-6**) indicates that the subject lands were in agricultural use at this time; the field boundary appears to have been replaced by a trackway, while the trackway to the north appears to have been replaced by a field division boundary. The Black Wood is still in existence, with some minor changes to its northern boundary and a further enlargement of the southwest, while a new residence – Geraldstown House – had been constructed to the south of the subject lands.

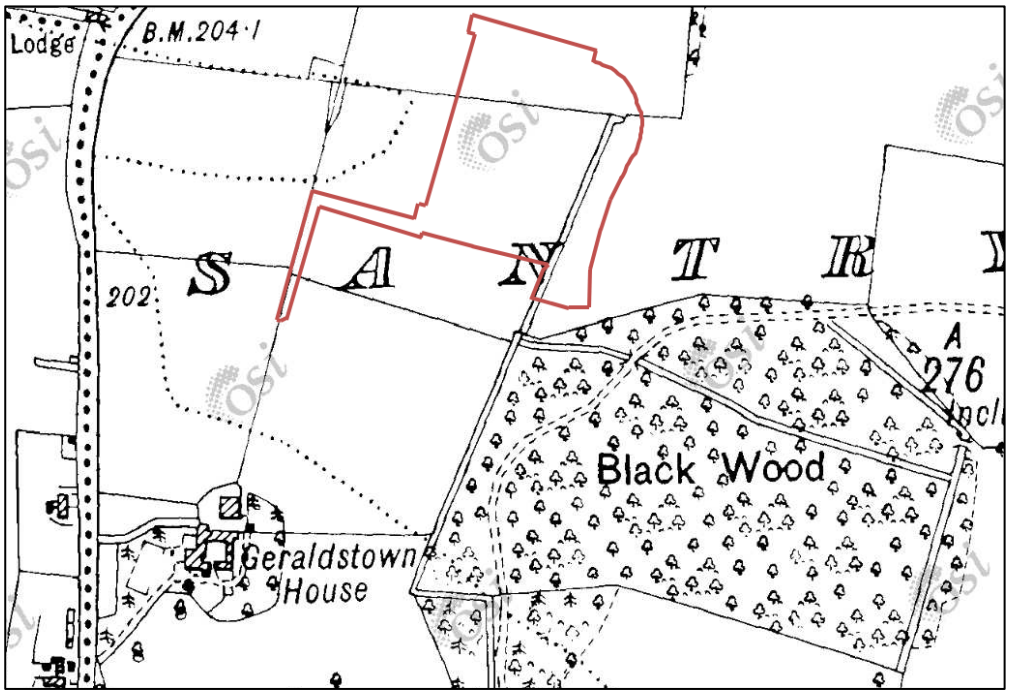

Figure 11-6: Extract from Ordnance Survey Map of 1910 (Dublin Sheet 14)

Dublin Corporation acquired Santry House in the early 1930s, and proposed to convert it into a mental home attached to Grangegorman. During World War II, it was used as a store by the Defence Forces, during which time it was gutted by fire and demolished in 1959 because of its dangerous state of repair. The entrance doorway was removed and is now held in State storage, while the entrance gates were removed and re-erected at St. Brendan's Hospital, Grangegorman.

The lands in the area largely remained in agricultural use until more recent years, when they were developed for commercial and residential use, with some residential works currently progressing to the north and northeast of the subject lands.

11.3.2 Archaeological Heritage

Archaeology is the study of past societies through their material remains and the landscapes they lived in. "The archaeological heritage consists of such material remains (whether in the form of sites and monuments or artefacts in the sense of moveable objects) and environmental evidence" (DoAHG 1999, p9).

11.3.2.1 Statutory Protections

The statutory and administrative framework of development control in zone of archaeological potential or in proximity to recorded monuments has two main elements:

(a) Archaeological preservation and licensing under the National Monuments Acts and

(b) Development plans and planning applications under the Planning Acts.

National Monuments Acts

Section 12 (1) of the National Monuments (Amendment) Act, 1994 provides that the Minister for the Environment, Heritage and Local Government shall establish and maintain a record of monuments and places where the Minister believes there are monuments, such record to be comprised of a list of monuments and relevant places and a map or maps showing each monument and relevant place in respect to each county of the State. This is referred to as the 'Record of Monuments and Places' (RMP), and monuments entered into it are referred to as 'Recorded Monuments'.

Section 12(3) of the National Monuments (Amendment) Act 1994 provides for the protection of monuments and places in the record, stating that:

> "*When the owner or occupier (not being the Minister) of a monument or place which has been recorded under subsection (1) of this section or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Minister and shall not, except in the case of urgent necessity and with the consent of the Minister, commence work for a period of two months after having given the notice.*"

Fingal County Development Plan 2017-2023

The following relevant Archaeological Heritage Objectives are set out in Chapter 10 of the Plan:

CH02 Favour the preservation in situ or at a minimum preservation by record, of archaeological sites, monuments, features or objects in their settings. In securing such preservation the Council will have regard to the advice and recommendations of the National Monuments Service of the Department of the Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

CH03 Protect all archaeological sites and monuments, underwater archaeology, and archaeological objects, which are listed in the Record of Monuments and Places and all sites and features of archaeological and historic interest discovered subsequent to the publication of the Record of Monuments and Places, and to seek their preservation in situ (or at a minimum, preservation by record) through the planning process.

CH05 Ensure archaeological remains are identified and fully considered at the very earliest stages of the development process, that schemes are designed to avoid impacting on the archaeological heritage.

CH06 Require that proposals for linear development over one kilometre in length; proposals for development involving ground clearance of more than half a hectare; or developments in proximity to areas with a density of known archaeological monuments and history of discovery; to include an Archaeological Impact Assessment and refer such applications to the relevant Prescribed Bodies.

Note: The Record of Monuments and Places (RMP) for County Dublin was published in 1998. Consequently, all monuments discovered since the publication are not RMP Sites but are subject to protection under Objective AH05 of the County Development Plan 2011-2017, as set out above.

11.3.2.2 Archaeological Inventory

There are no previously identified individual sites of archaeological interest located within the defined study area (Section 2.1). The nearest is the site of Santry Court/Santry House, which is listed in the RMP (Ref: DU014-030) and located approximately 700m to the east-south-east of the subject lands (see **Figure 11-7**; Site CH-1).

No features of archaeological potential were noted by cartographic and aerial photographic research and no surface features/traces of archaeological potential were noted by the surface reconnaissance survey

11.3.2.3 Archaeological Artefacts

The Topographical Registers of the National Museum of Ireland have one record relating to the area, as follows:

- NMI Ref: 1947:43 – Stone Axe Head retrieved from ruins of Santry Court

11.3.2.4 Results from Previous Documented Relevant Archaeological Investigations

A search undertaken of the annual Archaeological Excavations Bulletin (www.excavations.ie) and the Dublin Archaeological Data (www.heritagemaps.ie) indicates that a number of archaeological investigations have been undertaken within the defined study area, none of which were located within the subject development lands, as follows:

- A programme of archaeological monitoring was undertaken by Sinead Phelan, Margaret Gowen & Co (Licence No: 03E1003) at the site of the Game Building, Santry Demesne. Nothing of archaeological interest was uncovered.

- A programme of archaeological monitoring of the mechanical removal of topsoil with respect to the development of lands in the western area of Santry Demesne was undertaken by E. Eoin Sullivan Margaret Gowen & Co (Licence No: 05E0894). The development comprised offices, retail warehousing and enterprise starter units. This led to the identification and excavation of two isolated pits and a probable garden feature. The first pit was oval in plan and measured 0.8m (north–south) by 0.5m. The cut was regular and deepest (0.1m depth) at the northern portion but was irregular and shallow on the southern portion. The pit had a single fill consisting of grey clay with traces of ash and occasional pieces of charcoal. There was insufficient charcoal for a dating sample. No artefacts were discovered within the fill of the pit. The second pit was subcircular in plan and measured 0.42m (north–south) by 0.36m. The cut was shallow and gently sloping on the western and southern portion, but sharp and steep at the northern and eastern portion. The pit had a single fill consisting of light-black clay with several pieces of wood charcoal. A probable garden feature was identified due to the discovery of a rectangular-shaped stone setting of red bricks set in mortar. The chamber was filled with disturbed dry grey sand and contained several pieces of scrap wrought iron, primarily pipe, clay pipe and many pieces of clear window glass. A short length of clay pipe bore the inscription ‘Sloan & Co., Clay Works’. The chamber was constructed of red brick with a clay lining on the sides and base. The internal dimensions of the chamber were 0.9m (east–west) by 1.43m with a depth of 0.8m. The clay lining was 0.22m thick throughout.

  Further monitoring in 2006, undertaken by Emer Dennehy under an extension of the original Excavation Licence, did not uncover anything of archaeological interest or potential.

- A programme of Archaeological Testing was undertaken by James Hession, Headland Archaeology (Ireland) Ltd (Licence No: 09E0481) as part of the advance works on proposed route of Metro North light rail project. For the purposes of these works the Metro North route was subdivided into fourteen testing areas. Testing Area 13 was located in Ballymun and Balcurris townlands, Co. Dublin, on the footprint of the Metro North alignment, Northwood Stop and construction compound (west of subject lands and on western side of Ballymun Road). A total of twelve test-trenches were excavated in two fields and no features of archaeological significance were identified

11.3.3 Architectural Heritage

Architectural heritage has several definitions and meanings for people. A useful rule of thumb (which is actually the legal situation) is set out in the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 which provides the following definition:

a) structures and buildings together with their settings and attendant grounds, fixtures and fittings,

b) groups of such structures and buildings, and

c) sites, which are of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

A rich architectural heritage has survived to the present day in Fingal County. While there are impressive demesne features and large houses in the County, most of the County's architectural heritage has come from vernacular traditions with local craftsmen sometimes borrowing from the traditions of classical architecture to construct buildings that met local needs. This rich architectural heritage contributes enormously to the overall built environment and, indeed, helps to give it definition in terms of place and character for those that live and work in the county as well as those who visit here.

11.3.3.1 Fingal County Development Plan 2017-2023 & Dublin City Council Development Plan 2016-2022

Section 51 of the Planning and Development Act, 2000 (as amended) requires Local Authority Development Plans to include a record of structures. These structures form part of the architectural heritage of the Local Authority/Council Administrative Areas and are to be protected. The Councils draw up these lists, referred to as the Record of Protected Structures (RPS). The RPS is a section of the Development Plan in which each structure is given a reference number.

There are no structures listed in the RPS of the Fingal County Development Plan 2017-2023 as being located within the subject site or wider Cultural Heritage study area.

There are two structures listed in the RPS of the Dublin City Council Development Plan 2016-2022 as being located within the wider Cultural Heritage study area. These are listed below in **Table 11-1** and their locations indicated in **Figure 11-7**.

11.3.3.2 National Inventory of Architectural Heritage (NIAH)

The National Inventory of Architectural Heritage (NIAH) is a state initiative under the administration of the Department of Culture, Heritage and the Gaeltacht. It was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. Its purpose is to identify, record, and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage. It is intended that the NIAH will provide the basis for the recommendations of the Minister for Culture, Heritage and the Gaeltacht to the planning authorities.

There are no structures of Architectural Heritage interest listed by the non-statutory NIAH as being located within the subject site or overall Cultural Heritage study area.

Table 11-1: Inventory of Architectural Heritage Structures

Site No.	RPS No.	ITM	Address	Classification	Distance from Site
CH-2	482	715547 740226	Ballymun Rd, Dublin 9	Former Church (St. Pappin's)	500m
CH-3	481	715514 740196	Ballymun Rd, Dublin 9	Former Residence (Domville House)	600m

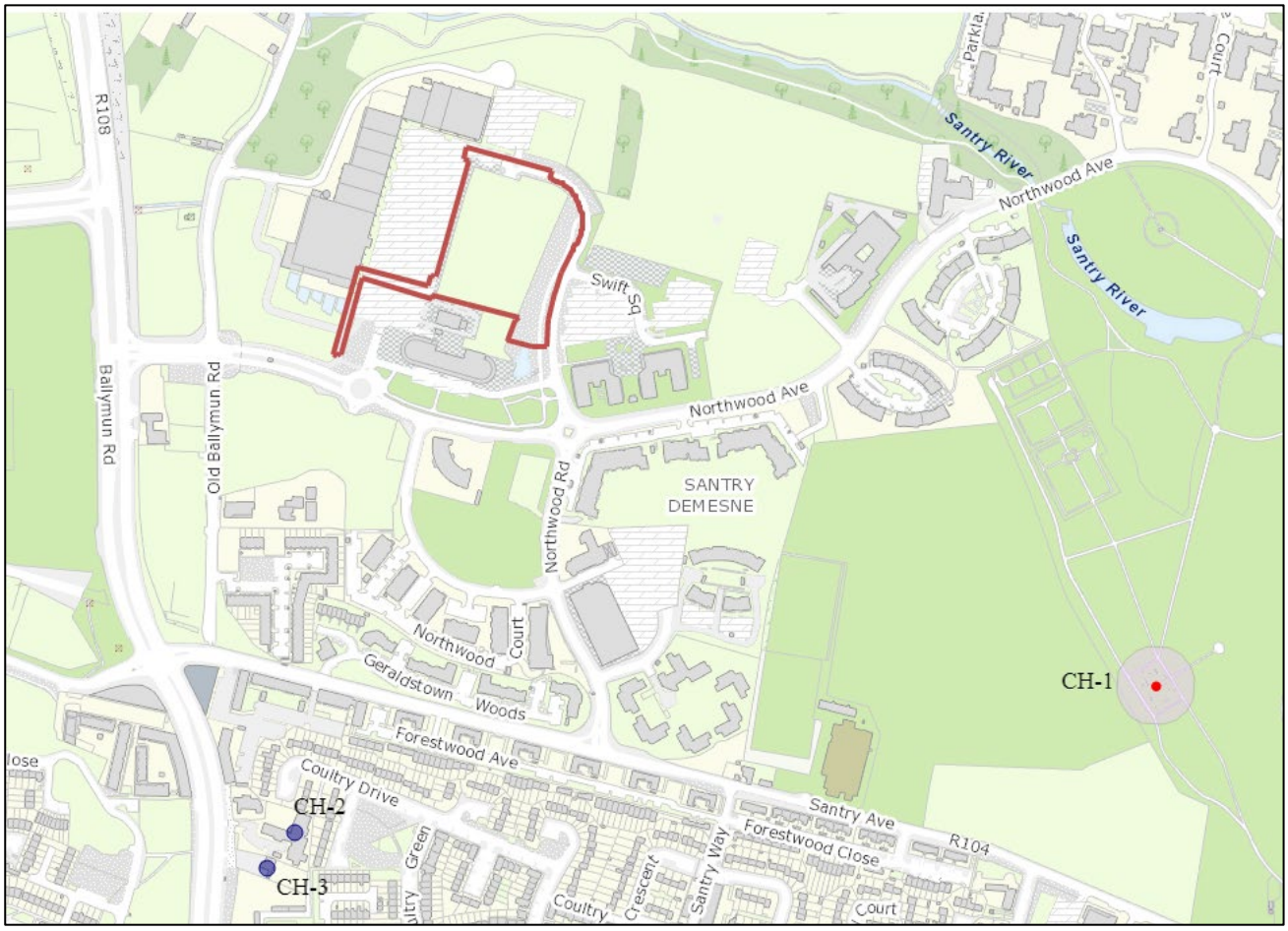

Figure 11-7: Locations of Cultural Heritage Sites
(Archaeological Heritage = red dot; Architectural Heritage = blue dot)

11.4 Impact Assessment

11.4.1 Do Nothing

The “do nothing” scenario is the outcome that would be achieved if the proposed development was not constructed. In terms of Cultural Heritage, no impacts (direct or visual) will occur.

11.4.2 Construction Phase

11.4.2.1 Local History

The general historical background to the subject development area was introduced above in **Section 11.3.1**. In summary, there are no significant historical events associated with the proposed development lands which have the ability to be impacted upon by the proposed development.

11.4.2.2 Archaeological Heritage

The general archaeological background to the subject development area was introduced above in **Section 11.3.2**. In summary, there are no previously identified archaeological monuments and features located within the overall study area associated with the subject project; the nearest being approx. 700m to the east-southeast (CH-1). No features of archaeological potential were noted by cartographic and aerial photographic research and no surface features/traces of archaeological potential were noted by the surface reconnaissance survey.

In general, ground reductions associated with a development of this kind, in areas of previous generally undisturbed ground, have the ability to uncover and disturb hitherto unrecorded subsurface features, deposits, structures and finds of archaeological interest and potential. Without the adoption and implementation of a suitable mitigation strategy, any subsurface archaeological features or artefacts that might be located within the site during the construction phase of the development might not be identified and recorded.

11.4.2.3 Architectural Heritage

As noted above in **Section 11.3.1** are no structures listed in the Record of Protected Structures (RPS) of the Fingal County Development Plan 2017 – 2023 as being located within, or in the immediate environs of, the subject proposed development lands. The RPS of the Dublin City Council Development Plan 2016 – 2022 lists two structures of interest – CH-2 & CH-3 – at distances of 500m and 600m respectively to the south of the subject development lands. The National Inventory of Architectural Heritage (NIAH) has not identified any structures within the defined study area. Given the locations of the identified structures of architectural heritage interest with respect to the subject development lands, it is not predicted that any impacts to such structures will occur during the construction phase of the development.

11.4.3 Operational Phase

11.4.3.1 Local History

The general historical background to the subject development area was introduced above in **Section 11.3.1**. In summary, there are no significant historical events associated with the proposed development lands which have the ability to be impacted upon by the proposed development following its construction.

11.4.3.2 Archaeological Heritage

There are no archaeological monuments located within, or in the immediate environs of, the subject development site. The nearest monument to the subject development lands is the site of the former Santry House/Santry Court (CH-1) which was demolished din 1959, and for which there are no extant remains. Consequently, it is not predicted that the visual setting of any archaeological monuments will be impacted upon by the proposed subject development.

11.4.3.3 Architectural Heritage

There are two structures of Architectural Heritage Interest located Protected Structures features located within the defined study area associated with the preparation of this assessment. These, (Ch-2 and CH-3), are located a minimum of 500m to the south of the subject lands, on the eastern side of Ballymun Road and in the administrative area of Dublin City Council. Given the distances between the subject lands and these structures, together with existing concentration of buildings in the intervening area, it is not predicted that any impacts with respect to architectural heritage will occur as a result of the operation of the development.

11.5 Mitigation Measures

11.5.1 Construction Phase

11.5.1.1 Local History

As noted above in **Section 11.4.2.1**, there are no significant historical events associated with the proposed development lands which have the ability to be impacted upon by the proposed development following its construction. Consequently, no specific mitigation measures are required at construction stage.

11.5.1.2 Archaeological Heritage

As noted above in **Section 11.4.2.2**, there are no extant remains for any of the archaeological monuments and features located within, or in the immediate environs of, the subject development area and, consequently, it is not considered that development, as proposed, will cause any direct impacts to any previously identified archaeological monuments.

As further noted above in **Section 11.4.2.2**, in general, ground reductions associated with a development of this kind, in areas of previous generally undisturbed ground, have the ability to uncover and disturb hitherto unrecorded subsurface features, deposits, structures and finds of archaeological interest and potential. Without the adoption and implementation of a suitable mitigation strategy, any subsurface archaeological features or artefacts that might be located within the site during the construction phase of the development might not be identified and recorded.

Consequently, given the above, the following mitigation measures are suggested:

1. Prior to the commencement of site preparation works, a suitably qualified and experienced archaeologist should be appointed to undertake the mitigation measures listed below.

2. All topsoil stripping/general ground reduction works onto the underlying archaeologically sterile geological subsoils associated with the development shall be monitored by an archaeologist.

3. In the event of archaeological material being uncovered during the course of such monitoring, the archaeologist shall be empowered to have works stopped in the vicinity of such material pending receipt of advice from the National Monuments Service, Department of Culture, Heritage and the Gaeltacht. Likewise, should archaeological/historical artifactual material be recovered during such works, then the requirements of the National Museum of Ireland with regard to such items should be implemented.

4. Following completion of the monitoring and any other possible archaeological investigations, the archaeologist shall prepare a full and final report for submission to the Planning Authority and the Department of Culture, Heritage and the Gaeltacht and National Museum of Ireland.

11.5.1.3 Architectural Heritage

As noted above in **Section 11.4.2.3**, it is not considered likely that the development, as proposed, will cause any direct impacts to any identified structures of architectural heritage interest. Consequently, no mitigation measures are considered necessary.

11.5.2 Operational Phase

It is not envisaged that any visual impacts will occur to any previously identified sites or features of Cultural Heritage Interest as a result of the construction of the development, as proposed. Consequently, no mitigation measures are considered necessary.

11.6 Monitoring Measures (Construction and Operational)

Archaeological monitoring of topsoil stripping /site preparation works are outlined in the mitigation section and no monitoring measures during construction /post construction are required.

11.7 Cumulative Impact

The cumulative impact of the proposed development and other existing and/or approved developments in the area was assessed by taking into account the existing baseline environment and the predicted impacts of this and other approved developments in the area.

It is not envisaged that any negative cumulative effects will occur with respect to Cultural Heritage assets as a results of the project proceeding as proposed.

11.8 Residual Impact

It is not envisaged that any negative residual effects will occur with respect to Cultural Heritage assets as a result of the project proceeding as proposed.

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12 LANDSCAPE AND VISUAL

12.1 Introduction

This chapter should be read in conjunction with the site layout plans for the site and project description provided in **Chapter 5** of this EIAR. This chapter was prepared by Kevin Fitzpatrick, BA (Hons) Land Arch, MLA, MILI, director of Kevin Fitzpatrick Landscape Architecture.

12.2 Assessment Methodology

The assessment was carried out by visiting the site and its surroundings in May 2018 by analysis of the proposals through photomontages, plans, aerial photographs, the tree survey by The Tree File Ltd., historic maps and by reference to the *Fingal County Development Plan 2017-2023*.

12.2.1 Assessment Criteria

Table 12-1: Assessment Criteria

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

12.3 Baseline Scenario (Existing Environment)

12.3.1 Receiving Environment

Figure 12-1: Context Map

The site is situated to the north of Ballymun within Northwood, formerly a part of Santry Demesne. The main section of the site is an rectangular shaped area measuring 181 m on its longest north south axis and 128m on its longest east-west axis. The site extends to the west in a narrow corridor, 10m wide, then extends by 70m to the west and 90m to the south. The total land area of the site measures approximately 2.1 ha.

The site is bounded to the west by the Gulliver's Retail Park, to the south by the local centre and to east in part by Swift Square Office Park. To the north and north east of the site a residential housing and apartment development is under construction. Beyond this residential development is the Santry River Amenity Walk and further to the south and east is Santry Demesne Park.

The ground levels within the site area are generally flat with a slow and gradual rise from the south-west corner in a northerly direction. There are some localised steep slopes however this only occurs along the banks of the drainage ditch on the eastern edge of the lands. Apart from the drain the lowest level is in the south west corner of the site (57.10m OD). From this low point the ground levels rise by 1.4m towards the very northern edge of the site (58.50m OD). Other than the drainage ditch and temporary spoil heaps the slope across the site is quite consistent.

The land use of the subject lands is divided into three distinct sections. The eastern section of the lands is dominated by the drainage ditch and the mature trees that are growing on the eastern bank of the ditch. The vegetation in this area also consists of relative recent successional tree planting (planted in 2006) and hedgerow scrub growing along the edge of the ditch. To the west of the ditch the area is completely devoid of any significant vegetation. The southern section of this land is currently relatively flat grassland with some temporary spoil heaps consisting of topsoil. The northern section is all under hardstanding with the majority of the area being used as a car park and an area being used as the construction compound for the construction sites to the north and east. Within the construction compound there are several temporary buildings, storage containers and material storage.

According to the *Tree Survey and Report*, by The Tree File Ltd. the tree cover of value on the site is primarily contained within the raised embankment on the east side of the ditch and to the east of that ditch. The trees on site are from two different origins. The first is the primary , more historic trees which are remnants of the agricultural stock proof field boundaries and are contained on the eastern side of the ditch. These trees are primarily oak and are very large both in height and crown spread. Of the twelve trees on site, eight are Oaks

and all but one of those Oaks are class as category B. The second type of tree are the more recently planted trees within the historic tree line and along the path on the eastern perimeter. The report also finds some groups of Lime and Elm saplings in sections, primarily to the north of the lands along the ditch.

12.3.2 Character of the site

The character of the site and its environs has largely been determined by the following:

- Flat topography in the site and its surrounding environs;
- Landscape history of agricultural use with grassland and a remnant ditch and hedgerow field boundary;
- The large mature trees on the east side of the ditch
- The temporary hardstanding to provide a car park and construction compound for the building works to the north and east.
- Number of large industrial and commercial buildings in the local landscape;
- The parkland to the north and the dense mature tree cover within

The subject lands still retain some of the elements of an agricultural field with a traditional ditch and hedgerow field boundary. The large trees are the dominant element in defining the landscape character. However, this character is contrasted by the temporary car park and compound and the surrounding built environment and construction sites. With this considered the lands would be considered a 'transitional landscape'

Through a comparison of the historical Ordnance Survey maps with the current site and through analysis by site visits it is evident that there has been little change to the study area until recent times. The ditch and hedgerow reflects historic field patterns as recorded in the historic '6 inch' maps. The ditch was at one time connecting Black Wood to the south with the river to the north. It appears to have always had significant trees along its banks. A field boundary once existed running east west across the northern section of the lands however it seems to have been removed by the time the '25 inch' maps were surveyed (1888-1913).

In the context of the surrounding landscape, landscape sensitivities and views most of the lands would be considered of no aesthetic value. The mature trees along the banks of the drainage ditch do hold significant aesthetic value in the context of the local landscape character and local views. The aesthetic qualities provided are the visual aesthetic provided by the trees and link that the trees hold to the historic landscape.

12.3.3 Existing Views and Visibility

The location from which the site is most visually prominent is from the local access road directly to the east of the lands. From this road the trees on site are visually prominent and create a strong focal feature as the user travels along the road by car, bike of on foot. The lands are visible in views from the Gulliver's Retail Park immediately to the west of the lands. In these views the car parking and compound on the land are visible in the foreground. The trees on site are also visually prominent and form the ridgeline of views to the east.

The lands to the west of the ditch are not visible from elsewhere in the local landscape. The mature trees however are visible from the business park and new residential areas to the east and north. The trees are also visible from the Northwood Avenue especially in the vicinity of the roundabouts on either side of the local centre. From beyond Northwood Avenue to the south the views are mostly obstructed by the buildings and vegetation, although some partial, glimpsed views of the trees are possible. The lands are screened from views form the Santry Demesne by the vegetation within the park and the existing buildings and those under construction.

Views of the subject lands are possible from the Old Ballymun Road and Northwood Avenue as it continues to the R108. The trees are the only part of the site visible in restricted views from the section of these roads closest to the Northwood entrance gates. The trees and hedgerows in the area combined with the built development create visual screen restricting other views into the site form this direction.

The site is not visible from locations in the wider landscape due to the flat nature of the topography, the scale of the local built development and the significant number of trees in the area.

12.3.4 Landscape Planning

Within the *Fingal County Development Plan 2017-2023*, there are several specific landscape objectives that apply to the subject lands.

Santry Development Plan Objectives

"Objective Santry 4

Enhance cycle and pedestrian linkages between Santry and Ballymun.

Objective Santry 5

Prepare and implement a Masterplan for lands identified at Northwood (see Map Sheet 11, MP 11.E) during the lifetime of this Plan. The main elements to be included are provided below.

- Ensure where feasible, development overlooks the Santry River Walk.

- Enhance pedestrian links within and to Santry Demesne.

- Ensure the continued protection of trees within the subject lands."

Further to those specific objectives within the Santry Development plan all trees on the site and the surrounding lands are covered by the Santry Demesne Tree Protection Order.

Within the *Fingal County Development Plan 2017-2023*, there are also several general landscape objectives that apply to the subject lands.

General Landscape Objectives

"Objective GI24

Ensure biodiversity conservation and/or enhancement measures, as appropriate, are included in all proposals for large scale development such as road or drainage schemes, wind farms, housing estates, industrial parks or shopping centres.

Objective GI25

Integrate provision for biodiversity with public open space provision and sustainable water management measures (including SUDS) where possible and appropriate.

Objective GI26

Maximise the use and potential of existing parks, open space and recreational provision, both passive and active, by integrating existing facilities with proposals for new development and by seeking to upgrade existing facilities where appropriate.

Objective GI27

Provide a range of accessible new parks, open spaces and recreational facilities accommodating a wide variety of uses (both passive and active), use intensities and interests.

Objective GI28

Provide attractive and safe routes linking key green space sites, parks and open spaces and other foci such as cultural sites and heritage assets as an integral part of new green infrastructure provision, where appropriate and feasible.

Objective GI28

Ensure green infrastructure provision responds to and reflects landscape character including historic landscape character, conserving, enhancing and augmenting the existing landscapes and townscapes of Fingal which contribute to a distinctive sense of place."

Landscape Character Assessment Objectives

"Objective NH 23

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 NH 34

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."

There are no views or prospects that include the subject lands listed in the *Fingal County Development Plan 2017-2023.*

12.4 Impact Assessment

12.4.1 Potential Impact of the Proposal

Construction phase

The change of use of the site from its current state to that of a construction site has the potential to result in the following impacts:

- Visual impacts due to the introduction of new structures, access roads, machinery, materials storage, associated earthworks, car parking, lighting and hoarding.
- Change of character due to the change in use.
- Visual impacts due change in ground levels and earthworks.

Operational phase

The proposed development has the potential to result in the following impacts:

- Visual impacts due to the introduction of new buildings and built structures.
- Visual impacts due to the introduction of new roads, parking, mechanical plant and lighting.
- Visual impacts due to the introduction of services and waste handling areas and litter.
- Change of character due to the change in use.
- Visual impact of landscape proposals – planting, lighting, hard surfaces etc.
- Landscape and visual impacts due to the installation of trees and vegetation.

12.4.2 Predicted Impact of the Proposal

Construction phase

As described under Potential Impact of the Proposal above, the initial construction operations created by the clearance of the site and the construction of the buildings and roads will give rise to temporary or short term impacts on the landscape character, through the introduction of new structures, machinery etc. and the removal of a small amount of vegetation. The conversion of part of the site from a greenfield landscape type to a building site, is likely to be perceived in the short term as a negative 'loss' of landscape character, particularly by sections of the local community closest to it. The north section of the site is currently a construction compound and car park. The conversion of this area to a construction site will have little negative impact on the landscape character.

The introduction of the elements described under Potential Impact of the Proposal will have an impact on the amenity value of the adjacent surrounding areas. The construction compounds, temporary car parking and storage facilities etc. will be located to avoid any visually sensitive areas. Furthermore, as the site is located within an existing retail park and residential area with recent built developments the visual elements associated with construction would be considered part of the existing urban landscape.

With the above considered the negative visual impact on the landscape character during construction would be considered moderate in magnitude and short term in its duration.

Operational Phase

As described under Potential Impact of the Proposal above, the operational phase of this development will give rise to a noticeable change in the landscape character. The development will not have a negative impact on the more sensitive aspects of the landscape character, the stand of large trees along the ditch. The main impact on the landscape character will be the transformation of the area to the west of the trees from a construction compound and an area of grass to a built development. However as described in the 'Character of the Site' section of this document the landscape of this section of the site would be considered of no aesthetic value and in the wider environment would be considered a transitional landscape.

The site is specifically zoned for this type of development and there have been recent built developments of a large scale in the local vicinity. Many of these built developments are dominant in views from the site. In this context the proposed development would be considered a continuation of existing trends in the local area.

The landscape proposals include the retention of the large trees and the creation of additional native trees, hedgerows and ecological corridors. The proposed landscape treatment will contribute positively to the landscape character of the area and in particular the landscape character Santry River woodland and habitat.

With this considered the impact on the landscape character would be considered negative, slight in magnitude and long-term in duration.

12.4.3 Predicted Impact on Landscape Planning

As described in **Section 12.3.4**, within the *Fingal County Development Plan 2017-2023*, there are several specific landscape objectives that apply to the subject lands. The landscape objectives that apply to the site and its environs, are mostly aimed at protection of the character, the heritage value and visual amenity of the mature trees on site and the provision of pedestrian and cycle links through the wider area. The proposed scheme fully protects the mature trees and incorporates these trees into a larger landscape space with additional tree planting. The scheme also provides for pedestrian and cycle connections through this space linking many of the existing circulation networks together. The proposed development will therefore be in accordance with these policy objectives

Within the *Fingal County Development Plan 2017-2023*, there are also several general landscape objectives that apply to the subject lands, as described in **Section 12.3.4**. These general landscape objectives are mostly aimed and the promotion of biodiversity enhancement measures, access to open spaces for recreation and the protection of landscape character and sense of place. The proposed development will be in accordance with these policy objectives.

12.4.4 Visual impact assessment from specific locations

View 1 – From the junction of the Old Ballymun Road and Northwood Avenue

Figure 12-2: View 1 location map

Existing view

This view is from the entrance gate to Northwood campus towards the east. There are no views of any value from this location. In this specific view towards the site the railings, walls and signage associated with the Northwood campus are prominent in the view. These elements create visual clutter in the foreground. The trees in the eastern part of the site are visible in this view, forming part of the backdrop and visual ridgeline. The office buildings in Swift Square are visible on the right and the retail buildings on the left of the view.

Figure 12-3: Existing view

Figure 12-4: Proposed view on day 1 of operations.

Visual impact of proposed development during construction

The proposed development will result in a visual impact on this view during construction. The construction process, machinery, storage of materials, built structures will result in a visual intrusion into this view. The level of this impact will be limited due to the construction works being located close to recently constructed large buildings where similar construction activities were recently part of the visual landscape. The impact of the proposals during construction on the view from this location would be considered negative, moderate in magnitude, and temporary in duration.

Visual impact of proposed development during operation

The nature of the proposed development will result in an alteration to the existing view that would be considered negative in nature. The photomontage (**Figure 12-4**) demonstrates accurately the extent of the alteration of the view on day 1 of operations. The proposed building is visible to the left of the view and it will alter the visual ridgeline. The building is partially screened by the existing retail building. The level of the visual impact is mitigated due to the number of large buildings in the local landscape most notable the Swift Square Office Park to the right of this view. This development would therefore be considered as consistent with existing and emerging trends in the area. The magnitude of the negative visual impact on this view would be considered moderate to slight and long-term in duration.

View 2 – From the roundabout at the junction of Northwood Avenue and Northwood Road

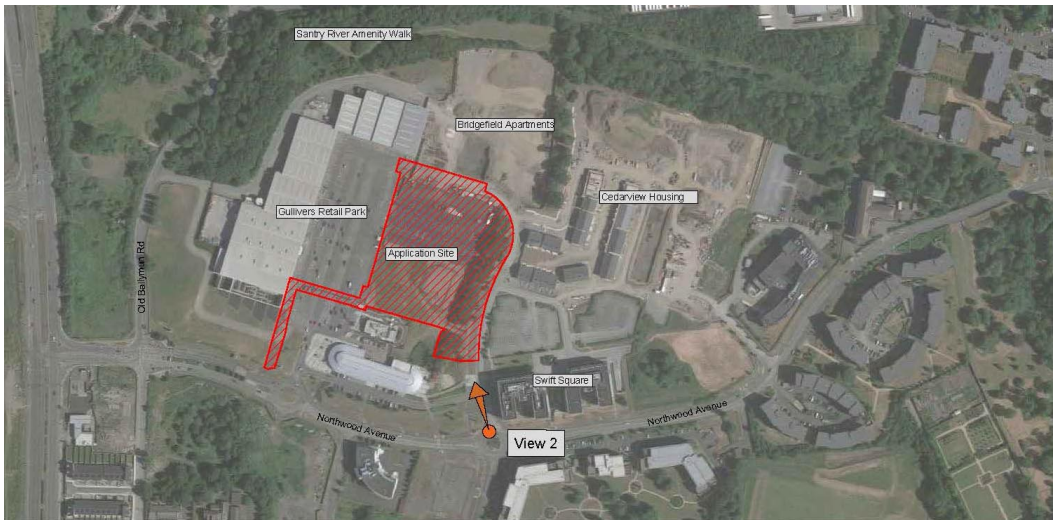

Figure 12-5: View 2 location map

Existing view

Views in this vicinity are the mostly short-range views due to the built environment and trees and vegetation. There are no views of any value from this location. In this specific view towards the site the trees and vegetation to the south of the site are prominent and form the visual ridgeline. There is an amount of visual clutter in the foreground of the view created by the signage and lighting poles. These elements intrude into the wider view over the landscape and create a partial visual screen of views into the subject lands.

Figure 12-6: Existing view

Figure 12-7: Proposed view on day 1 of operations

Visual impact of proposed development during construction

The proposed development will result in a visual impact on this view during construction. The construction process, machinery, storage of materials, built structures will be visible however there will be some screening provided by the existing vegetation. However, the level of this impact will also be limited due to the construction works being located close to a recently constructed large building where similar construction activities were recently part of the visual landscape. The impact of the proposals during construction on the view from this location would be considered negative, moderate in magnitude, and temporary in duration.

Visual impact of proposed development during operation

The nature of the proposed development will result in an alteration to the existing view that would be considered negative in nature. The photomontage (**Figure 12-7**) demonstrates accurately the extent of the alteration of the view on day 1 of operations. The proposed building is prominent in the centre of the view, where it alters the ridgeline of the view. The building is partially screened by the existing vegetation and this will be strengthened over time when the proposed trees mature.

The level of the visual impact is mitigated due to the number of large buildings in the local landscape most notable the Bridgefield Apartments immediately to the north of this scheme. This development would therefore be considered as consistent with existing and emerging trends in the area. The magnitude of the negative visual impact on this view would be considered moderate and long-term in duration. As the trees planted as screening mature the magnitude of this impact will be reduced.

Figure 12-8: View 3 – View From the entrance to the Santry Sports Injury Clinic

Existing view

The view shown in **Figure 12-9** shows a large construction compound in the foreground. This is a temporary land use and it is likely that this land will be used for building at some stage soon. There are no views of value in this vicinity. No expansive views are offered due to the nature of the surrounding built environment. Swift Square Office Park is visible on the left of the view and the trees on site would normally form the ridgeline of the view however the temporary structures are currently intruding into the view. A high rise building under construction south of Northwood Ave is visible in the background of the view.

Figure 12-9: Existing view

Figure 12-10: Proposed view on day 1 of Operations

Visual impact of proposed development during construction

The proposed development will result in a visual impact on this view during construction. The tall structures associated with the construction process will be visible however there will be some screening of the construction process provided by the existing vegetation. The level of this impact will also be limited due to the construction works being located close to a recently constructed large building and current similar construction activities in the immediate vicinity. The impact of the proposals during construction on the view from this location would be considered negative, slight in magnitude, and temporary in duration.

Visual impact of proposed development during operation

The nature of the proposed development will result in an alteration to the existing view that would be considered negative in nature. The photomontage (**Figure 12-10**) demonstrates accurately the extent of the alteration of the view on day 1 of operations. The proposed building is visible in the background of the view, where it alters the ridgeline of the view. The building is partially screened by the existing vegetation and new houses on the right of the view.

The level of the visual impact is mitigated due to the number of large buildings in the local landscape most notably the Swift Square Office Park to the left of the view. This development would therefore be considered as consistent with existing and emerging trends in the area. The magnitude of the negative visual impact on this view would be considered moderate and long-term in duration.

Figure 12-11: View 4 Location Map - View from the formal gardens at Santry Park

Existing view

This view is taken form the formal gardens within Santry Demesne in the direction of the proposed development. The views of value in this vicinity are of the trees, gardens and vistas within the Santry Demesne. In this specific view the wall of the formal gardens and perimeter trees forms the background of the view and restricts any wider views over the landscape.

Figure 12-12: Existing view

Figure 12-13: Proposed view on day 1 of operations -the red line indicates the outline of the proposed building

Visual impact of proposed development during construction

The proposed development will not result in any impact on this view during construction. The construction process, machinery, storage of materials, built structures will be screened from view by the existing vegetation.

Visual impact of proposed development during operation

The building proposed in this development will have no impact on the view from this location. The photomontage (**Figure 12-13**) demonstrates accurately the extent of the alteration of the view on day 1 of operations. The new building will not be visible due to the distance from the viewpoint, the built development and level of existing vegetation between the viewpoint and the proposed building.

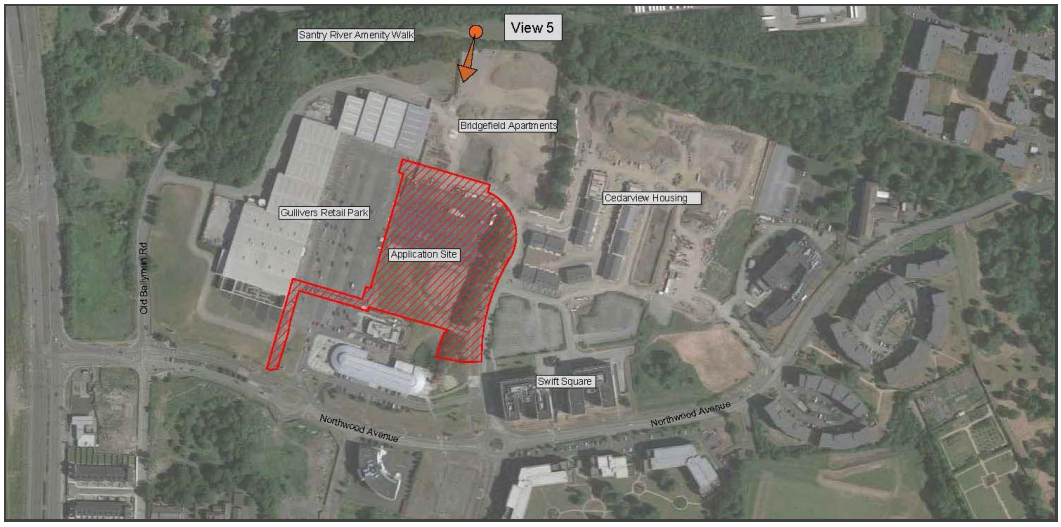

Figure 12-14: View 5 Location Map – View from the direction of the Santry River Amenity Walk

Existing view

This view is from the Santry River Amenity Walk directly south into Northwood towards the subject lands. This is a short-range view limited by the dense hedgerow and belt of deciduous trees along the perimeter with Northwood. The screening provided by this vegetation is further strengthened by the boundary wall on the Northwood side of the perimeter. As a result of this boundary treatment the subject lands are not visible from this location. However, some glimpsed views are possible between the trees where the Bridgefield Apartments (under construction) are visible on the left edge of the view.

Figure 12-15: Existing view

Figure 12-16: Proposed View on day 1 of Operations

Visual impact of proposed development during construction

The proposed development will result in a visual impact on this view during construction. The construction process, machinery, storage of materials and built structures will be mostly screened from view by the existing vegetation. Some of the visual elements associated with the building process may be visible in partial or glimpsed views. The level of this impact will also be limited due to the screening provided by the Bridgefield Apartments and as the construction works are located close to recently constructed large buildings. With the above considered the impact of the proposals during construction on the view from this location would be considered negative, slight in magnitude, and temporary in duration.

Visual impact of proposed development during operation

The nature of the proposed development will result in an alteration to the existing view that would be considered negative in nature. The photomontage (**Figure 12-16**) demonstrates accurately the extent of the alteration of the view on day 1 of operations. The building is mostly screened by the existing hedgerow trees and by the boundary wall and Bridgefield Apartments building. The level of the existing screening will increase over time as the young trees mature. The level of the visual impact is mitigated due to the number of large buildings in the local landscape and the distance of the viewpoint form the building. This development would be considered as consistent with existing and emerging trends in the area. None of the visual sensitivities of views from this location would be affected by this development. The magnitude of the negative visual impact on this view would be considered not significant and long-term in duration

12.4.5 Do Nothing

In the event of this scenario the northern section of the site would continue to be left in the 'transition state' as it is currently for a period. The southern section of grassland would continue to wild and scrub vegetation would take hold. Without proper management of the landscape it would go into decline as the field reverts to scrub areas. As the area has a specific zoning for development it is likely that the site would be developed in the future in a similar scale and type as is currently proposed.

12.5 Mitigation Measures

12.5.1 Construction Phase

The following measures will be taken during the construction process to mitigate negative landscape and visual impacts:

- Construction compounds, materials storage, car parking, lighting and hoarding will be designed and located sensitively to limit negative visual impacts on the surrounding lands.

- Adequate tree protection measures will be put in place and monitored by a qualified arborist to ensure the existing mature trees are not impacted by the construction processes.

12.5.2 Operational Phase

Having regard to the Masterplan measures included within the design as listed below, no further mitigation will be required:

- The architectural design of the building aims to reduce the visual mass through its form and choice of materials.

- The retention of the belt of large mature trees will assist the visual integration of the building into the landscape and mitigate the visual impact.

- The landscape proposals include green links, trees and woodland, seating and play features. These elements will assist the visual integration of the building into the landscape and mitigate the visual impact.

12.6 Monitoring Measures (Construction and Operational)

Contracts will ensure good working practices to reduce any negative impacts arising from construction to the lowest possible level and to ensure that all machinery operates within clearly defined construction areas. Storage areas will be located to avoid impacting on sensitive views, trees, hedgerows, drainage patterns etc. and such areas will be fully re-instated prior to, and at the end of the construction contract. The works will also have continuous monitoring to ensure adequate protection of areas outside of the construction works.

12.7 Cumulative Impact

The development would be considered an infill development in that it is surrounded by built developments on all sides. The massing scale and form of the proposed development would be similar to the scheme under construction directly to the north of the subject lands. The landscape scheme is designed to integrate this scheme with the surrounding landscape and serves to link together some of the currently unconnected circulation routes and landscape links.

While the scheme will alter the views and visual amenity in the area it would be consistent with existing and emerging trends in the area. Therefore, the cumulative impact of this scheme and the surrounding recent developments would not significantly effect the fabric of the landscape or the existing landscape type.

12.8 Residual Impact

As described under Potential Impact of the Proposal above, the operational phase of this development will give rise to a noticeable change in the landscape character. The development will not have a negative impact on the more sensitive aspects of the landscape character, the stand of large trees along the ditch. The main impact on the landscape character will be the transformation of the area to the west of the trees from a construction compound and an area of grass to a built development. However as described in the ‘Character of the Site’ section of this document the landscape of this section of the site would be considered of no aesthetic value and the wider environment would be considered a transitional landscape. As the proposed landscape scheme matures the new landscape spaces will become more appreciated by the users for their inherent values. This will reduce the magnitude of negative impact felt from the loss of ‘green’ space to build the scheme

The landscape proposals include the retention of the large trees and the creation of additional native trees, hedgerows and ecological corridors. The proposed landscape treatment combined with the architectural treatment of the building will reduce the visual mass of the development and mitigate its visual impact. As the new trees mature the magnitude of the visual impacts will be reduced further.

12.9 References

Environmental Protection Agency (2002) Guidelines on the Information to be Contained in Environmental Impact Statements. Wexford: Environmental Protection Agency.

Environmental Protection Agency (Draft 2017*) Guidelines on the Information to be Contained in Environmental Impact Statements. Wexford: Environmental Protection Agency.*

Environmental Protection Agency (2003) Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements. Wexford: Environmental Protection Agency.

Fingal County Council, Fingal Development Plan 2017-2023.

The Tree File Ltd, (January 2019), Preliminary Tree Survey and Report: Trees at proposed site at Northwood.

13 MATERIAL ASSETS: TRAFFIC AND TRANSPORT

13.1 Introduction

This Chapter of the EIA document has been prepared by Gerard Claffey of JB Barry Consulting Engineers and addresses all traffic and transport and related sustainability issues including means of vehicular access, pedestrian, cyclist and local public transport connections. Gerard *B.A. B.A.I. M.A.I.* is a Design Engineer with 5 years' experience specialising in the field of Traffic and Transportation Engineering. Gerard has been engaged as team member on a variety of Transportation and Traffic projects. Gerard's experience includes the design and management of road improvement projects, development of cycle schemes, bus corridors, high density cycle parking facilities, preparation of mobility management plans and traffic impact assessments. Gerard is a TII approved Road Safety Auditor and has been a team member in 25+ road safety audits.

The principal objective of this Chapter is to quantify any level of impact across the local road network and subsequently ascertain the operational performance of the local road network. This section should be read in conjunction with the site layout plans for the site and project description provided in **Chapter 5** of this EIAR. The proposed development will consist of 331 apartments in four separate blocks, with mixed use commercial units, a gym area and a childcare facility at ground floor level over basement car parking, and all associated site works including roads, footpaths, landscaping, site services, SUDS measures and sundry related works.

13.1.1 Scoping

Scoping of the proposal identified the following issues for consideration in the EIAR:

This chapter of the EIAR provides an assessment of the potential traffic impacts associated with the proposed development. In this regard, the assessment aims to:

- Identify the existing environment in terms of traffic, existing transport infrastructure and emerging transport developments;
- Quantify the likely vehicle traffic flows to and from the development, from and to the surrounding road network;
- Identify and quantify the likely traffic impacts on the surrounding road network resulting from the development;
- Identify any potential safety issues, in particular impacts on vulnerable road users in the study area;
- Produce a car and bicycle parking strategy;
- Identify suitable measures to mitigate traffic and transportation impacts, if any, associated directly with the development.

The assessment is based on the findings of site visits, traffic observations, on-site traffic counts, architectural plans, consultations with the Design Team and consultation with Fingal County Council, TII and NTA as detailed in **Chapter 2**.

13.2 Assessment Methodology

The methodology adopted for this section is based on, but not limited to the following published guidance;

- TII *"Traffic and Transport Assessment Guidelines"* 2014
- Department of Transport, Tourism and Sport *"Traffic Management Guidelines"* 2012

The methodology incorporated a number of key inter-related stages, which are outlined below;

- A site audit was undertaken to quantify existing road network issues and identify local infrastructure characteristics, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport;
- Reference was made to site layout drawings;
- Existing and proposed access arrangements for the proposed development onto Northwood Avenue were considered;
- Traffic surveys were undertaken on 12 February 2019 at the junctions most likely to be impacted by the proposed development;
- A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed development;
- In accordance with the Traffic and Transport Assessment Guidelines, the specific level of influence generated by the proposed development upon the surrounding local road network was ascertained and the junctions which required assessment in greater detail were identified;
- The junctions considered most likely to be impacted upon by traffic movements associated with the development were assessed in terms of capacity.

13.3 Baseline Environment

13.3.1 Land Use and Location

The existing site is a part greenfield and part temporary car park site. The temporary car park is often used for construction workers car parking from surrounding developments. Vehicular access is currently provided off Northwood Road and through the existing Gulliver's Retail Park itself off Northwood Avenue. The site is situated on the eastern side of the Northwood area. The site is bounded by Gulliver's Retail Park to the West, Cedarview residential development to the East and Swift Square office development to the East.

The land uses surrounding the development site are a mix of commercial and residential (comprising both individual dwellings and larger residential apartment blocks), all of which benefit from access to / from Northwood Avenue.

Figure 13-1 and **Figure 13-2** below illustrates the location and setting of the proposed development.

Figure 13-1: Location of Proposed Development and Environs

Source: Google Maps, annotation by J. B. Barry and Partners Limited

Figure 13-2: Local Setting of Proposed Development within the Northwood area

Source: Google Maps, annotation by J. B. Barry and Partners Limited

13.3.2 Existing Transport Infrastructure

13.3.2.1 Introduction

An important aspect of the Traffic and Transport chapter of the EIAR is the identification and appreciation of the local network's existing transport conditions and vehicle movement characteristics. An assessment of the local road network has been undertaken to establish the existing transport conditions and vehicle movement patterns across the existing network.

13.3.2.2 Pedestrian and Cycle Infrastructure

As a modern development, the pedestrian and cycle facilities within the Northwood area are of a good quality. All pedestrian routes leading to / from the development benefit from the provision of street lighting in addition to good quality pedestrian footways. There are numerous pedestrian crossing facilities available along Northwood Avenue just south of the development. Additionally, off road cycle tracks are provided throughout the Northwood area and on the external road network. Ballymun Road has an off-road cycle track while Swords Road has an On-Road cycle track. **Figure 13-3** below illustrates the existing cycle network in the area and **Figure 13-4** illustrates the proposed improvements from the *NTA's "Greater Dublin Area Cycle Network Plan".* The off-road cycle lane along Northwood Avenue branches out at numerous locations along the route providing additional cycle facilities throughout the Northwood area. For the Proposed Cycle Network (**Figure 13-4**), it is noted that much of the alignment for the Santry River Greenway is already in place throughout the Northwood area.

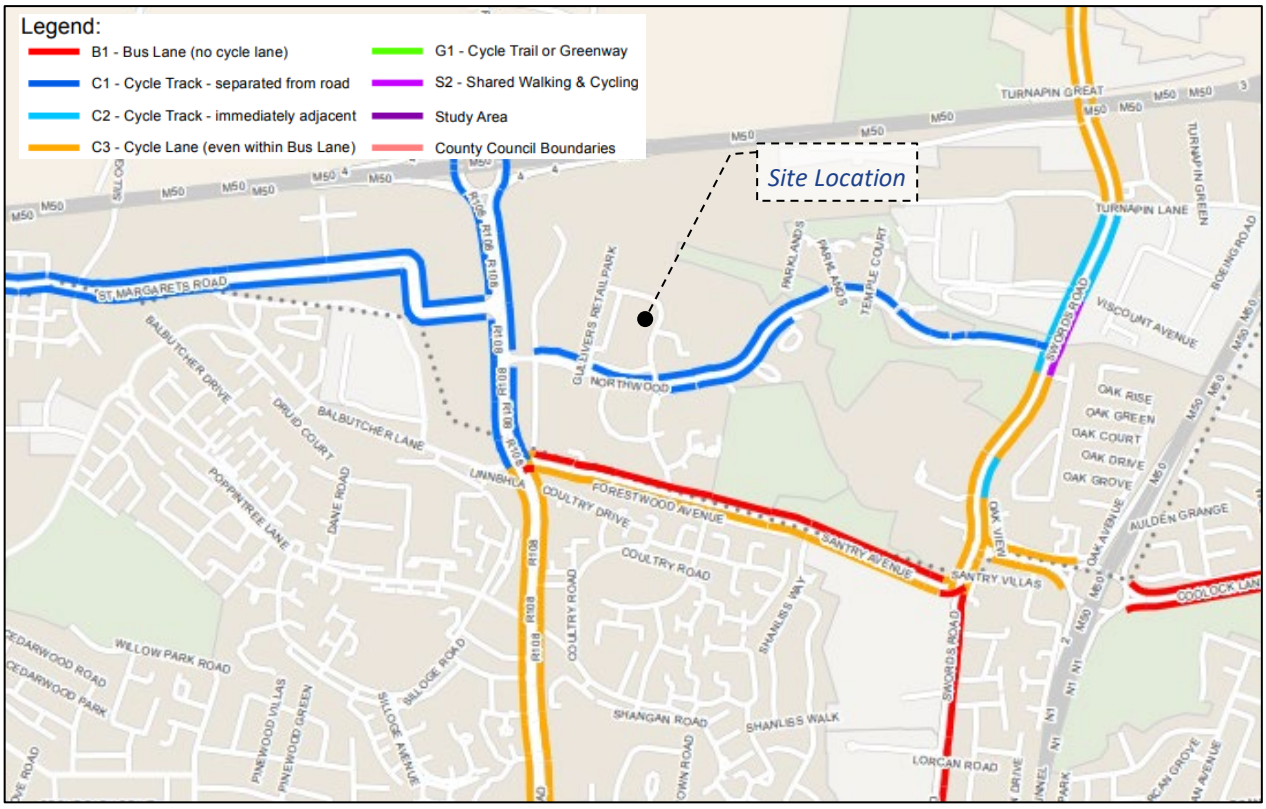

Figure 13-3: Existing Cycle Facilities - Greater Dublin Area Cycle Network Plan

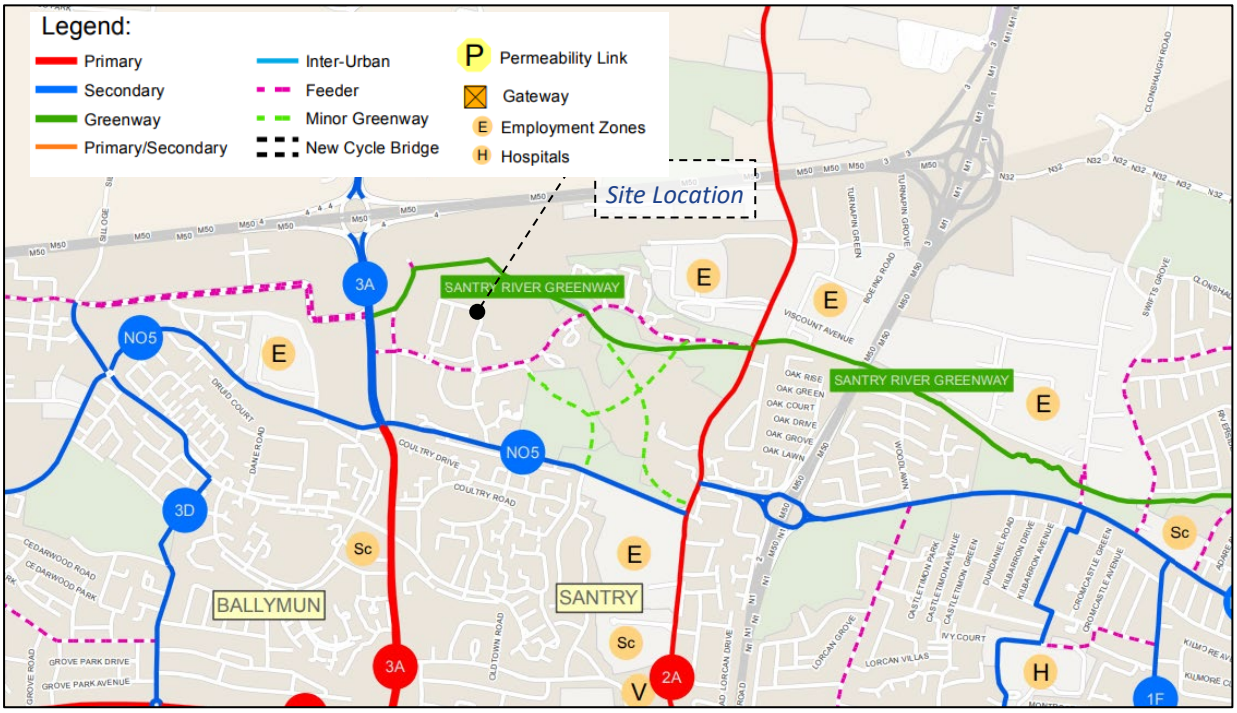

Figure 13-4: Proposed Cycle Facilities - Greater Dublin Area Cycle Network Plan

13.3.2.3 Existing Public Transport

The Site is ideally situated to benefit from a comprehensive range of Dublin Bus and Transport for Ireland (TFI) Go Ahead bus connections. Furthermore, the range and proximity of a number of emerging public transport interchanges further enhances the sustainability characteristics of the Site.

Dublin Bus and TFI operate numerous routes along Swords Road and Ballymun Road and Santry Avenue. These Dublin Bus operated bus services operate on a daily basis and offer relatively frequent schedules as summarised in **Table 13-1** below.

Table 13-1: Dublin Bus Service Frequency - No. of Services (www.dublinbus.ie)

Route No.	Route	Mon - Fri	Sat	Sun	
16	*Dublin Airport to Ballinteer*	87	81	63	Swords Road
27b	*Eden Quay to Harristown*	53	51	31	Swords Road
33 *(TFI)*	*Lower Abbey St. to Balbriggan*	21	14	12	Swords Road
41*	*Lwr. Abbey St. to Swords Manor*	50	44	29	Swords Road
41b	*Lwr. Abbey St. to Rolestown*	5	4	3	Swords Road
41c*	*Lwr. Abbey St. to Swords Manor*	45	41	28	Swords Road
4	*Harristown to Monkstown Avenue*	80	64	47	R108
155	*Ikea (Ballymun) to Bray Rail Station*	5	53	47	R108
13	*Harristown to Grange Castle*	75	63	46	R108
42d	*DCU to Portmarnock*	1	No service	No service	R108
17a *(TFI)*	*Kilbarrack to Blanchardstown*	57	52	42	Santry Avenue (R104)

13.3.3 Emerging Transport Developments

13.3.3.1 Public Transport Developments

13.3.3.1.1 Bus Connects

Bus Connects proposes 16 No. Core Bus Corridors extending radially from Dublin City Centre to the surrounding suburbs. Dublin Bus Connects proposes to introduce numerous new bus routes in close proximity to the development. **Figure 13-5** taken from the latest Bus Connects proposal illustrates proposed new routes in the vicinity of the proposed development such as the "E Bus Route", which is the Ballymun to City Centre Core Bus Corridor. The "E Spine" Core Bus Corridor will operate every 5 minutes or better. It would travel from the city centre along the R108/Ballymun Road and would split into branches, the E1 continuing north along the R108 (just west of the development) and the E2 would travel west towards Charlestown Shopping Centre. Each branch would operate every 10 minutes. The E1 would also operate to Bray and the E2 to Dun Laoghaire. Additionally, the A2 branch of the A Core Bus Corridor from Airport to Tallaght, A4 Branch of the A Core Bus Corridor between Swords to Rathfarnham and N8 Charlestown Shopping Centre to Howth Junction will all be frequent services.

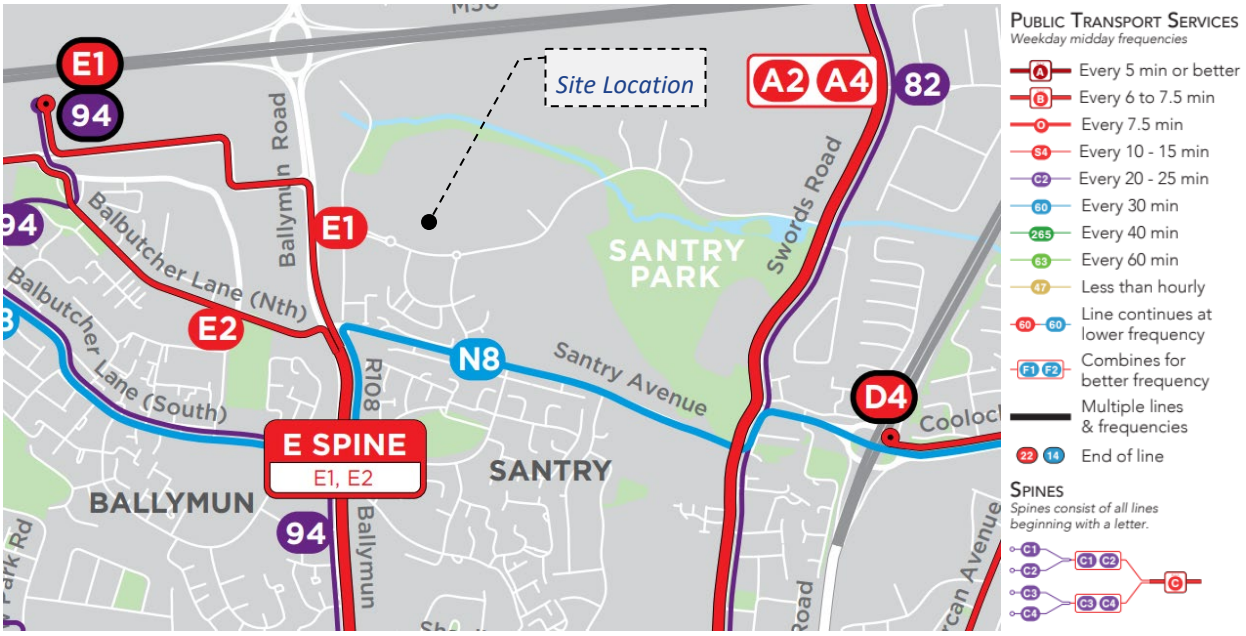

Figure 13-5: Proposed Bus Connects Routes beside Northwood (Source www.busconnects.ie)

13.3.3.1.2 MetroLink

A Metro Link stop is currently proposed at Northwood in close proximity to the proposed development. Metro Link is the proposed high-capacity, high-frequency rail line running from Swords to Charlemont, linking Dublin Airport, Irish Rail, DART, Dublin Bus and Luas services, creating a fully integrated public transport service in the Greater Dublin Area. The proposed Northwood Metro Link stop will likely be located west of the proposed development at the junction of the Ballymun Road (R108)/Northwood Avenue. The exact location is yet to be confirmed. The development will also include a new pedestrian walkway through Gulliver's Retail Park, providing direct access to the MetroLink stop. The new pedestrian walkway will require removing c.44 car parking spaces in the retail park. It is noted that the retail park is rarely over 50% occupancy due to the excessive number of parking spaces. See **Figure 13-6** and **Figure 13-7** for the route map and a draft artists impression of the Northwood stop by the Ballymun Road.

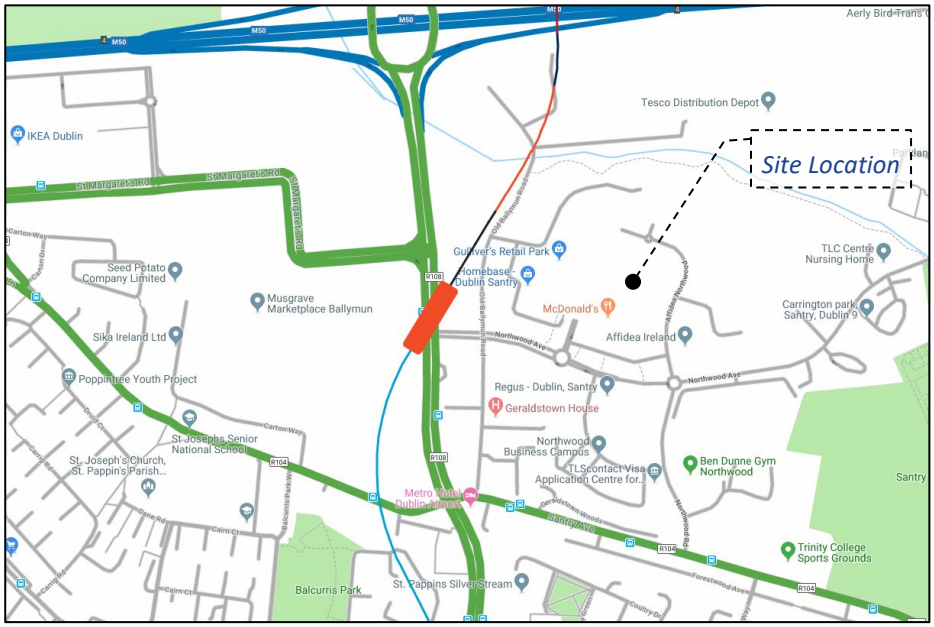

Figure 13-6: MetroLink Emerging Preferred Route and Northwood Stop (Source www.metrolink.ie)

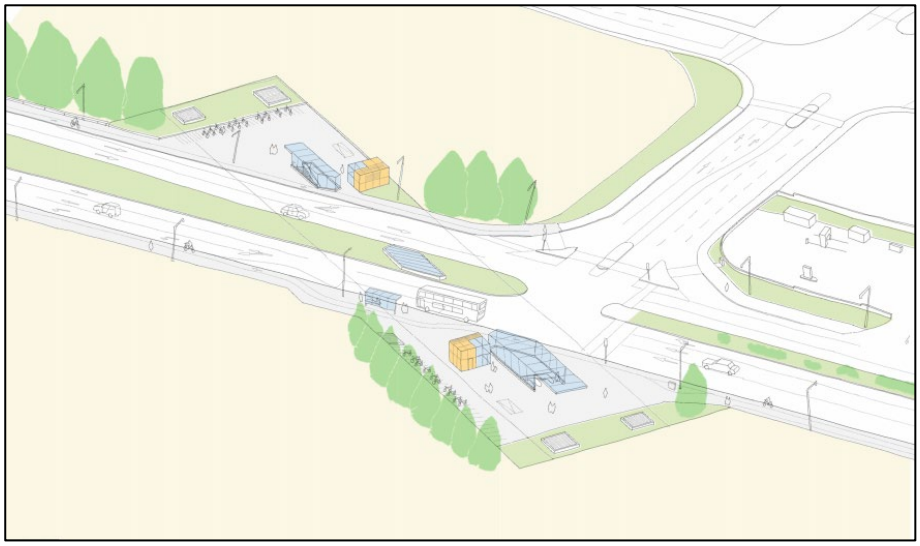

Figure 13-7: Artists impression of proposed Northwood Stop on Ballymun Rd (R108) (Source www.metrolink.ie)

13.3.3.2 Fingal Development Plan Northwood Area Objectives

The FDP has outlined several objectives for the Northwood Area which are summarised below:

- *Facilitate provision of an underpass to include provision for a car, bus, cycle, and pedestrian link to link lands east and west of the R108 to enhance connectivity.*
- *Ensure where feasible, development overlooks the Santry River Walk.*
- *Allow the re-location of existing units to facilitate connectivity to the proposed Northwood Metro Stop.*
- *Enhance pedestrian links within and to Santry Demesne.*
- *Ensure the continued protection of trees within the subject lands.*

- *Facilitate provision of a direct access route from Old Ballymun Road through Northwood. Development shall enhance connectivity to the proposed Northwood Metro Stop.*

13.3.4 Road Safety Authority (RSA) Collision History

The Road Safety Authority (RSA) database of road collision information was interrogated to establish if the surrounding road network in the vicinity of the proposed development access holds records relating to historical collision occurrence (**Figure 13-8** below). Collisions from 2005 to 2015 only are available.

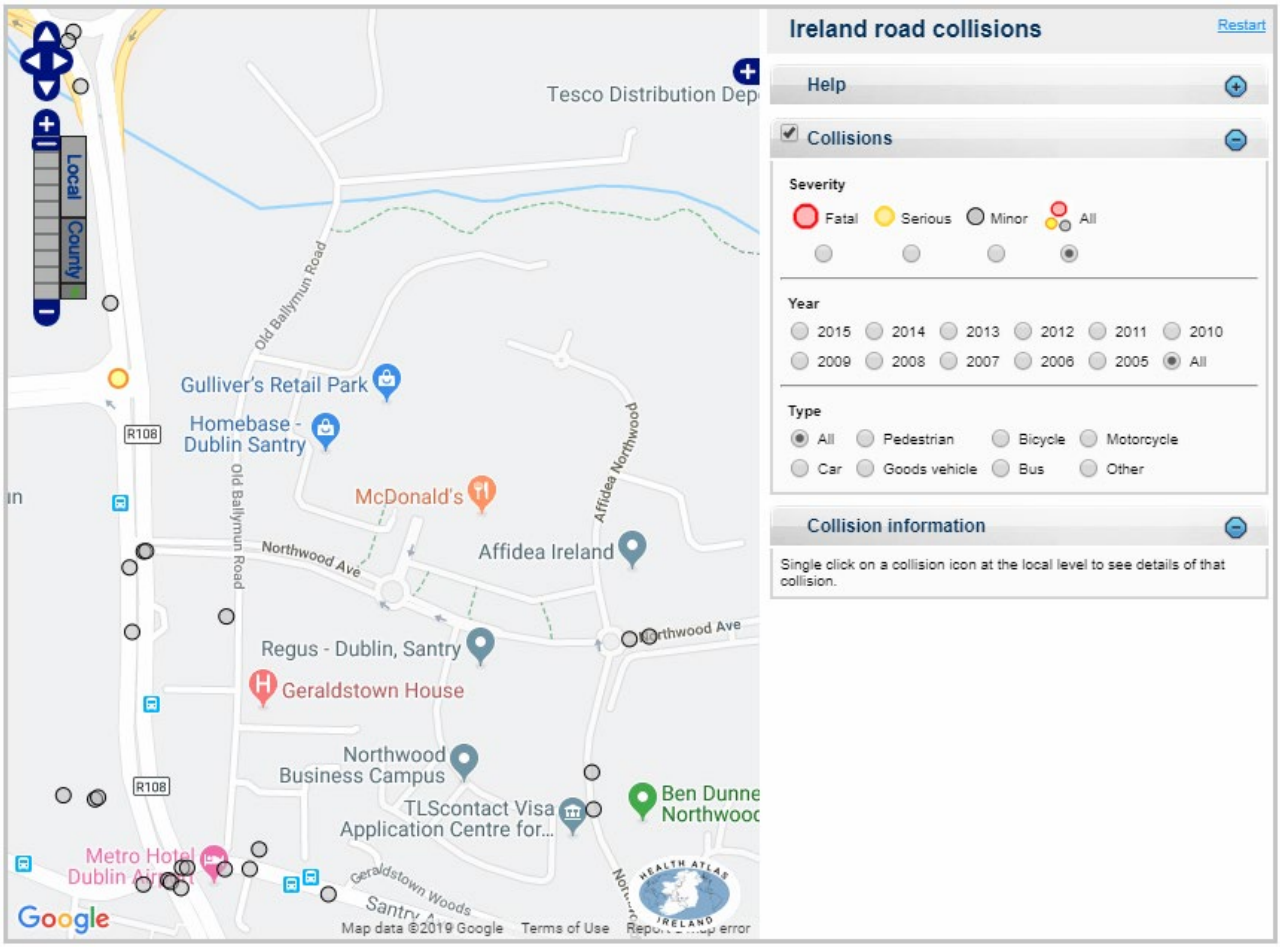

Figure 13-8: Historic Collisions 2005 - 2015 (Source RSA Database)

This exercise revealed that there have been two minor collisions near the site on Northwood Avenue, both recorded in 2013. One was a single vehicle collision, the other a pedestrian/vehicle collision. In addition, there has been two minor collisions on Northwood Road, one involving a bicycle in 2014 and one involving two vehicles in 2008. A number of minor collisions have also taken place outside the Northwood area on the Ballymun Road (R108) at the junction with Northwood Avenue and the junction with Santry Avenue. Due to the isolated nature and low frequency of these collisions a pattern of collisions is not identifiable.

13.4 Characteristics of the Proposed Scheme

13.4.1 Overview

The proposed development will consist of 331 apartments in four separate blocks, with retail units, a gym area and a childcare facility at ground floor level over basement car parking, and all associated site works including roads, footpaths, landscaping, site services, SUDS measures and sundry related works. A full project description is contained in **Chapter 5** of this EIAR.

13.4.2 Site Access

The Site will benefit from one vehicle access which will be provided off Northwood Road, directly north of the site itself. This access forms part of an existing mini roundabout on the local Road, with arms to Gulliver's Retail Park (west arm), the Cedarview development (north arm), the proposed development (south arm) and the local road off Northwood Road itself. See **Figure 13-9** for a sketch illustrating the roundabout on the access.

The access road connects to the existing roundabout junction on Northwood Avenue. This will form part of the main access to the development, as all residential traffic will likely come through this Northwood Avenue roundabout. Whilst it will be possible to access the development through the Gulliver's Retail Park car park, the route contains additional turning movements and pedestrian crossing points and therefore it is unlikely that any residential traffic will take this route.

Figure 13-9: Proposed Access Arrangement (Source: Google Maps)

13.4.3 Car Parking and Bicycle Parking Strategy

13.4.3.1 Overview

A meeting was held with the Roads and Traffic department of Fingal County Council (FCC) on 6th December 2018 to discuss the parking requirements of the proposed development. It was agreed with FCC that a sustainable approach to parking would be incorporated into the development. The parking strategy utilised is derived from *"Sustainable Urban Housing: Design Standards for New Apartments",* which places a strong emphasis on bicycle parking. As per the standards, cycling is a:

> *"Flexible, efficient and attractive transport option for urban living and these guidelines require that this transport mode is fully integrated into the design and operation of all new apartment development schemes."*

The proposed development is well situated next to high-quality off-road cycling infrastructure and there is an opportunity to maximise the benefit deriving from appropriate cycle parking provision. The proposed development is an integrated area adjacent to existing employment, retail and community facilities. The proposed development is also well situated next to high-quality existing public transport services, as well as planned future public transport upgrades. Additionally, the development is in a "Intermediate Urban Location" as per the standards and therefore car parking should be reduced:

> *"In suburban/urban locations served by public transport or close to town centres or employment areas and particularly for housing schemes with more than 45 dwellings per hectare net (18 per acre),* ***planning authorities must consider a reduced overall car parking standard and apply an appropriate maximum car parking standard****."*

Due to the close proximity of the proposed development to high-quality off-road cycling infrastructure, as well as numerous existing and future high frequency and high capacity public transport services, the parking strategy for the proposed development is based upon the principles of "Sustainable Urban Housing: Design Standards for New Apartments" in order to further promote sustainable transport modes thus minimising the need for additional car parking.

13.4.3.2 Car Sharing Facility

Further to the car parking provision, FCC recommended the provision of 3 no. car parking spaces for a private car sharing company. The benefits of such car sharing services include:

- The reduction of the number of cars on the road and therefore traffic congestion, noise and air pollution;
- Frees up land traditionally used for private parking spaces but which may not be used;
- Increases use of public transport, walking and cycling as the need for car ownership is reduced; and
- Car sharing allows those who cannot afford a car the opportunity to drive, encouraging social inclusivity.

13.4.3.3 Car Parking and Cycle Parking

Table 13-2 summarises the car parking and cycle parking provided within the development. The majority of car/cycle parking will be provided in the basement area. The basement car parking strategy equates to one car parking space per residential unit. The basement cycle parking strategy equates to 1 bicycle parking spaces per residential unit bed space. 70 visitor bicycle parking spaces will be provided on surface level. Additionally, 5 motorcycle parking spaces will be available in the basement level.

Non-residents, utilising the retail area will also be able to avail of the excess car parking provided in the Gulliver's Retail Park car park. Gulliver's Retail car park is under the control of the applicant and this car park is to be shared with the proposed retail units. Any future developments will ensure that retail car spaces for the proposed development will be retained. Non-residents using the retail park will also be able to utilise the visitor parking bicycle spaces located next to the retail areas on the ground floor.

A childcare facility set-down area has also been provided and 5 no. parking spaces are allocated north of the childcare facility area on the ground flood to facilitate servicing, short duration parking and childcare facility pickup / drop off.

Charging points for electric vehicles will be provide at 3 No. surface car parking spaces and provision made for future connections to all surface car parking spaces.

Table 13-2: Car Parking and Bicycle Parking

	Land Use	Parking Provided	*Ratio*
Car Parking	**Residential Units**	331 Car Parking Spaces	*1 space per residential unit*
		3 Additional Disabled Parking Spaces	*1 disabled parking bay per 100 spaces*
	Childcare Facility	5 Ground Floor Short-term/Drop-off Car Parking Spaces	*1 space per 64m²*
Bicycle Parking	**Residential Units**	690 Basement Cycle Parking Spaces	*1 space per residential unit bed space*
		70 Surface Level Visitor Cycle Parking Spaces	*1 visitor space per 5 residential units*

13.4.3.4 Car Ownership Levels

Census 2016 Small Area Population Statistics were analysed in order to determine existing car ownership levels for households in the Northwood area. For the purposes of this analysis, 13 No. locations, which are characterised as being predominately apartment complexes were utilised. These locations mirror closely the proposed apartment development and are illustrated in **Figure 13-10** below. Small Area populations which comprised mainly office blocks, hotels or industrial areas were excluded from this analysis.

Figure 13-10: Census 2016 Data Locations (Source: Central Statistics Office)

Table 13-3 below outlines the total car ownership levels per household for all the existing apartment developments in the Northwood area highlighted in **Figure 13-10**.

Table 13-3: Car Ownership

No. of Households	No. of cars	Ratio - Car space: Residential Unit
1274	1182	0.93

With respect to the application of car parking standards as set out in the Development Plan to the proposed development, there is a requirement for 510 no. residential spaces and 66 no. visitor spaces resulting in 576 no. spaces overall. However, with reference to the Design Standards for New Apartments the level of car parking proposed is considered in the context of an intermediate urban location where a reduced level of car parking is required.

In order to determine an appropriate quantum of car parking at this location the review of CSO data was undertaken. As demonstrated in **Table 13-3**, the data revealed that the car ownership rate is approximately 1 car per household in the Northwood area. Providing for this level of car parking to the proposed development results in 331 no. car parking spaces for the apartments. If any more car parking spaces were introduced, it may encourage an over reliance on single occupancy vehicles, resulting in a negative effect on traffic in the surrounding area. Providing less than one car space per apartment would constrain accessibility and mobility for residents and potentially lead to unregulated car parking and associated safety issues in the area.

While no additional car parking spaces are proposed for visitors, visitor car parking demand can be met through shared usage of existing car parking spaces within Gulliver's Retail Park and in the basement as overall car usage declines overtime.

The level of parking proposed for the apartments represents a reduced level of car parking on the site of over 40% based on the Development Plan management standards and is consistent with an intermediate urban location where a reduced level of car parking is required.

13.5 Impact Assessment

The traffic and transport effects are assessed in the following sections for the construction and operation phases of the proposed development.

This assessment of impacts follows guidelines established by the TII in the *Traffic & Transportation Assessment Guidelines* (2014).

The significance of impacts on specific junctions are considered in terms of the magnitude of the effect/impact of an element of the project on a junction and the importance of that junction.

13.5.1 Do Nothing

The 'do nothing' alternative describes the scenario where no development occurs. The impacts of the development will be compared against this do-nothing scenario referred to as "without" the development in the following sections.

13.5.2 Potential Impact of the Proposed Development

13.5.2.1 Construction Phase

All construction activities will be governed by a construction Traffic Management Plan (TMP) the details of which will be agreed with FCC's Roads Department prior to the commencement of the Construction Phase. The principal objective of the TMP is to ensure that the impacts of all building activities generated during the Construction Phase upon both the public (off-site) and internal (on site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders' requirements.

During the construction works there will be additional HGV movements to/from the site. Traffic will be generated by the disposal of surplus subsoil from the site, deliveries of construction materials and equipment and of course private vehicles owned and driven by construction workers and staff.

It should be noted that construction traffic generated during the Construction Phase tends to be outside of peak hours. (Staff and deliveries arrive before 07:00 and generally depart after 19:00). The traffic generated by the construction phase will not be higher than the peak hour predicted volumes for the Operational Phase. Any specific recommendations/requirements with regard to construction traffic management made by FCC will be adhered to during this phase.

13.5.2.2 Operational Phase: Base Year

13.5.2.2.1 Traffic Survey

In order to assess the operation of the proposed road network and its future capacity, a traffic model of the existing local road network and proposed links was created. Firstly, a vehicle turning movement survey was carried out at seven junctions near the subject site (See **Figure 13-11**);

- Site 1- Junction 1) Ballymun Road (R108) / St. Margaret's Road;
- Site 2- Junction 2) Ballymun Road (R108) / Northwood Avenue;
- Site 3- Junction 3) Northwood Avenue / Old Ballymun Road;
- Site 4- Junction 4) Northwood Avenue / Local Access Road;
- Site 5- Junction 5) Northwood Ave / Northwood Road;
- Site 6- Junction 6) Santry Ave / Northwood Road; and
- Site 7- Junction 7) Northwood Ave / Swords Road (R138).

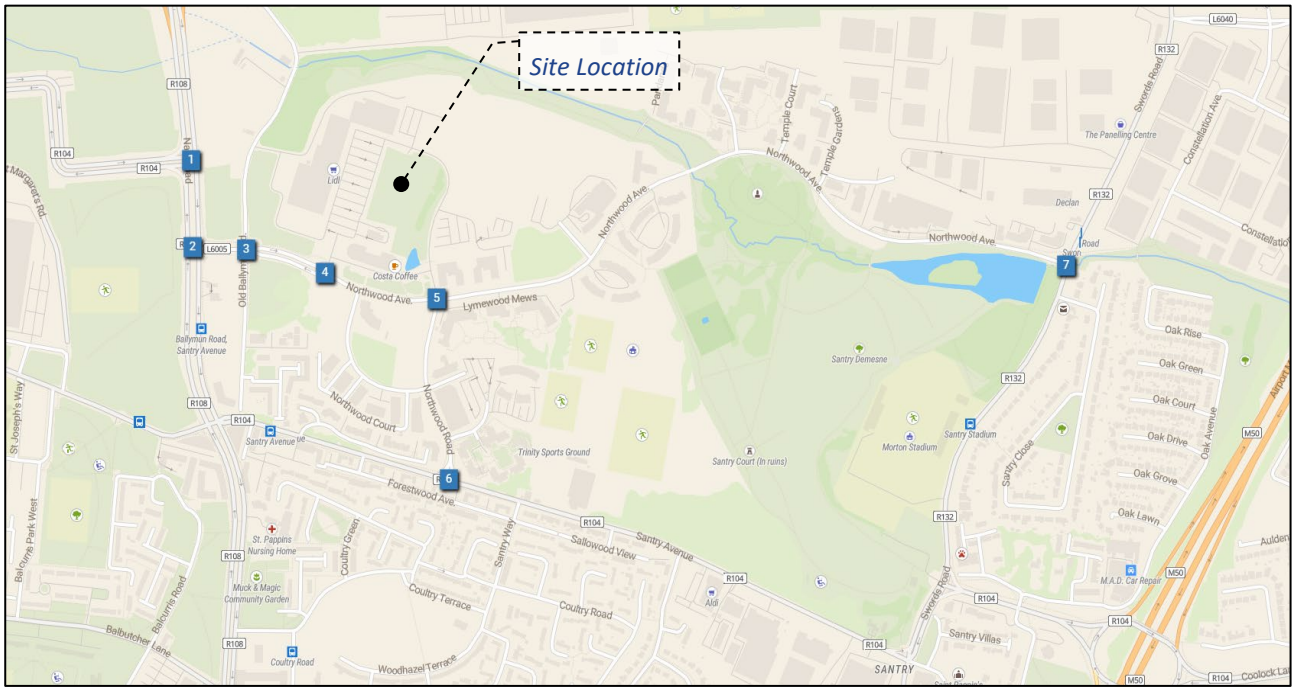

Figure 13-11: Traffic Count Locations (Source- IDASO Traffic Surveys and Data Collection)

The counts captured all turning movements at these junctions. The vehicle turning movement surveys were undertaken on Tuesday 12th February 2019. The counts were carried out over the 12-hour period 07:00 hours to 19:00 hours including both the morning and evening peak periods.

The morning peak hour was identified as 08:00-09:00 for all junctions. The evening peak hour was identified as 17:00-18:00 for all junctions. Data was collected in 15-minute intervals. A full transcription of the turning movement survey is included in **Volume 3, Appendix 13.1**.

The evening peak hour of 17:00 to 18:00 hours was observed to be marginally more intense than the morning peak hour. However, in order to carry out a robust traffic analysis of the surrounding road network, the traffic modelling exercise following herein will be based on traffic flows recorded for both the weekday morning and evening peak hours for each junction.

A summary of the 2019 vehicle turning movement surveys for the morning and evening peak hour periods is shown in **Figure 13-12** and **Figure 13-13** below.

In order to determine the effect of the development on the adjoining road network, the estimated trip generation (as detailed in the next section below), was applied to the traffic counts at each junction. It was assumed the trips generated by the development will mirror the existing trip distribution.

It was determined that Junction 2) Ballymun Road (R108) / Northwood Avenue, Junction 6) Santry Ave / Northwood Road and Junction 7) Northwood Ave / Swords Road (R138) were the key junctions to be modelled, as they provide access to/from the public road network. Junction 5) Northwood Ave / Northwood Road, whilst fully contained within the private area of Northwood, would experience the largest increase from trips generated by the development and therefore would also be modelled.

As part of the OSCADY traffic models, existing signal timings where recorded for each of the signalised junctions. The existing traffic signals where vehicle actuated on each arm and as a result, signal and cycle timings differed depending of the traffic flows. For the purpose of the OSCADY models, numerous signal timings were recorded, and an average signal time was utilised for the model. This was carried out for the morning and evening peak hour. Additionally, as part of the traffic analysis, optimised signal and cycle timings were modelled. The optimised timings from OSCADY were largely similar to the recorded results, demonstrating that the existing vehicle actuated timings are operating efficiently as possible.

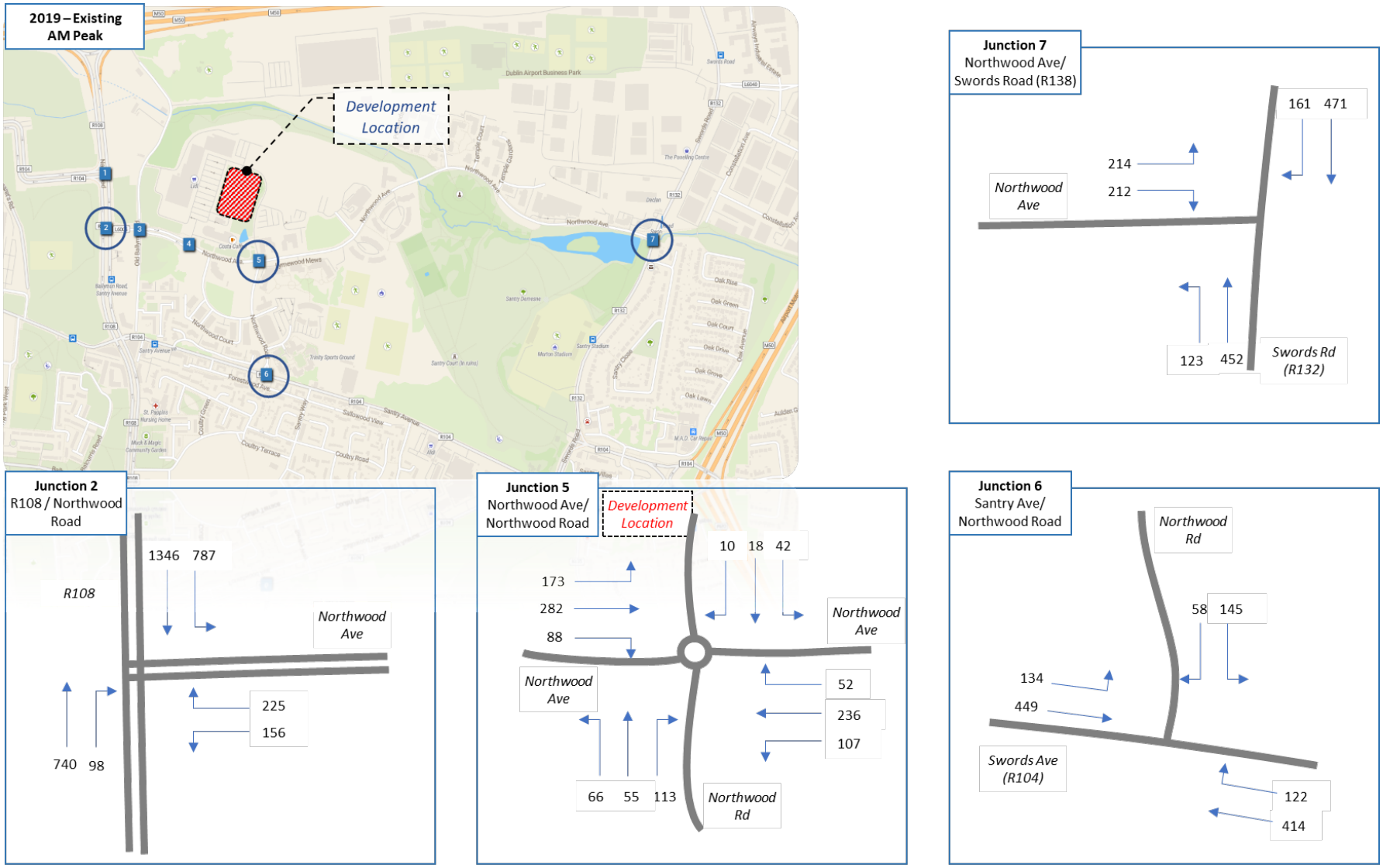

Figure 13-12: Vehicle turning movement- 2019 Existing Morning Peak Hour (08:00 – 09:00)

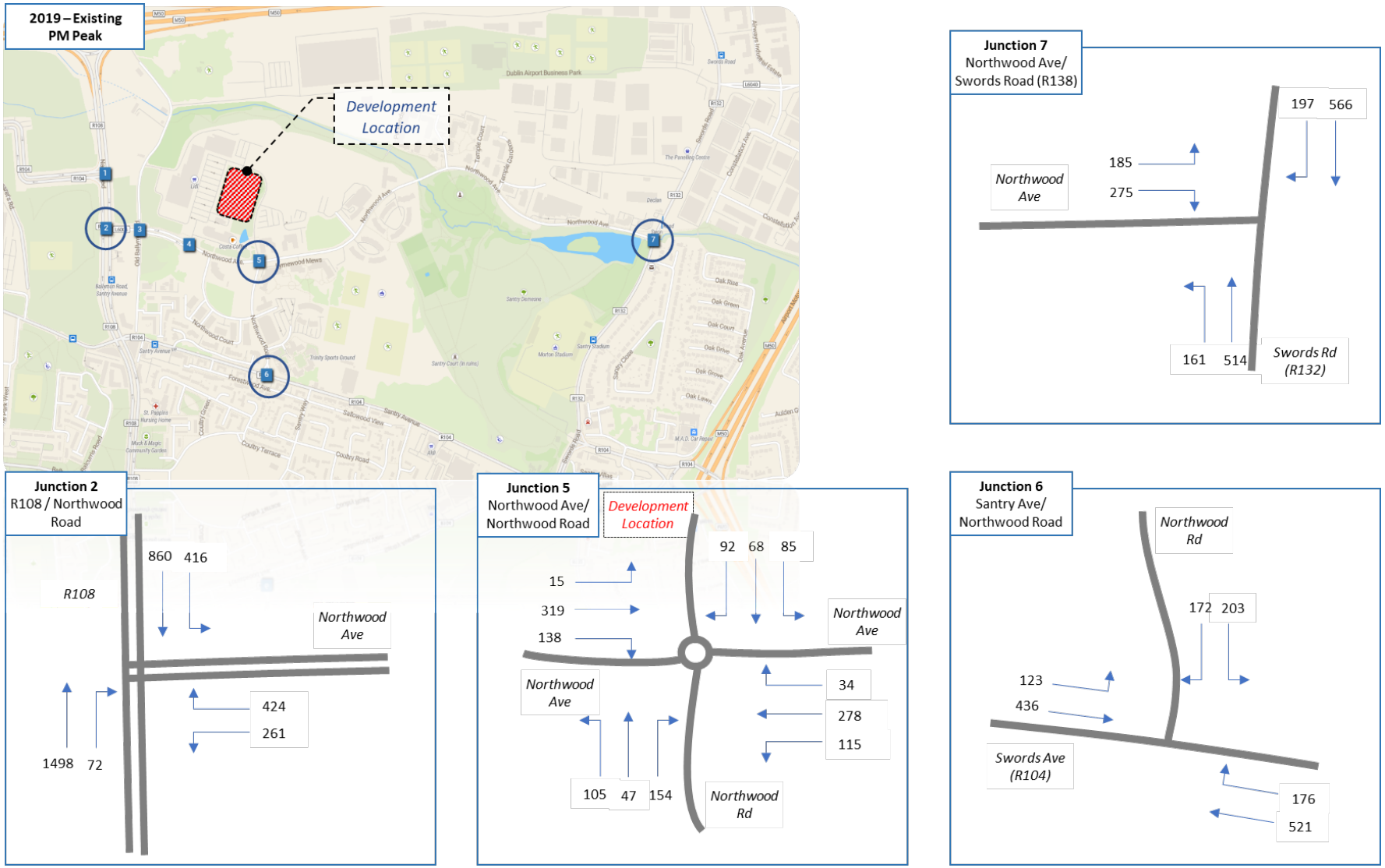

Figure 13-13: Vehicle turning movement- 2019 Existing Evening Peak Hour (17:00 – 18:00)

13.5.2.2.2 Junction Capacity Assessment for Base Year 2019

A traffic capacity assessment of the four key junctions in the vicinity the subject site was undertaken utilising the surveyed results shown in **Figure 13-12** and **Figure 13-13** above and TRL's OSCADY (for junctions 2, 6 and 7) & ARCADY (for junction 5) traffic modelling software.

A summary of the results of the analysis of Junction 2) Ballymun Road (R108) / Northwood Avenue, Junction 5) Northwood Ave / Northwood Road, Junction 6) Santry Ave / Northwood Road and Junction 7) Northwood Ave / Swords Road (R138) for the morning and evening peak hours is shown in **Table 13-4** to **Table 13-7** following.

Table 13-4: Junction 2) Ballymun Road (R108) / Northwood Avenue 2019 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Ballymun Road (R108) North	0.841	0.510	14	12	26	30
Northwood Avenue	0.904	0.934	10	23	86	97
Ballymun Road (R108) South	0.316	0.642	4	15	8	18

Table 13-5: Junction 5) Northwood Ave / Northwood Road 2019 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Affidea Northwood	0.047	0.177	1	1	2	2
Northwood Avenue East	0.244	0.286	1	1	2	2
Northwood Road	0.139	0.191	1	1	2	2
Northwood Avenue West	0.330	0.289	1	1	3	3

Table 13-6: Junction 6) Santry Ave / Northwood Road 2019 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Santry Ave West	0.619	0.614	9	9	22	23
Northwood Road	0.357	0.609	4	7	25	28
Santry Ave East	0.589	0.788	5	9	11	18

Table 13-7: Junction 7) Northwood Ave / Swords Road (R138) 2019 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Swords Road South	0.670	0.791	8	14	28	43
Northwood Avenue	0.660	0.840	9	15	33	56
Swords Road North	0.825	0.939	10	16	23	34

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction and 0.85 for a roundabout junction.

Table 13-4 and **Table 13-7** demonstrate that Junction 2) Ballymun Road (R108) / Northwood Avenue currently operates just over the normal design threshold during the morning and evening peak hours considered. This is evident at the Northwood Avenue arm with queues and delays for motorists forming. Junction 7) Northwood Ave / Swords Road (R138) will exceed the normal design threshold on the Swords Road arm during the evening peak hour. This analysis concurs with observations made on site, as minor queuing was apparent at each of the junctions. Junction 5) Northwood Ave / Northwood Road and Junction 6) Santry Ave / Northwood Road currently operate efficiently below the design threshold. Furthermore, this analysis concurs with the "max" queue length survey taken at the same time during the traffic counts on Tuesday 12th February 2019. The max queue lengths are largely similar to the modelled queue lengths across the board.

At peak traffic times, such as the evening peak hour, traffic occasionally queues from the Ballymun Road signalised junction along Northwood Avenue in both traffic lanes through the Old Ballymun Road junction and into the Northwood area. Traffic is not observed to keep the junction clear during such instances and blocks entry and exit movements into and out of Old Ballymun Road.

13.5.2.2.3 Trip Generation and Distribution

Trip Generation

The Trip Rate Information Computer System (TRICS) database was interrogated to derive the potential development trip generation rates. Utilising data supplied by the TRICS database, **Table 13-8** details the estimated trip generation for the proposed residential units, retail area, childcare facility and gym development during the morning and evening peak hours being considered for this study. The TRICS morning and evening peak hours were 08:00 to 09:00 and 17:00 to 18:00 respectively. The trips generated during these times were applied to the morning and evening peak hours for the road network.

As the residential element of the proposed development includes 1, 2 and 3 bedroom apartments, the trip rates were calculated "per bedroom" in order to produce a more robust result. The full TRICS output files are contained in **Volume 3, Appendix 13.2**.

In reality, the trips generated by the retail, childcare facility and gym area will likely come from within the Northwood development and most likely form part of the residential trips (i.e. the people using the retail area will live within the proposed development or nearby Northwood development, rather than the surrounding Ballymun / Santry area). However, in order to produce a robust, conservative and a worst-case scenario, it will be assumed that all trips generated by the development will be generated from outside the Northwood area.

Table 13-8: TRICS Trip Generation Proposed Development

	Time	Factor	TRICS Arrival Rate	TRICS Departure Rate	Hourly Trips	
					Trips In	Trips Out
Residential Development 331 Units	Morning Peak Hour	689 Bedrooms	0.028 *(per bedroom)*	0.106 *(per bedroom)*	19	73
	Evening Peak Hour		0.098 *(per bedroom)*	0.041 *(per bedroom)*	67	28
Mixed Use Commercial Units	Morning Peak Hour	1,006 m^2	2.899 *(per 100m^2)*	2.357 *(per 100m^2)*	29	24
	Evening Peak Hour		4.247 *(per 100m^2)*	4.789 *(per 100m^2)*	43	48

	Time	Factor	TRICS Arrival Rate	TRICS Departure Rate	Hourly Trips	
					Trips In	Trips Out
Childcare Facility	Morning Peak Hour	321 m^2	4.235 *(per 100m^2)*	3.286 *(per 100m^2)*	14	11
	Evening Peak Hour		2.970 *(per 100m^2)*	3.547 *(per 100m^2)*	10	11
Gym	Morning Peak Hour	126 m^2	0.841 *(per 100m^2)*	0.654 *(per 100m^2)*	1	1
	Evening Peak Hour		1.684 *(per 100m^2)*	0.981 *(per 100m^2)*	2	1
TOTAL	**Morning Peak Hour**				**63**	**109**
	Evening Peak Hour				**122**	**88**

Modal Choice

When estimating trip generation for a residential development using TRICS the trip rate for car drivers generally accounts for a 65% modal split of total trips. In order to produce a robust and conservative assessment of the traffic impact of the proposed development, this study will continue to utilise the modal split of 65% for car trips. In reality, this modal split will be smaller as a number of residents will choose to take the Dublin Bus service in the vicinity of the development and MetroLink in the future. Additionally, the parking strategy has been development to encourage less of a reliance on private cars and a greater focus on sustainable transport such as cycling.

Trip Distribution and Assessment Years

It was assumed for the purposes of this study that the future development traffic will mirror existing travel flows when exiting and entering the development. The existing traffic from the entire Northwood development was analysed in the morning and evening peak hours. Currently during the morning peak, 42% of vehicles departing the Northwood area travel east towards the Swords Road, 20% travel south towards Santry Ave, while the remaining 38% travel west towards the Ballymun Road. During the evening peak hour 30% travel east towards the Swords Road, 25% travel south towards Santry Avenue and 45% travel west towards the Ballymun Road. The future development traffic distribution at the surrounding junctions will mirror existing traffic patterns i.e. development generated flows will be split through the junctions proportionally to existing flows.

Assuming planning permission is granted for the development in 2019, and allowing for a 2 to 3 year construction period, it is estimated that the proposed development will be fully operational by 2021 / 2022. For the purpose of this study, the end of 2021 is assumed as the Year of Opening. Therefore, traffic analysis associated with this study will focus on the following future development operational scenarios:

- Residential Development Year of Opening – 2021
- 15 Year Design Horizon – 2036

The projected 2021 and 2036 design year traffic flows have been calculated by factoring up the 2019 recorded traffic flows in accordance with the TII Publications Project Appraisal Guidelines for National Roads document 'Unit 5.3 Travel Demand Projections, Table 5.3.2: Link-Based Growth Rates: Annual Growth Factors. The medium growth rate factors have been utilised. The TII traffic growth rates will account for any increase in traffic as a result of other developments in the area such as Bridgefield, Cedarview and other potential developments in the future. Consequently, all impacts assessed are inherently cumulative impacts.

Figure 13-14 and **Figure 13-15** illustrate the 2021 Year of Opening for the "without" and **"with"** development scenarios for morning and evening peaks. **Figure 13-16** and **Figure 13-17** illustrate the 2036 Design Year Horizon for the "without" and **"with"** development scenarios for morning and evening peaks.

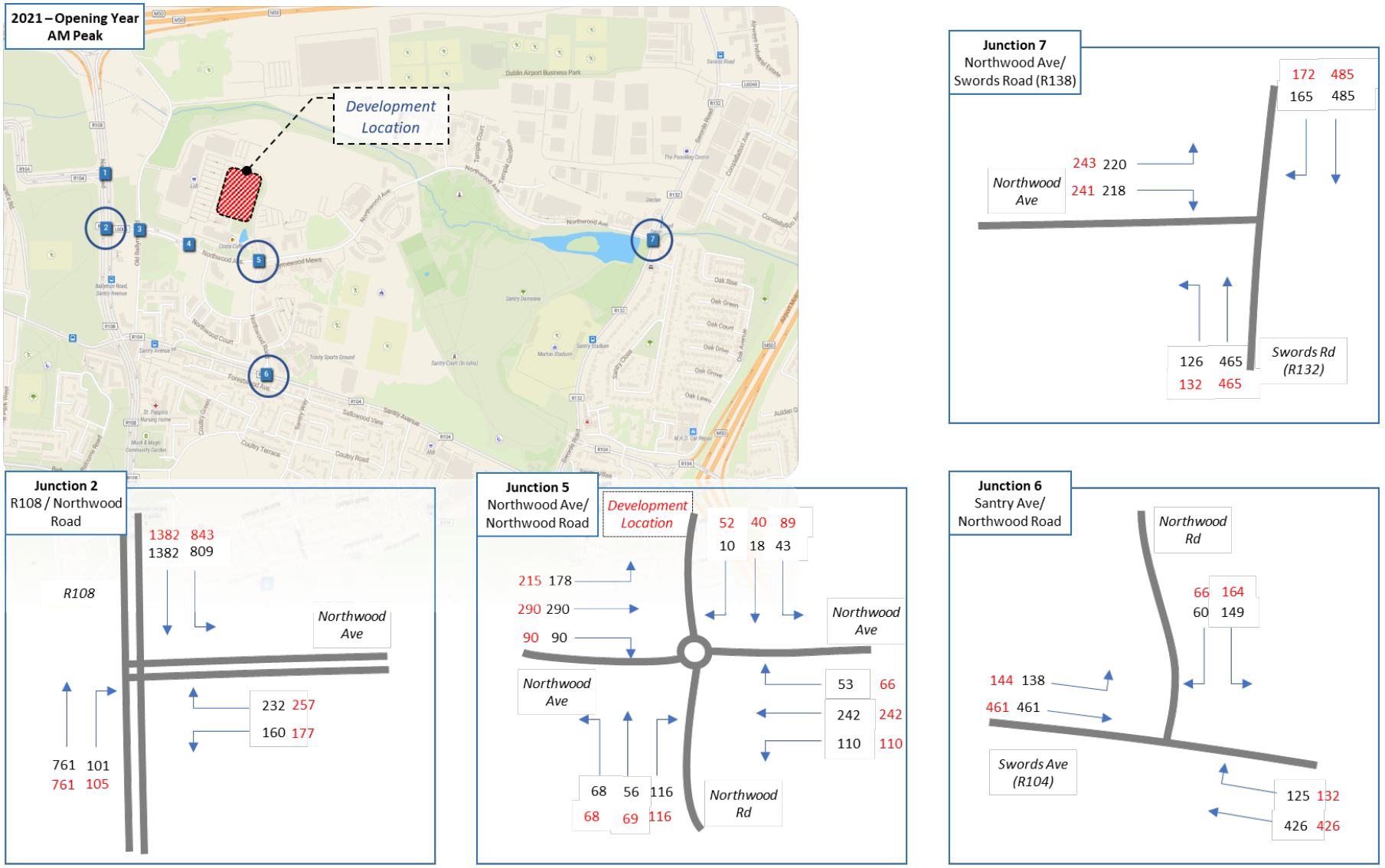

Figure 13-14: Vehicle turning movement 2021 Opening Year - Morning Peak Hour (08:00 – 09:00)

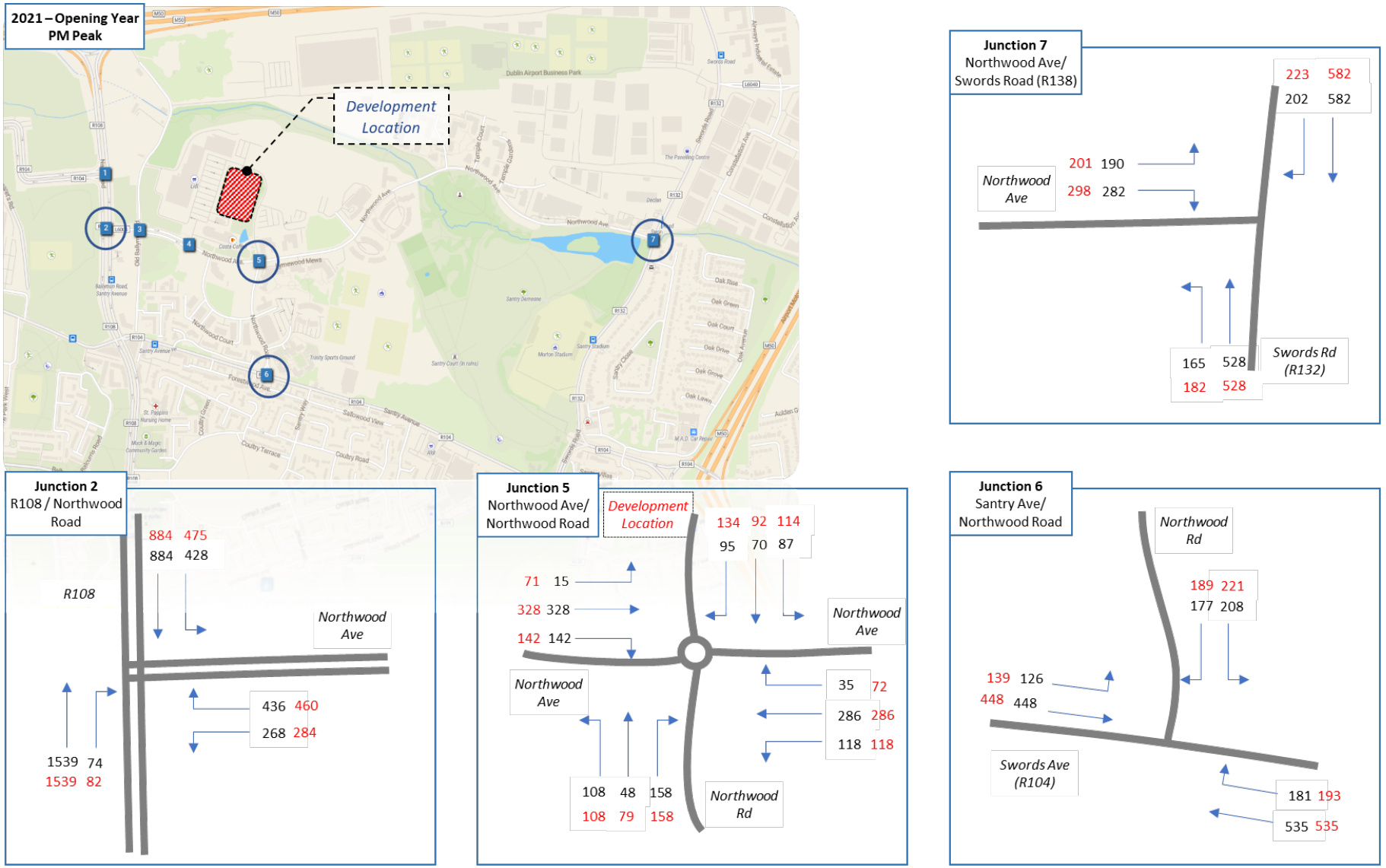

Figure 13-15: Vehicle turning movement 2021 Opening Year - Evening Peak Hour (17:00 – 18:00)

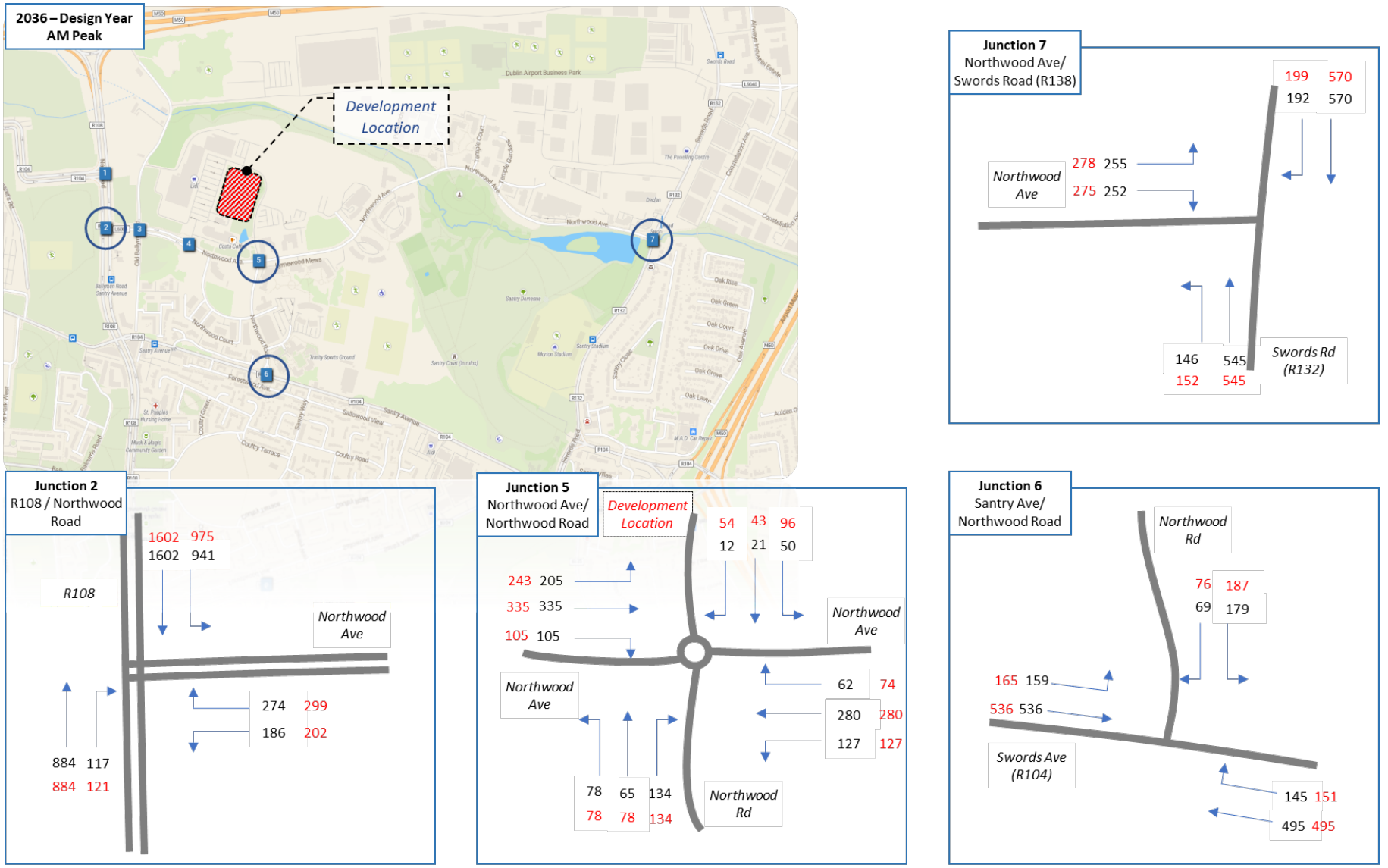

Figure 13-16: Vehicle turning movement 2036 Design Year - Morning Peak Hour (08:00 – 09:00)

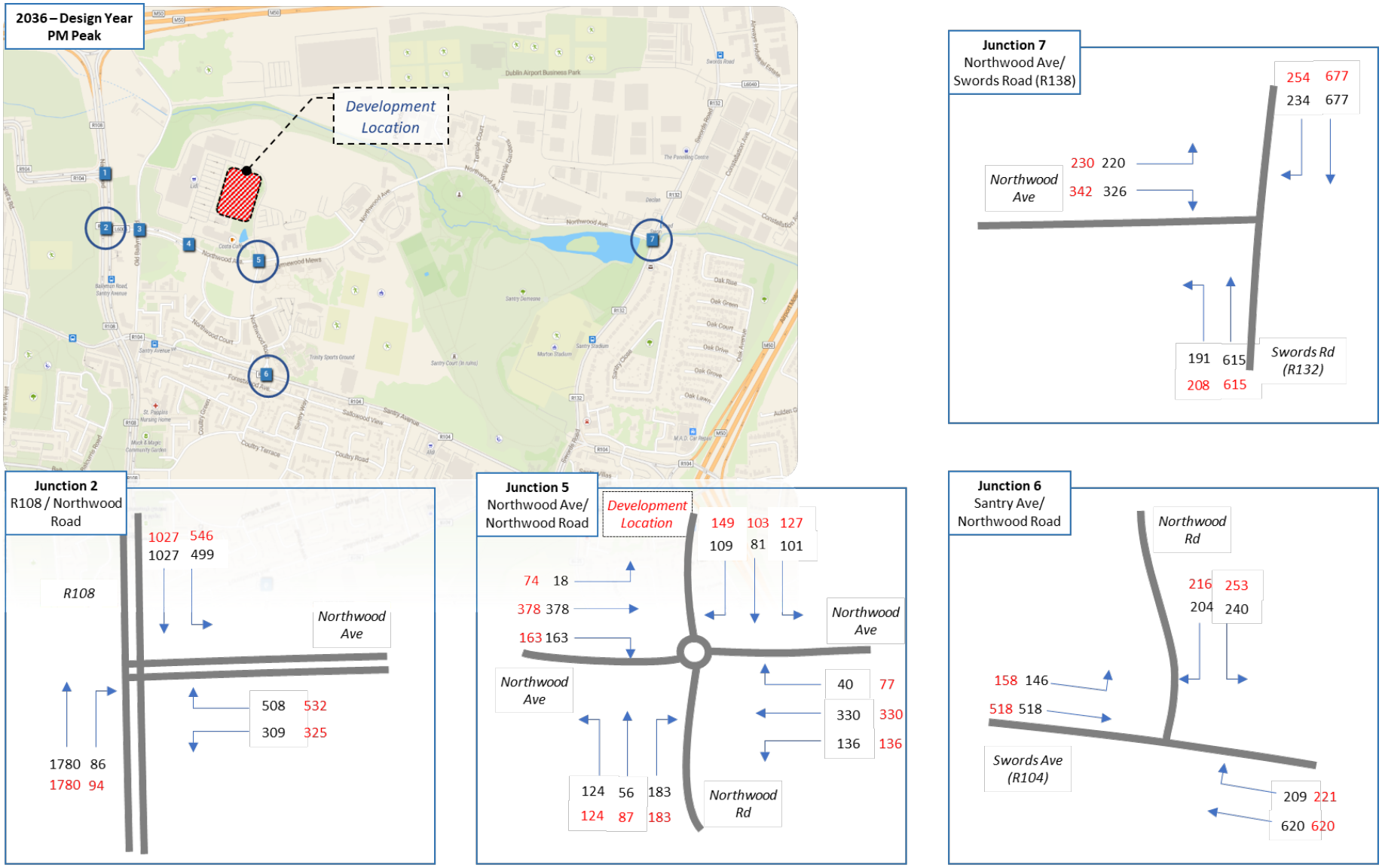

Figure 13-17: Vehicle turning movement 2036 Design Year - Evening Peak Hour (17:00 – 18:00)

13.5.2.3 Operational Phase 2021 & 2036

13.5.2.3.1 Background

In order to assess the future traffic impact of the proposed development, capacity assessments were undertaken using TRL's OSCADY (for junctions 2, 6 and 7) & ARCADY (for junction 5) software on the following junctions;

- Site 2- Junction 2) Ballymun Road (R108) / Northwood Avenue;
- Site 5- Junction 5) Northwood Ave / Northwood Road;
- Site 6- Junction 6) Santry Ave / Northwood Road;
- Site 7- Junction 7) Northwood Ave / Swords Road (R138).

The junctions were modelled for the 2021 year of Opening and 2036 the 15 Year Design Horizon for the morning and evening peak hour periods using the flow diagrams shown in **Figure 13-14** to **Figure 13-17** in the previous section herein.

To demonstrate the direct traffic impact associated with the proposed development on the key junction being considered, the traffic modelling exercise was carried out for the "Without" development and **"with"** development scenarios. A sample traffic modelling output file is included in this report in **Volume 3, Appendix 13.3**.

13.5.2.3.2 Operational Phase 2021 Traffic Impact

A traffic capacity assessment of the four junctions in the vicinity the subject site was undertaken utilising the surveyed results shown in **Figure 13-14** and **Figure 13-15** above and TRL's OSCADY (for junctions 2, 6 and 7) & ARCADY (for junction 5) traffic modelling software.

A summary of the results of the analysis of Junction 2) Ballymun Road (R108) / Northwood Avenue, Junction 5) Northwood Ave / Northwood Road, Junction 6) Santry Ave / Northwood Road and Junction 7) Northwood Ave / Swords Road (R138) both "without" and **"with"** the development for the morning and evening peak hours is shown in **Table 13-9** to **Table 13-12** following.

Table 13-9: Junction 2) Ballymun Road (R108) / Northwood Avenue 2021 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Ballymun Road (R108) North	0.865	0.525	15	12	28	31
	0.901	**0.582**	**16**	**13**	**31**	**32**
Northwood Avenue	0.932	0.960	12	25	94	104
	1.032	**1.013**	**19**	**32**	**143**	**125**
Ballymun Road (R108) South	0.335	0.660	4	15	8	19
	0.348	**0.660**	**4**	**15**	**9**	**20**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. **Table 13-9** demonstrates that at Junction 2) Ballymun Road (R108) / Northwood Avenue, the Ballymun Road arm will operate just within the normal design threshold during the morning and evening peak hours considered. However, the Northwood Avenue arm, will exceed the design threshold with queues and delays for motorists

evident. This is the case both "without" and **"with"** the development scenarios. The analysis indicates that the development will have an imperceptible impact on the Junction 2) Ballymun Road (R108) / Northwood Avenue junction. During consultation with FCC, it is noted that Fingal plan to upgrade Junction 3) Northwood Avenue / Old Ballymun Road to incorporate SCATS. Upgrading this junction to SCATS will allow the junction to control the traffic arriving from Northwood to the Ballymun Road. The junctions will better calculate and adapt the timing of traffic signals in the network allowing the junction to operate efficiently, creating an overall positive impact.

Table 13-10: Junction 5) Northwood Ave / Northwood Road 2021 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Affidea	0.048	0.183	1	1	2	2
Northwood	**0.123**	**0.247**	**1**	**1**	**2**	**3**
Northwood	0.250	0.295	1	1	2	3
Avenue East	**0.267**	**0.329**	**1**	**1**	**2**	**3**
Northwood	0.143	0.197	1	1	2	2
Road	**0.155**	**0.225**	**1**	**1**	**2**	**2**
Northwood	0.340	0.297	1	1	3	2
Avenue West	**0.367**	**0.342**	**1**	**1**	**3**	**3**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a roundabout junction. **Table 13-10** demonstrates that the Junction 5) Northwood Ave / Northwood Road roundabout will operate within the normal design threshold during the morning and evening peak hours considered. This is the case in both "without" and **"with"** the development scenarios. The analysis indicates that despite a large increase in traffic on the Affidea Northwood arm, as the junction is considerably within capacity, the development will have an insignificant impact on the operation of the roundabout.

Table 13-11: Junction 6) Santry Ave / Northwood Road 2021 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Santry Ave West	0.636	0.630	9	9	23	24
	0.642	**0.646**	**9**	**10**	**23**	**24**
Northwood Road	0.367	0.626	4	7	25	29
	0.404	**0.666**	**4**	**8**	**26**	**29**
Santry Ave East	0.609	0.815	5	9	12	19
	0.620	**0.835**	**6**	**10**	**12**	**20**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. **Table 13-11** demonstrates that Junction 6) Santry Ave / Northwood Road will operate within the normal design threshold during the morning and evening peak hours considered. Very little queues and delays are forming in both the "without" and **"with"** development scenarios. The analysis indicates that the development will have an insignificant impact on the Junction 6) Santry Ave junction.

Table 13-12: Junction 7) Northwood Ave / Swords Road (R138) 2021 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Swords Road South	0.689	0.812	9	15	28	44
	0.689	**0.812**	**9**	**15**	**28**	**44**
Northwood Avenue	0.678	0.862	10	16	34	58
	0.750	**0.911**	**11**	**18**	**36**	**64**
Swords Road North	0.859	0.975	11	21	25	48
	0.876	**1.020**	**11**	**31**	**26**	**59**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. **Table 13-12** demonstrates that Junction 7) Northwood Ave / Swords Road (R138) will operate within the normal design threshold during the morning peak hour but exceed the normal design threshold during the evening peak hour. This is the case both "without" and **"with"** the development scenarios. At this stage, once a junction is at capacity any slight increase, whether it is background traffic growth or new trip generation, will have a noticeable increase in queues/delays.

The analysis indicates that the junction will not operate efficiently in either the "without" and **"with"** the development scenarios. Any future traffic growth, irrespective of the subject development, will therefore result in an impact to the operation of the junction. However, the proposed development will have little effect on the junction. Additionally, the expected improvements in the public transport services in the surrounding area will have a positive impact on junction capacity.

13.5.2.3.3 Operational Phase 2036 Traffic Impact

A traffic capacity assessment of the four key junctions in the vicinity the subject site was undertaken utilising the surveyed results shown in **Figures 13-15** and **13-16** above and TRL's OSCADY (for junctions 2, 6 and 7) & ARCADY (for junction 5) traffic modelling software.

A summary of the results of the analysis of Junction 2) Ballymun Road (R108) / Northwood Avenue, Junction 5) Northwood Ave / Northwood Road, Junction 6) Santry Ave / Northwood Road and Junction 7) Northwood Ave / Swords Road (R138) both "without" and **"with"** the development for the morning and evening peak hours is shown in **Table 13-13** to **Table 13-15.**

Table 13-13: Junction 2) Ballymun Road (R108) / Northwood Avenue 2036 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Ballymun Road (R108) North	0.989	0.612	30	14	51	34
	1.025	**0.670**	**40**	**16**	**69**	**35**
Northwood Avenue	0.956	1.119	15	54	101	202
	1.043	**1.172**	**23**	**68**	**149**	**248**
Ballymun Road (R108) South	0.482	0.763	5	18	13	22
	0.499	**0.763**	**5**	**18**	**9**	**22**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. **Table 13-13** demonstrates that Junction 2) Ballymun Road (R108) / Northwood Avenue will not operate within the normal design threshold during the morning and evening peak hours considered. This is the case in both "without" and **"with"** the development scenarios. The junction will also exceed the theoretical capacity of 1.0 for a signalised junction by 2036. At this stage, once a junction is at capacity any slight increase, whether it is background traffic growth or a new residential development, will have a noticeable increase in queues/ delays. During consultation with FCC, it is noted that Fingal plan to upgrade Junction 3) Northwood Avenue / Old Ballymun Road to incorporate SCATS. Upgrading this junction to SCATS will allow the junction to control the traffic arriving from Northwood to the Ballymun Road. The junctions will better calculate and adapt the timing of traffic signals in the network allowing the junction to operate efficiently, creating an overall positive impact.

The analysis indicates that the junction will not operate efficiently in either the "without" and **"with"** the development scenarios. Any future background traffic growth, irrespective of the subject development, will therefore result in an impact to the operation of the junction. However, the proposed development will have an insignificant impact on the junction.

Table 13-14: Junction 5) Northwood Ave / Northwood Road 2036 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Affidea	0.059	0.223	1	1	2	2
Northwood	**0.136**	**0.290**	**1**	**1**	**2**	**3**
Northwood	0.292	0.347	1	1	2	3
Avenue East	**0.308**	**0.384**	**1**	**1**	**3**	**4**
Northwood	0.169	0.235	1	1	2	2
Road	**0.182**	**0.265**	**1**	**1**	**2**	**3**
Northwood	0.400	0.349	1	1	3	3
Avenue West	**0.429**	**0.396**	**1**	**1**	**3**	**3**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.85 for a roundabout junction. **Table 13-14** demonstrates that the Junction 5) Northwood Ave / Northwood Road roundabout will operate within the normal design threshold during the morning and evening peak hours considered. This is the case both "without" and **"with"** the development scenarios. The analysis indicates that despite a large increase in traffic on the Affidea Northwood arm, as the junction is considerably within capacity, the development will have an insignificant impact on the operation of the roundabout.

Table 13-15: Junction 6) Santry Ave / Northwood Road 2036 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Santry Ave West	0.737	0.729	11	11	25	26
	0.744	**0.743**	**11**	**12**	**25**	**26**
Northwood Road	0.436	0.722	4	9	26	31
	0.462	**0.762**	**5**	**9**	**26**	**33**
Santry Ave East	0.732	0.979	7	20	15	40
	0.743	**1.001**	**7**	**25**	**15**	**47**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. **Table 13-16** demonstrates that Junction 6) Santry Ave / Northwood Road will operate within the normal design threshold during the morning and evening peak hours considered. Very little queues and delays are forming in both the "without" and **"with"** development scenarios. The analysis indicates that the development will have an insignificant impact on the Junction 6) Santry Ave junction.

Table 13-16: Junction 7) Northwood Ave / Swords Road (R138) 2036 Morning and Evening Peak Hour

	Max. RFC		Max. Queue (Vehicles)		Average Delay (Seconds)	
Approach Arm	AM	PM	AM	PM	AM	PM
Swords Road South	0.873	0.951	15	24	47	66
	0.873	**0.951**	**15**	**24**	**47**	**66**
Northwood Avenue	0.881	1.122	16	55	55	190
	0.961	**1.176**	**22**	**70**	**70**	**238**
Swords Road North	1.006	1.128	26	72	54	137
	1.022	**1.170**	**30**	**90**	**61**	**172**

The normal design threshold for the ratio of flow to capacity (RFC) is 0.9 for a signalised junction. **Table 13-16** demonstrates that Junction 7) Northwood Ave / Swords Road (R138) will not operate within the normal design threshold during the morning and evening peak hours considered. The junction will also exceed the theoretical capacity of 1.0 for a signalised junction by 2036. This is the case in both "without" and **"with"** the development scenarios. At this stage, once a junction is at capacity any slight increase, whether it is background traffic growth or new trip generation, will have a noticeable increase in queues/delays.

The analysis indicates that the junction will not operate efficiently in either the "without" and **"with"** the development scenarios. Any future traffic growth, irrespective of the subject development, will therefore result in an impact to the operation of the junction. However, the proposed development will only have a minor impact on the junction. Additionally, the expected improvements in the public transport services in the surrounding area will have a positive impact on junction capacity. The transport benefits associated with planned public transport upgrades have not been modelled but ensure the impact of the proposed development on the junction will be reduced.

13.5.2.4 Summary

The traffic analysis, traffic/queue counts, and on-site observations all demonstrated that Junction 2) Ballymun Road (R108) / Northwood Avenue and Junction 7) Northwood Ave / Swords Road (R138), are currently nearing capacity. In the future, the junctions will not operate efficiently in either the "without" and

"with" the development scenarios. Any future traffic growth, irrespective of the subject development, will therefore result in an impact to the operation of the junction. The planned upgrade of the Old Ballymun Road junction to SCATS will help control traffic reducing delays. It is noted that the 2036 analysis does not include the likely improvements in the public transport services (MetroLink and BusConnects). Furthermore, in order to produce a robust, conservative analysis, a worst-case scenario was assumed as noted in **Section 13.7.3.1** Trip Generation.

This further emphasises the need for an improved public transport network as outlined in **Section 13.3.3**, such as MetroLink and BusConnects, regardless of the proposed development. Additionally, further investments are needed in cycling infrastructure not just in Northwood, but the Greater Dublin Area. This will encourage a greater number of Northwood residents to leave the car at home and choose sustainable transport modes.

13.6 Cumulative Impacts

The TII traffic growth rates will account for any increase in traffic as a result of other developments in the area such as Bridgefield, Cedarview and other potential developments in the future. Consequently, all impacts assessed are inherently cumulative impacts.

13.6.1 Road Safety

It is considered that the proposed development, which is located adjacent to Gulliver's Retail Park, will have an imperceptible impact on road safety for the roads within Santry Demesne and the greater public road network. This is the case during both the construction and operational phase.

13.7 Mitigation Measures

13.7.1 Construction Phase

In advance of work starting on site the works Contractor will prepare a detailed Construction Environmental Management Plan and Traffic Management Plan to be submitted to FCC for approval. The construction stage management plan will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIAR and any subsequent conditions relevant to the proposed development. The following mitigation measures have been identified which will form part of a plan:

- Good construction management practices will be employed such as fencing the site off from the public and neighbouring sites, adequate external/internal signage, secure internal site offices, dedicated construction access points all to ensure the safety construction staff and the public.
- Appropriate levels of staff parking and compounding will be provided to ensure no potential overflow or haphazard parking in the area. The Site will be able to accommodate employee and visitor parking throughout.
- Set construction traffic routes to and from the site will be agreed with FCC prior to the commencement of constructions activities onsite. The time of day permittable for such routes will also be agreed upon and outside of the morning/evening peak hours.
- Wheel wash facilities will be provided on site to ensure that construction debris will not have an impact on the quality of roads in the Northwood area.

13.7.2 Operational Phase

The following proposals have been identified and subsequently form an integral part of the subject development proposals:

- Whilst FCC Development Plan (Objective DMS116) does not specify the requirement for a Mobility Management Plan (MMP) for an apartment block, a development of this nature would lend itself to an MMP. The MMP can be developed with the aim of guiding the delivery and management of coordinated initiatives by the apartment management. The MMP ultimately seeks to encourage sustainable travel practices for all journeys to and from the apartments (and retail areas). The plan will consider the opportunities of shaping all journeys and promoting sustainable transport habits at both the proposed apartments and the mixed use commercial /childcare facility space.

- A childcare facility set-down area has been provided and a number of parking spaces are allocated north of the childcare facility area on the ground flood to facilitate servicing, short duration parking and childcare facility pickup / drop off.

- Refuse collections will be managed to ensure there is no conflict with childcare facility drop off and collection times.

- Three no. car parking spaces for a private car sharing company will reduce the need to own a private car thereby contributing to reducing the overall number of vehicle trips generated by the proposed Project.

- It was agreed with FCC that a sustainable approach to parking would be incorporated into the development. The parking strategy is in reference to the Sustainable Urban Housing: Design Standards for New Apartments, with a strong emphasis on bicycle parking, thus reducing the need for private vehicles.

13.8 Monitoring Measures (Construction and Operational)

As all the impacts are predicted to be neutral/imperceptible, no monitoring is proposed.

13.9 Residual Impacts

13.9.1 Construction Phase

There will be minor impacts on the safety or operation of the road network as a result of the construction phase of the proposed development. Having consideration for the mitigation measures outlines above, any impacts during the construction phase will be negligible. All construction related traffic will be outside the morning and evening peak hours and will not have a significant impact the operation of the adjoining junctions.

13.9.2 Operating Phase

The traffic analysis demonstrated that Junction 2) Ballymun Road (R108) / Northwood Avenue, Junction 6) Santry Ave / Northwood Road, Junction 7) Northwood Ave / Swords Road (R138), are currently operating near capacity. This concurs with the observations made on site. The junctions will not operate efficiently in either the “without” and **“with”** the development scenarios. Any future traffic growth, irrespective of the subject development, will therefore result in an impact to the operation of the junction. However, the proposed development will only have a minor impact on the junctions on the surrounding road network.

During consultation with FCC, it is noted that Fingal plan to upgrade Junction 3) Northwood Avenue / Old Ballymun Road to incorporate SCATS. Upgrading this junction to SCATS will allow the junction to control the traffic arriving from Northwood to the Ballymun Road. The junctions will better calculate and adapt the timing of traffic signals in the network allowing the junction to operate efficiently, creating an overall positive impact.

The residual impacts from both the proposed development and background traffic growth will be mitigated with the improvements of the public transport network (MetroLink and BusConnects) and cycling infrastructure throughout Dublin. The proposed development will provide adequate pedestrian and cycle linkages to both existing and future sustainable travel facilities and modes which will encourage a greater number of Northwood residents to choose sustainable transport modes.

13.10 References

TII Guidelines 'Traffic & Transportation Assessment Guidelines; (TII, 2014).

TII Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections (PE-PAG-02017), TII (October 2016).

'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003).

Fingal Development Plan 2017 – 2023.

Greater Dublin Area Cycle Network Plan; National Transport Authority (NTA) (2013).

Dublin Bus Website: www.dublinbus.ie

Ordnance Survey Ireland (OSI): www.osi.ie

Transport Infrastructure Ireland (TII): www.tii.ie

Transport for Ireland (TFI): www.transportforireland.ie

MetroLink Website: www.metrolink.ie

14 MATERIAL ASSETS: BUILT SERVICES

14.1 Introduction

This chapter of the EIAR will address the likely effects on Material Assets which may be affected by the construction of the proposed development. Material Assets include Architectural, Archaeological and Cultural Heritage, Designed Landscapes, Natural Resources of Economic Value, Building & Structures and Infrastructure.

The August 2017 Draft EIAR Guidelines published by the EPA state that “material assets can now be taken to mean built services and infrastructure”. This chapter will assess the impacts on material assets associated with built services, namely.

- Potable Water Supply
- Wastewater Services
- Electricity
- Gas
- Telecommunications
- The impact on other material assets are assessed in various chapters of the EIAR.
- **Chapter 7**: Land, Soils, Geology and Hydrogeology
- **Chapter 8**: Water and Hydrology
- **Chapter 11**: Cultural Heritage
- **Chapter 12**: Landscape & Visual Impact
- **Chapter 13**: Material Assets: Traffic and Transportation Assessment

This chapter has been written by Dan O’ Donoghue and Richard McElligott.

Dan O’ Donoghue B.E, MBA, M.I.E.I is a former Associate Director and Project Manager within the Civil/Structural Department at J. B. Barry and Partners Limited. Dan has over 40years experience on a wide range of Engineering projects. He has a Civil Engineering Degree from University College Cork and an MBA from the Michael Smurfit Graduate Business School, University College Dublin. Dan was responsible for projects on residential, institutional, commercial and retail developments within the firm. He has also acted as an expert witness at compulsory purchase hearings and planning appeals for major infrastructure projects. Dan currently acts as a Consultant to the firm on select projects.

Richard McElligott C Eng, BSc Eng M.I.E.I is a director in McElligott Consulting Engineers and has been involved in the design of building services installations for the last 22 years. Prior to this Richard was employed in the contracting sector of the industry. He has a degree from DIT Bolton Street in Building Services Engineering. Over the last 10 years Richard has specialist in the design of large scale residential project with particular expertise in the field of district heating and more recently the delivery of NZEB solutions. He has ongoing contact with the Department of Environment and SEAI in relation to achieving compliance with the Regulations.

14.2 Assessment Methodology

This section of the EIAR was prepared having regard to the following;

Guidelines:

- *Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2002);*
- *Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);*
- *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) (EPA, August 2017);* and,
- *Advice Notes for Preparing Environmental Impact Statements (Draft) (EPA, September 2015).*

Desk-top study:

Information on the land, soils and hydrogeology has been obtained from the following sources:

- *Base maps – Ordnance Survey of Ireland;*
- *Topographical Survey including record drawings of the North Fringe Watermain and the North Fringe Sewer in Northwood Avenue;*
- *Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council;*
- *Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0 (Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council);*
- *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001);*
- *Irish Water Code of Practice for Water Infrastructure, December 2017(Revision 1)*
- *Irish Water Code of Practice for Wastewater Infrastructure, December 2017(Revision 1)*

Another relevant report consulted as part of this assessment includes the following:

- *Water Services Report, prepared by JB Barry and Partners Limited*

The above report forms part of the documentation submitted with the Planning Application.

14.3 Baseline Scenario (Existing Environment)

14.3.1 Potable Water Supply

The existing 600mm North Fringe Watermain is located along Northwood Avenue. The North Fringe Watermain is a key trunk watermain laid along the North Fringe from Cappagh Cross to Baldoyle. It is supplied from the Leixlip Water Treatment Plant via the Ballycoolin Reservoir and the High Level Water Tower at Sillogue.

14.3.2 Wastewater Services

The North Fringe Sewer is located along Northwood Avenue. The North Fringe Sewer is a major trunk sewer that runs east from Ballymun / Santry to Balboyle. At Baldoyle the sewer is laid in a south easterly direction to Sutton Pumping Station. The Sutton Pumping Station is connected via submarine pipeline to the Wastewater Treatment Plant at Ringsend.

The Ringsend Plant is currently being upgraded from a Population Equivalent (PE) of 1.6 Million to 2.4 million PE. Irish Water advised in their Confirmation of Feasibility Statement, dated 8 March 2019 that their water wastewater infrastructure could cater for the proposed development.

14.3.3 Electricity

There are no electricity connections on the subject site but there are connections within the Northwood area.

14.3.4 Gas

There is not an existing gas networks connection but adjacent to the boundary there is a high pressure Gas Networks Ireland main. As part of previous developments nearby a pressure reducing station has been installed.

14.3.5 Telecommunications

There are dedicated ducting network installed by Virgin and Eir within the Northwood area.

14.4 Characteristics of the Proposed Development

The proposed development will consist of 331 apartments in four separate blocks, with mixed use commercial units and a childcare facility at ground floor level over basement car parking, and all associated site works including roads, footpaths, landscaping, site services, SUDS measures and sundry related works.

A *Water Services Report* has been submitted as part of the planning application. A Pre-connection application to Irish Water in respect of water supply and wastewater disposal for the proposed development was submitted on the 25th January 2019. Irish Water advised in their Confirmation of Feasibility Statement, dated 8th March 2019 that their water supply network and wastewater infrastructure could cater without upgrades for the proposed development. A copy of the Confirmation of Feasibility Statement is included in an Appendix to the *Water Services Report*.

14.4.1 Potable Water Supply

The proposed development will be supplied via the existing 200mm watermain in the access road as shown on J. B. Barry and Partners Limited Drawing No.19205-JBB-00-XX-DR-C-01004 Rev P1 which is included with the planning documentation. This 200mm main is supplied from the existing 600mm North Fringe Watermain in Northwood Avenue. The North Fringe Watermain is a key trunk watermain laid along the North Fringe from Cappagh Cross to Baldoyle. It is supplied from the Leixlip Water Treatment Plant via the Ballycoolin Reservoir and the High Level Water Tower at Sillogue.

14.4.2 Wastewater Services

The proposed development will be connected to the 225mm foul sewer in the Access Road shown on Drawing No. 19205-JBB-00-XX-C-01003 Rev P1 (included with the planning documentation). This sewer is connected to the North Fringe Sewer at the roundabout on Northwood Avenue. The North Fringe Sewer is a major trunk sewer that runs east from Ballymun / Santry to Balboyle. At Baldoyle the sewer is laid in a south easterly direction to Sutton Pumping Station. The Sutton Pumping Station is connected via submarine pipeline to the Wastewater Treatment Plant at Ringsend.

The Ringsend Plant is currently being upgraded from a Population Equivalent (PE) of 1.6 Million to 2.4 million PE. Irish Water advised in their Confirmation of Feasibility Statement, dated 8 March 2019 that their water wastewater infrastructure could cater for the proposed development.

14.4.3 Electricity

To provide for the proposed extent of accommodation at the proposed development provision is made for of a double ESB sub station on the site. It is our experience is that the ESB are looking to strengthen the network and cater for the changes in load profile associated with e car charging and moves away from non-renewable heat sources. Mains cables from the substation will circle the site and there will be a mini pillar at each core. Prior to entering the building line, including the basement, a cabinet will be provided that will accommodate the ESB cut out and meters for the core apartments. From this cabinet, metered supplies will be ducted into the apartments.

14.4.4 Gas

On the proposed development site there is not an existing gas networks connection but adjacent to the boundary there is a high pressure Gas Networks Ireland main. As part of previous developments nearby a pressure reducing station has been installed. The capacity of the pressure station allows for the potential demand associated with the proposed development.

The proposed development will have a district heating scheme and this will centralise the heat generation plant and therefore gas will only be required into the basement (natural ventilated). A single local meter will be mounted local to the plantroom and feed the boilers and CHP plant therein.

14.4.5 Telecommunications

In the Santry Demesne area there are dedicated ducting network installed by Virgin and Eir. Within the scheme itself both networks will be catered for and the consultants have contacted the suppliers about supply and capacity on to the scheme, neither of which will be an issue.

The infrastructure around the subject site has been laid in relatively recent times and there is good record information available.

14.5 Impact Assessment

14.5.1 Do Nothing

The impact on the existing water supply infrastructure if the development did not take place would be negligible in magnitude and imperceptible in significance. Similarly, the impact on the existing foul sewer Infrastructure and treatment plant in a ‘Do Nothing Scenario’ would be negligible in magnitude and imperceptible in significance.

14.5.2 Potential Impacts (Construction)

14.5.2.1 Water Supply – Construction Phase Impact

Watermain construction will be carried out as part site development works for the project. A new connection will be required from the existing 200mm watermain in the access road to the east of the development site. During these connection works which will require the water supply being shut down within the overall development for a short period of time there is potential for a temporary slight adverse impact.

The water supply requirements of the construction phase will be from a temporary connection to the watermain. The impact on the water supply network is considered be slight and short term.

14.5.2.2 Wastewater Services – Construction Phase Impact

Pipeline construction for the foul sewer network will also be carried out during the site development works. This will involve a connection to the existing 225mm foul sewer in the access road. The temporary on-site toilet and washing facilities for construction workers will be connected to existing foul sewer via the internal

sewer network. The significance of these potential impacts on the existing foul infrastructure is considered 'imperceptible' and temporary adverse in duration.

14.5.2.3 Surface Water Disposal – Construction Phase Impact

The impacts of surface water drainage and its impacts are described in **Chapter 9** and the Water Services Report.

14.5.2.4 Electricity – Construction Phase Impact

The proposed development is at the forefront of the transition to NZEB accommodation and moving away from combustion engine transport. This impacts on the ESB's assessment of the network strength and we are catering for a double substation that the ESB have advised will be needed.

14.5.2.5 Gas – Construction Phase Impact

There is a proposed central plant scheme for the site and this would be supported with a single gas feed into the basement. The forecast load associated with the proposed development had been advised the Gas Networks Ireland, and allowed for during earlier networks extensions into the area.

14.5.2.6 Telecommunications – Construction Phase Impact

A robust telecoms infrastructure will be provided on site with ducting for at least two providers and a fibre installation expected to support to demand on site.

14.5.3 Operational Phase Impact

14.5.3.1 Water Supply and Wastewater– Operational Phase Impact

Occupancy of the entire development will occur around the same time. This will lead to an increase in demand on the water supply network and increased foul effluent flows to the wastewater infrastructure. Irish Water have confirmed, in their Confirmation of Feasibility Statement (a copy of which is contained as an **Appendix** of the *Water Services Report*), that water supply to the proposed development is feasible without upgrades. Similarly, Irish Water have confirmed, in their Confirmation of Feasibility Statement, that there is capacity in their wastewater infrastructure to cater for this Development. The potential impacts on the potable water supply network and wastewater infrastructure is considered to be imperceptible.

14.5.3.2 Surface Water Disposal – Operational Phase Impact

The impacts of surface water drainage are described in **Chapter 8** and the Water Services Report.

14.5.3.3 Electricity – Operational Phase Impact

Once the scheme is completed and handed over to the Management Company the electrical infrastructure provided will meet the on operation requirements, but the load will fluctuate depending on the future transport profile of the site and take up of electric vehicles.

14.5.3.4 Gas – Operational Phase Impact

With the high performance envelope being constructed on site the gas consumption figure will be relatively steady over the course of the year and the majority of the demand relates to hot water generation and only modest uplift in the heating season.

14.5.3.5 Telecommunications – Operational Phase Impact

A robust telecoms infrastructure will be provided on site with ducting for at least two providers and a fibre installation expected to support to demand on site.

14.6 Cumulative Impacts

There is capacity in both the water supply network and wastewater infrastructure to cater for this Development as confirmed by Irish Water. Accordingly, it is considered that the potential cumulative impacts are imperceptible.

14.7 Mitigation

14.7.1 Design Mitigation

The proposed water supply network, including water conservation measures, will be designed strictly in accordance with the Irish Water Code of Practice for Water Infrastructure, Dec 2017 (Revision 1). The proposed wastewater pipelines will be designed strictly in accordance with the Irish Water Code of Practice for Wastewater Infrastructure, Dec 2017 (Revision 1). SUDS / attenuation will be incorporated in the surface drainage design (see **Chapter 8**),

14.7.2 Construction Phase Mitigation.

Prior to the commencement of works the contractor will be required prepare a contract specific CEMP. This will take account of the requirements of the Outline CEMP prepared as part of this planning application.

Mitigation in relation to Built Services will include:

- *Communication and consultation will be conducted with public utility providers ahead of construction commencement;*
- *Underground surveying techniques are a key method of understanding the below ground conditions and confirming the presence of utility services. A Cable Avoidance Tool and a Signal Generator (CAT and Genny) are used to scan the surface of the ground with an audible signal being developed where underground utilities are detected. Surface radar scanning shall also be used to locate underground services before commencement of any mechanical excavation in the vicinity of underground services. These detection surveys shall be undertaken by the contractor;*
- *Method Statements shall be developed for the construction phase by the contractor to ensure that all underground services are located manually and carefully protected. The CEMP, prepared by the contractor and approved by IW shall outline a methodology and procedure for carrying out such detection surveys;*
- *An avoidance policy shall be adopted where possible in relation to all services and appropriate protection shall be provided for all above and below ground services as necessary;*
- *The water supply network will be constructed, pressure tested, swabbed and chlorinated in accordance with Irish Water requirements and standards;* and,
- *The wastewater infrastructure will be constructed, pressure tested, cleaned and subject to CCTV to Irish Water requirements and standards.*

14.7.3 Operational Phase Mitigation

Potential operational impacts are substantially mitigated through avoidance by the implementation of good management systems and sensible practices.

The design of the water supply network and the wastewater infrastructure has inbuilt mitigation when designed in accordance with Irish Water Standards noted in **Section 14.7.1** above. Other potential operational impacts will be substantially mitigated by the implementation of good maintenance procedures and practices. Method Statements shall be developed during the operational phase to ensure that any

underground services are located manually and carefully protected during any onsite maintenance work requiring excavation works in the vicinity of the underground utilities.

14.8 Monitoring Measures (Construction and Operational)

Watermains will be tested, prior to operation, to Irish Water Standards. Ongoing water usage will be monitored by a bulk meter, to be installed on the supply pipe within the site. Irish Water will take regular readings from the bulk meter for billing purposes. Individual meters to the apartments, the retail units and the childcare facility will be provided as required.

Sewers will be tested, prior to operation, to Irish Water standards and will also be subject to CCTV Survey.

Normal monitoring of the watermain and sewers will take place during the Operational Phase.

14.9 Residual Impacts

The predicted overall residual impact of the proposed development on Built Services both during construction and operational stage will be imperceptible.

15 POPULATION AND HUMAN HEALTH

15.1 Introduction

This chapter of the EIAR considers the potential effects of the proposed development on population and human health in the vicinity of the site. This chapter has been prepared by Michael Higgins of RPS - BA, M Reg. & Urban Planning, H Dip Edu, MIPI, CIHT, TPP. Michael is a Town Planner and manages EIAR and contributes to the population and human health (human beings) chapters of EIAR on a regular basis.

Population and human health comprise an important aspect of the environment to be considered. Any significant impact on the status of human health, which may be potentially caused by a development proposal, must be comprehensively addressed. Population and human health is a broad ranging topic and addresses the existence, activities and wellbeing of people as groups or populations. While most developments by people will affect other people, this EIAR document concentrates on those topics which are manifested in the environment, such as new land uses, more buildings or greater emissions. The principal concern is that human beings within the area experience no significant unacceptable diminution in aspects of quality of life because of the proposal. The potential impact can arise from natural heritage, air and noise emissions, visual and traffic, all of which are addressed in the relevant chapters of the EIAR. Topics assessed which are not covered in other chapters of the EIAR include impacts on the land use, settlement pattern, demography, economic activity and social infrastructure. These are dealt with in this chapter.

15.1.1 Scoping

Consultation undertaken with organisations as part of the EIAR which is of relevance to the population and human health impact assessment included, *inter alia*, Fingal County Council, HSE, Bord Fáilte and Fingal County Childcare Committee. Consultation responses to the EIA scoping report are summarised in **Chapter 2**.

15.2 Assessment Methodology

15.2.1 Assessment Approach

This assessment was undertaken in accordance with the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, Draft version May 2017 (EPA, 2017), *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018) and *Advice Notes for Preparing Environmental Impact Statements*, Draft version issued for consultation, September 2015 (EPA, 2015).

Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports Environmental Protection Agency (EPA), 2017 highlights the amendments to Article 3(1) of amended European Union (EU) Environmental Impact Assessment (EIA) Directive which states that:

> *"The environmental impact assessment shall identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of a project on the following factors: a) population and human health; […]"*

Moreover, Annex IV, paragraph 5(d) requires an EIAR to contain:

> *"A description of the likely significant effects of the project on the environment resulting from, inter alia, 'the risks to human health'".*

When outlining the scope of environmental factors covered by the EIA Directive within *Guidance on the Preparation of the Environmental Impact Assessment Report* (European Commission, 2017), *"population and human health"* is defined as follows:

> *"Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA*

Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."

The focus of the chapter is to establish the potential health and socio-economic impacts on population and employment in the area and on potential impacts to the community, including the resident, working and visiting community. Each section will set out the detail of the existing environment, the characteristics of the development that could have socio-economic impacts; the consequences of such impacts; and mitigation measures where considered necessary. The assessment partially draws from and builds upon the technical outputs from the air quality, noise and transport assessment chapters, and as a consequence are bound by the same limitations and assumptions therein applied.

To establish the existing receiving environment / baseline, site visits were undertaken to appraise the location and likely significant potential impact upon human receptors. A desk based study of published reference documents was included and includes:

- Central Statistics Office (CSO) data website www.cso.ie;
- ESRI Quarterly Economic Commentary;
- Pobal Mapping https://maps.pobal.ie/;
- *Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly*; and
- *Fingal Development Plan 2017 -2023.*

15.2.2 Definition of the Study Area

This chapter should be read in conjunction with the project description provided in **Chapter 5** of this EIAR and the drawings accompanying this application for permission. The proposed development will consist of 331no. apartments in four separate blocks arranged around a communal courtyard together with ground floor mixed-use commercial units, supporting residential service uses and a childcare facility, all over a shared basement accommodating car and bicycle parking areas. The development will also provide for all associated site works including roads, footpaths, landscaping, open spaces, site services, SUDS measures, utilities and sundry related works.

In identifying the principal receptors that may be potentially impacted by the construction and operational stage of the proposed development, consideration was given to the proposed mixed-use residential scheme and the identified receiving environment.

In terms of residential and visitor receptors, the closest are:

- Residential development of 355 no. units including houses and apartments being constructed under Reg. Ref. F15A/0440 as amended;
- Existing residential development south of Northwood Avenue; and;
- Commercial developments, where people are employed which may be impacted by the proposed development including Gulliver's Local Centre, Gulliver's Retail Park and Swift Square Office Park.

15.2.3 Assessment Criteria

In undertaking the assessment of the impact of the proposal on human beings, community and the local socio-economic environment both positive and negative impacts are considered. The following terms used

in this assessment are defined as per the EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (2017).

Table 15-1: Definitions of Terms

Term	Definition
Quality of Effects	
Positive Effects	A change which improves the quality of the environment.
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects	
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.
Describing the Extent and Context of Effects	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Describing the Probability of Effects	
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects	
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration
Frequency of Effects	Describe how often the effect will occur.
Describing the Types of Effects	
Indirect Effects (Secondary Effects)	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
'Do-Nothing Effects'	The environment as it would be in the future should the subject project not be carried out.
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Source: *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2017), EPA*

15.3 Baseline Scenario (Existing Environment)

A description of the relevant aspects of the current state of the environment (baseline scenario) in relation to population and human health is provided below. Specific environmental chapters in this EIAR provide a baseline scenario relevant to the environmental topic being discussed. Therefore, the baseline scenario for separate environmental topics is not duplicated in this section; however, in line with guidance provided by the EPA and the Department, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur, e.g. noise, water, air quality etc.

An outline of the likely evolution without implementation of the project as regards natural changes from the baseline scenario is also provided.

The existing environment is considered in this section under the following headings:

- Land use and Settlement Pattern;
- Demographics and Local Population;
- Household Size;
- Economic Activity and Employment;
- Local Services / Amenity;
- Human Health; and
- Risk of Major Accidents and Disasters.

The study area for the consideration of population and human health is the subject site and its immediate environs (i.e. the Northwood area).

15.3.1 Land Use and Settlement Pattern

The subject site is located within the former Santry Demesne c.6.5km to the north of Dublin city centre, proposed MetroLink Northwood Stop is located c.350m to the west of the subject site. The site is bounded to the north by residential development which is currently under construction (Reg. Ref. F15A/0440 as modified) and to the west by existing car parking associated with Gulliver's Retail Park. The site is bound to the east by an internal roadway and beyond that car parking associated with Swift Square Office Park office and housing under construction (Reg. Ref. F15A/0440 as modified). The site is bound to the south by a McDonald's fast food restaurant and Gulliver's Local Centre. Further to the south of the subject site is Northwood Avenue and the M50 is approximately 500m to the north. The location of the subject site and its surrounding context is illustrated in **Figure 15-1**.

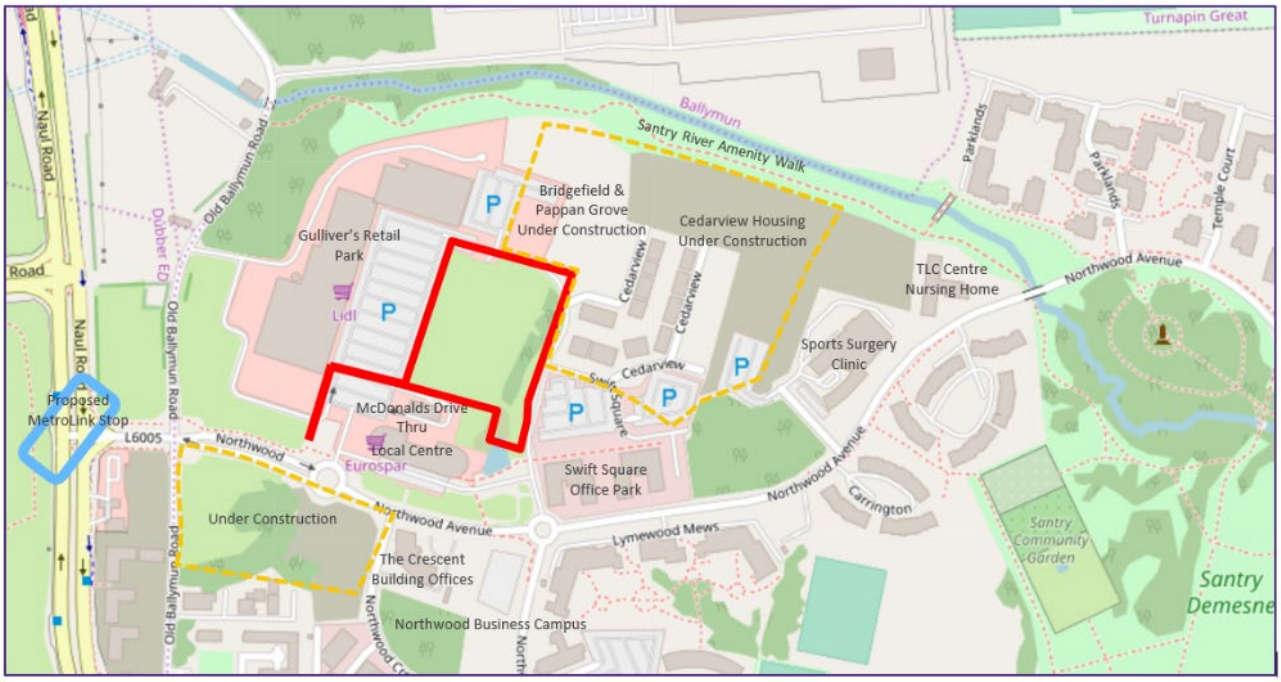

Figure 15-1: Site Location (indicative subject lands outlined in red)

The southern portion of the 2.1 hectare site currently consists primarily of a greenfield area. The northern portion of the site comprises a temporary surface car park for construction workers at the adjacent residential development. The ground levels within the site area are generally flat with a slow and gradual rise from the south-west corner in a northerly direction. There are some localised steep slopes however this only occurs along the banks of the drainage ditch on the eastern edge of the lands. Apart from the drain the lowest level is in the south west corner of the site (57.10m OD). From this low point the ground levels rise by 1.4m towards the very northern edge of the site (58.50m OD). Other than the drainage ditch and temporary spoil heaps the lands the slope across the site is quite consistent. The site drains to the Santry River.

The trees on site are from two different origins. The first is the primary, more historic trees which are remnants of the agricultural stock proof field boundaries and are contained on the eastern side of the ditch. These trees are primarily oak and are very large both in height and crown spread. The second type of tree are the more recently planted trees within the historic tree line and along the path on the eastern perimeter.

The surrounding lands have been subject to significant land use change over the last 15 years.

The applicant has developed Gulliver's Retail Park, Gulliver's Local Centre and part of Swift Square Office Park in the immediate vicinity of the subject site and is currently completing adjacent residential development to the north (Bridgefield and Pappan Grove) and to the east (Cedarview) permitted under Reg. Ref. F15A/0440, as amended, some of which will be occupied later this year. A childcare facility being provided within the adjacent Bridgefield development which will accommodate 100 no. children has recently opened.

Gulliver's Retail Park accommodates Lidl, Home Base, Home Focus, Petmania, Mr. Price and a number of furniture stores. Gulliver's Local Centre accommodates Spar, McDonalds, Costa Coffee, a chemist, hair and beauty salon and other local shops.

To the east of the site is the Sports Surgery Clinic and TLC Centre Nursing Home. To the south of Northwood Avenue in the immediate vicinity of the subject site are The Crescent Building office complex, Northwood Business Campus, Lymewood Mews Apartments and recreational parkland and grounds in Santry Park. Other sites along Northwood Avenue are under construction.

The Santry River Amenity Walk is located c. 250m to the north and Santry Park which is a regional park is located c.350m to the southeast.

The local planning policy framework is set out in the *Fingal Development Plan 2017 – 2023* (FDP). Future development of the subject lands is governed by the Development Plan which sets out planning policies and objectives, as well as design standards for the administrative area. The FDP is underpinned by a number of cross cutting themes including the principles of sustainable development, climate change adaptation, social inclusion and high quality design. The FDP's overall aims and strategic direction focus on consolidated development, efficient use of land and integrated transport and land-use planning was formulated from a consideration of various national, regional and local.

The Development Plan acknowledges Fingal's diverse range of environmental and heritage resources which include the coast, countryside, rivers, amenity lands, and rich archaeological and architectural heritage. The Development Plan identifies a number of key environmental challenges for the County which include *inter alia:*

- *"Protecting the ecological integrity of Natura 2000 sites while allowing for ongoing growth and development.*
- *Providing for growth and development which reduces energy consumption, promotes sustainable modes of transport and reduces car-dependency.*
- *Ongoing provision of high-quality accessible parks and open spaces for our growing population."* (page 22)

The entire area of the subject lands is zoned *"ME – Metro Economic Corridor"* with an objective that seeks to *"Facilitate opportunities for high density mixed use employment generating activity and commercial development, and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor."* (see **Figure 4-2**). The vision for lands with this zoning objective is to:

> *"Provide for an area of compact, high intensity/density, employment generating activity with associated commercial and residential development which focuses on the Metro within a setting of exemplary urban design, public realm streets and places, which are permeable, secure and within a high quality green landscape"* (page 386)

There is a local objective to prepare a Masterplan for lands at Northwood including the subject site.

> *"Objective SANTRY 5*
>
> – *Prepare and implement a Masterplan for lands identified at Northwood (see Map Sheet 11, MP 11.E) during the lifetime of this Plan. The main elements to be included are provided below. The list is not intended to be exhaustive.*
>
> – *Facilitate provision of an underpass to include provision for a car, bus, cycle, and pedestrian link to link lands east and west of the R108 to enhance connectivity.*
>
> – *Ensure where feasible, development overlooks the Santry River Walk.*
>
> – *Allow the re-location of existing units to facilitate connectivity to the proposed Northwood Metro Stop.*
>
> – *Enhance pedestrian links within and to Santry Demesne.*
>
> – *Ensure the continued protection of trees within the subject lands.*
>
> – *Facilitate provision of a direct access route from Old Ballymun Road through Northwood. Development shall enhance connectivity to the proposed Northwood Metro Stop." (page 121)*

The site is covered by a Tree Preservation Order and is also located within the Outer Airport Noise Zone.

15.3.2 Demographic and Local Population

The most recent *Census of Population* was undertaken in April 2016. The smallest geographical units distinguished by the CSO are Electoral Divisions (EDs) for general statistical use (previously called District Electoral Divisions - previously known as Wards). Demographic trends are analysed at state, county, and local levels for the purposes of this EIAR. For the purposes of examining Census population data, those EDs wholly or partially included within the study area were examined. In this regard, the subject site is located within Airport ED (CSO Area Code ED:04001). The location of the subject site in the context of the EDs is illustrated in **Figure 15-2**.

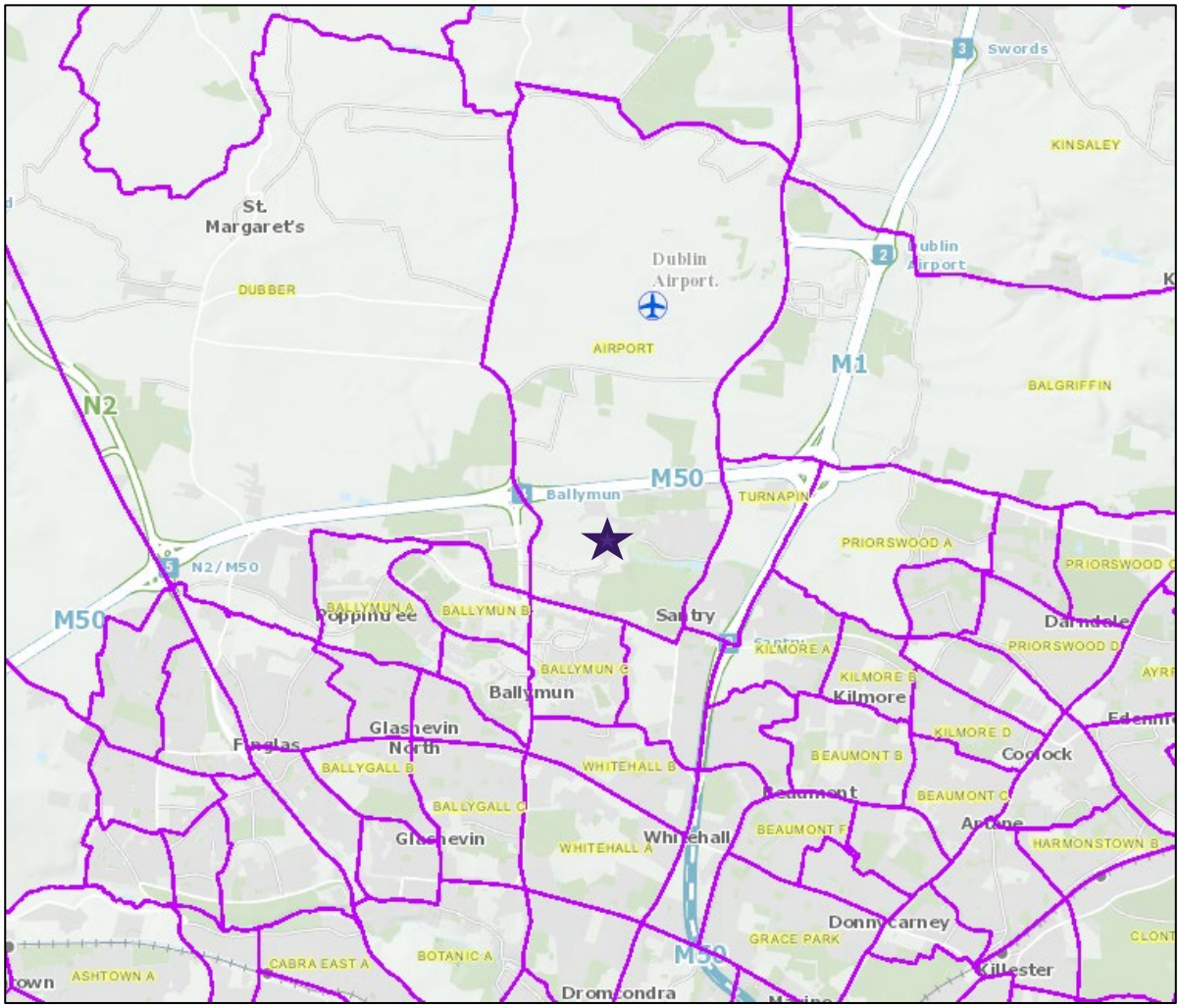

Figure 15-2: Site Location and Electoral Divisions

Source: pobal.ie

15.3.2.1 Population

The results of Census 2006, 2011 and 2016 indicate that the population of Fingal grew from 239,992 in 2006 to 273,991 in 2011 and to 296,020 in 2016. The level of population growth within Fingal in the period 2011 - 2016 is twice the national average and among the highest within any county in the state.

The subject site is located within the Airport ED. The rate of population increase between 2011 and 2016 from 4,032 to 5,018 (24.5%) within the Airport ED is significantly above that of the general rate of increase for County Fingal and the national average and is reflective of development which has taken place within the immediate area.

Population growth within the State, Fingal and Airport ED is summarised in **Table 15-2**.

Table 15-2: Population Growth 2006 – 2016

Area	2006	2011	2016	% Change 2011 - 2016
State	4,239,848	4,581,269	4,761,865	3.8
Fingal	239,992	273,991	296,020	8.0
Airport ED	1,611	4,032	5,018	24.5

Source: cso.ie

Fingal generally, and the application area in particular, is undergoing significant change and population growth. This is consistent with the application area location and profile as a somewhat under developed area within the Dublin Metropolitan Area and adjacent to a range of planned high capacity public transport upgrades.

15.3.2.2 Population Density

As shown in **Table 15-3** the average population density of the Airport ED is significantly higher than the national average and somewhat lower than that for Fingal. A large part of the Airport ED has little or no residential population as it is within the Dublin Airport campus. Those areas outside of the Airport campus within Airport ED have a considerably greater population density – for example the area south of the M50.

The construction of significant resident development which is ongoing within Swords and Northwood generally can be expected to accommodate a significantly increased population within Airport ED.

Table 15-3: Population Density State, Fingal & Airport ED

Population Density			
Area	**Area Size (sq.km)**	**Population 2016**	**Population Density (per sq.km)**
State	67,980.5	4,761,865	70
Fingal	448	296,020	661
Airport ED	8.66	5,018	580

Source: cso.ie

15.3.2.3 Age Profile

When compared to other countries in Western Europe, Ireland has a relatively young population. Approximately 28% of the population in Ireland is under the age of 19, compared to an average of 21% across the EU. The extent of people in the 20- 34 age group and those between 35-55 years old is marginally higher in Ireland when compared to the EU average age profile. Within Ireland the county with the youngest age as found in the 2016 census was Fingal with an average age of 34.3.

The age profile of the population of the State and County Fingal for 2011 and 2016 is highlighted in **Table 15-4**. This table shows that the proportion of 0-14 year olds increased in Fingal but dropped across the State as a whole over this period.

The 15-24 year old age cohort showed an overall decrease of population throughout the State and in Fingal County. The drop in population of this age cohort is possibly as a result of emigration associated with prevailing economic conditions at that time and normal population dynamics as the population ages.

Table 15-4: Population Structure by Age 2011, 2016

Area /Age	0 – 14 (%)	15 – 24 (%)	25-44 (%)	45-64 (%)	65+ (%)
State 2011	21.3	12.6	31.6	22.7	11.7
State 2016	21.1	12.1	29.5	23.8	13.4
Change	-0.2	-0.5	-2.1	+1.1	+1.7
Fingal 2011	24.2	11.9	36.6	20.0	7.2
Fingal 2016	24.5	11.3	33.6	21.5	9.1
Change	+0.3	-0.6	-3.0	+1.5	+1.9

Source: cso.ie

Figure 15-3 clearly shows that there is a higher than average proportion of 0-9 and 25-44 year olds within Fingal. This indicates that there is a comparatively large number of young families within Fingal County.

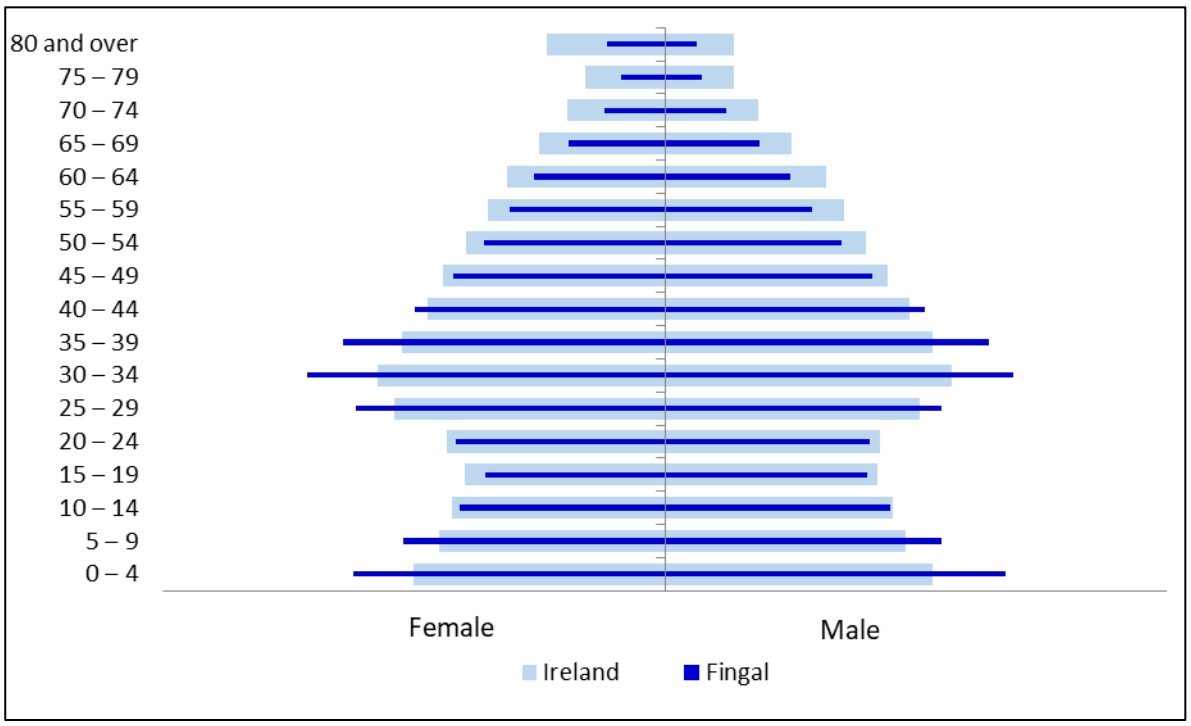

Figure 15-3 Population Pyramid Ireland and Fingal

Source: cso.ie

15.3.2.4 Household Size

Census 2016 revealed that the average number of persons per household recorded an increase in the state for the first time since 1966. In 2011 there were on average 2.73 persons per household. The equivalent figure stood at 2.75 in 2016. The largest increase in average household size between 2011 and 2016 occurred in Fingal (2.92 to 3.03).

15.3.3 Economic Activity and Employment

15.3.3.1 Employment

The 2016 Census of Population (CSO 2016) was examined to determine trends in relation to employment including the number of persons at work, unemployment levels and the sectoral composition of the population, based upon principal economic status.

Table 15-5 shows the overall unemployment rate as measured by the responses to the question on principal economic status in the Census for 2011 and 2016. The unemployment rate is calculated by adding the number of persons unemployed to first time job seekers, and then dividing the total by the overall labour force (i.e., total amount of unemployed persons and employed persons).

Table 15-5: Principal Economic Status 2011 - 2016

	State 2016	State 2011	Fingal 2016	Fingal 2011
At Work	2,006,641	1,807,360	133,971	119,276
Looking for First Regular Job	31,434	34,166	1,850	2,224
Unemployed or given up Previous Job	265,962	390,677	13,565	20,416
Overall Employed	297,396	424,843	15,415	22,640
Labour Force	2,304,037	2,232,203	149,386	141,916
Unemployment Rate %	**11.5%**	**19.0%**	**10.3%**	**16.0%**

Source: cso.ie

It can be seen that the unemployment rate (as measured in the Census) in 2016 had decreased significantly within the State and within Fingal, compared to the 2011 Census. The unemployment rate for Fingal was reduced to 10.3% in 2016 compared to 16% in 2011.

Monthly Unemployment Figures / Quarterly National Household Survey

The *Quarterly National Household Survey* (QNHS) and the *Quarterly Labour Force Survey* (QLFS) are designed to produce quarterly labour force estimates that include the official measure of employment and unemployment in the state (ILO basis). The ILO unemployment rate for the State for the period 2013 - 2018 is summarised in **Table 15-6**. In Q3 2017 the QLFS replaced the QNHS and included enhancements to the survey methodology.

Table 15-6: ILO Economic Status Unemployment Rate for State 2013-2018

	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Average (%)
2013	13.7	13.9	13.0	11.7	13.1
2014	12.0	11.8	11.3	9.9	11.3
2015	10.0	9.8	9.3	8.7	9.5
2016	8.4	8.4	7.9	7.1	8.0
2017	6.8	6.2	6.7	6.4	6.9
2018	5.7	6.0	6.0	5.4	5.8
2019	4.8	5.4	*	*	*

Note: *Not available at time of writing (September 2019).
Source: cso.ie

At the time of writing, it was reported that there was an increase in employment of 45,000 in the year to the second quarter of 2019, bringing total employment to 2,300,000.

There is very significant commuting into and out of Fingal for work. Approximately 17,000 people commute from Dublin city and suburbs to work in Fingal and 28,600 people commute from Fingal to work in from Dublin city and suburbs.

Within Airport ED there is very significant employment. This includes commercial employment immediately adjacent to the subject site at Swift Square, Gulliver's Retail Park, Sport Surgery Clinic and the large proximate employment centre at Dublin Airport. It was estimated in the 2017 *Dublin Airport Economic Impact Study* that 19,200 people are directly employed at the airport or airport related businesses (based on 2016 traffic levels).

15.3.3.2 Affluence and Deprivation

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores each small area (50 – 200 households) in terms of affluence or disadvantage. The index uses information from Ireland's census, such as employment, age profile and educational attainment, to calculate this score. Airport ED is classified as "Affluent". There is a significant variation in the level of affluence and deprivation in the surrounding EDs as shown in **Figure 15-4**. Ballymun C ED to the south of Airport ED is classified as "Disadvantaged".

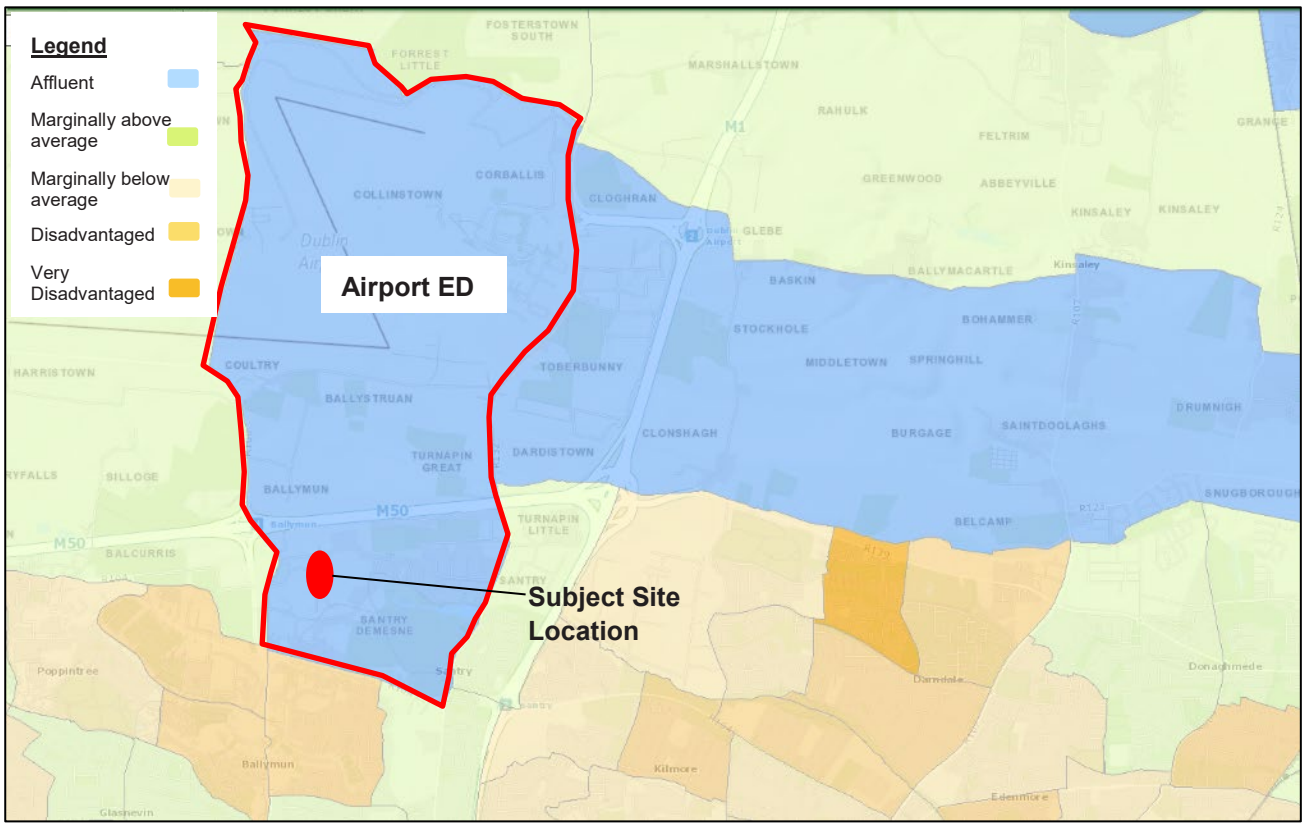

Figure 15-4: Deprivation Index[25]

15.3.3.3 Education Profile

Census 2016 found that the average age of persons aged 15 and over had completed their full time education in April 2016 within Fingal was 20.4. This was fourth eldest within the State. 48.7% of the population within the County were found to have a third level education.

15.3.4 Local Services/ Amenities

Local Services /Amenities (Social infrastructure) includes a wide range of services and facilities including health, education, community, cultural, play, faith, recreation and sports facilities that contribute to the quality of life. Northwood and the surrounding areas have a wide range of community facilities including parks, youth centres playgrounds, sports clubs and gyms, including:

- Ballymun Library;
- Axis Theatre Ballymun;
- The Reco (Ballymun Regional Youth Resource);
- Santry Regional Park;
- Santry River Amenity Walk;
- Balcurris Park;
- Ben Dunne Gym Northwood;

[25] Source: Pobal, 2016 Mapping

- SportsLink (Sports Club);
- Ballymun Leisure Centre;
- Poppintree Youth Project;
- Ballymun United Soccer Complex;
- Morton Stadium (including Clonliffe Harriers AC & Sporting Fingal Football Club);
- Silloge Park Golf Club;
- TLC Nursing Home; and
- Pieta House.

15.3.4.1 Childcare Facilities

There are a large number of childcare facilties within 2km of the subject site. The location of childcare facilties within approximately 3km the of the subject site as per Pobal Mapping are shown in **Figure 15-5** and listed in **Table 15-7.**

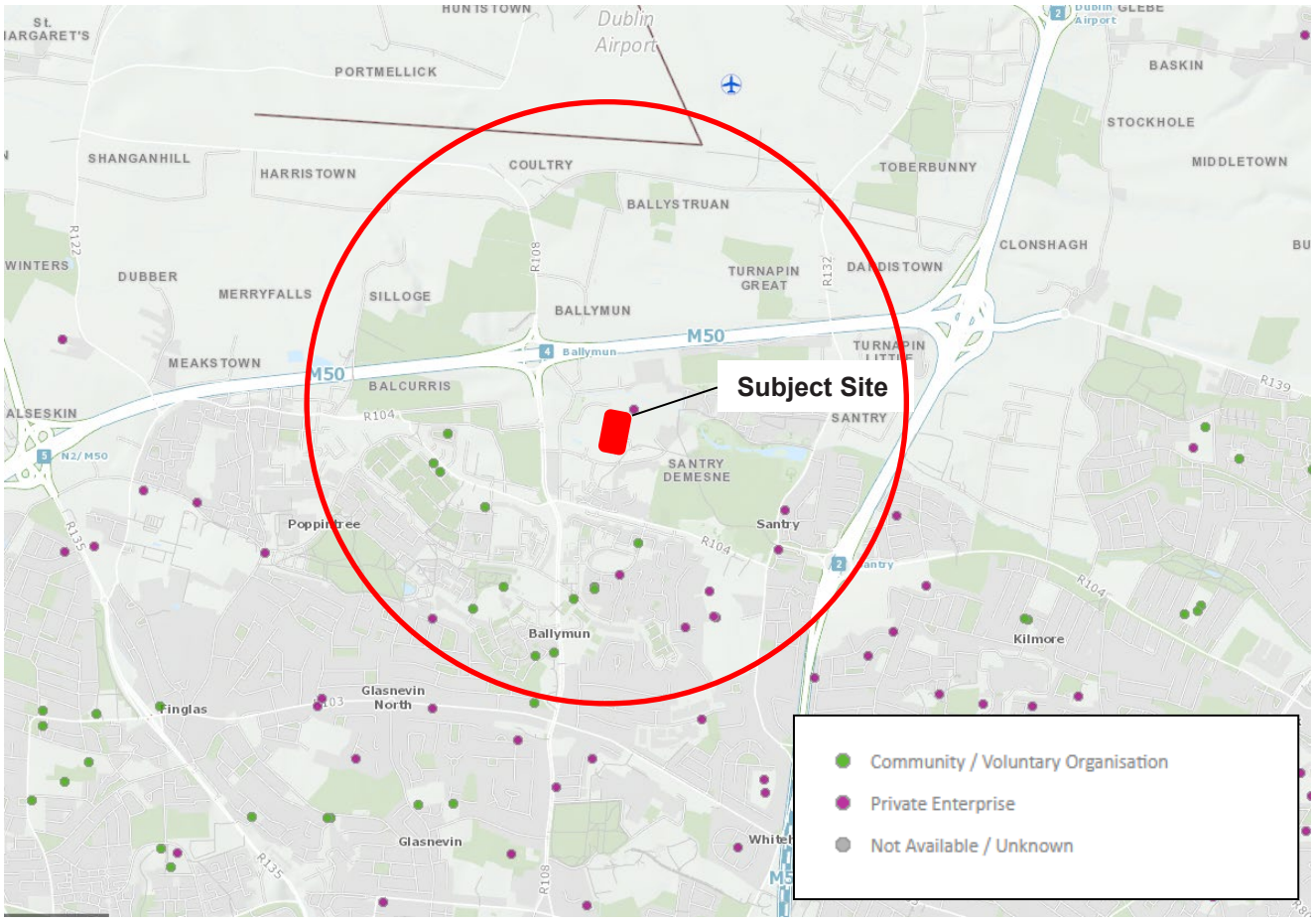

Figure 15-5: Childcare Facilities within a 3km radius

Source: *Pobail.ie,* RPS annotation

Table 15-7: Childcare facilities within a 3km radius of the subject site

No.	Name	Address
1.	Little Harvard	Bridgefield, Northwood, Santry, Dublin 9.
2.	Pop Up Preschool	St Joseph's Junior School, Balcurris Road, Dublin 9.
3.	St Margaret's Pre School	St Margaret's Road, Dublin 11.
4.	Poppintree Early Education Centre	Ballbutcher Lane, Dublin 11.
5.	Aisling Project	Poppintree Sport and Community Centre, Ballybutcher Lane North, Dublin 11.
6.	Naionra Glor na nGael	Sli Sheanntraibh, Baile Munna
7.	Bernie/Sharons Preschool	Longdale Terrace, Santry. Dublin 9.
8.	Ballymun East Community Centre Ltd	Ballymun East Community Centre, Woodhazel Close, Dublin 9.
9.	Aisling Project (Ballymun)	Ballymun East Child & Youth Centre, Woodhazel Close, Dublin 9.
10.	Axis Creche	Main Street, Dublin 9.
11.	Aisling Project (Sillogue Road)	The Lighthouse, Sillogue Road, Ballymun, Dublin 11.
12.	Tír na nÓg Early Childhood Care & Education Centre	Ballymun Day Nursey, Sillogue Road, Dublin 11.
13.	Our Lady's Nursery	121 Sillogue Gardens, Dublin 11.
14.	Naionra an T-Seachtar Laoch	Scoil an t-Seachtar Laoch, Bothar Baile Munna
15.	Mother of Divine Grace Playgroup	Riversdale Sports Club, Glasnevin Avenue, Dublin 11.
16.	Playpals	131 Glasnevin Avenue, Dublin 11.
17.	Pinocchious Little Treasures	Silverdale, Old Swords Road, Dublin 9.
18.	The Playhouse Preschool	Santry Community Resource Centre, Domville Court, Dublin 9.
19.	Happy Ways Preschool	Greenfield Community Centre, Shanliss Avenue, Dublin 9.
20.	Sunshine Creche and Montessori	Unit D2, Santry Hall Industrial Estate

Source: *Pobail.ie,* RPS annotation

A childcare facility accommodating 100 no. children form 0 – 4 years has been permitted under Reg. Ref. 15A/0440 (as amended) adjacent to the subject site in apartment Block A3. This will be located within 150m of the subject site. This facility recently started operations.

There is also a childcare facility for 32 no children permitted under Reg. Ref. F18A/0438 approximately 350m from the subject site. This is under construction.

15.3.4.2 Education Facilities

There is a City of Dublin Education and Training Board early school leavers programme provided in the Adult Education Centre located at Ballymun Road, Ballymun, Dublin 11.

There are 11 primary schools and 2 secondary school within 3km of the subject site. The location of these schools is illustrated on **Figure 15-6**.

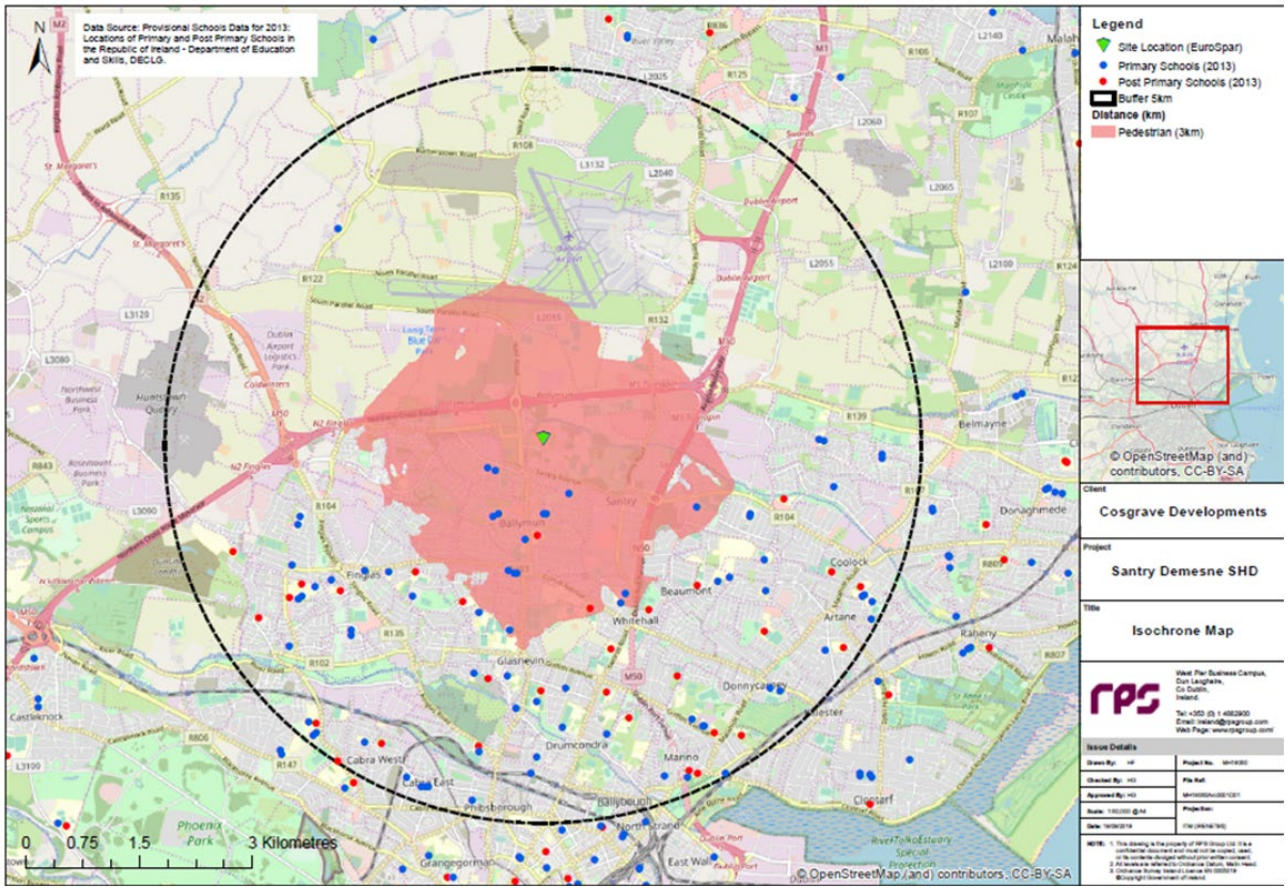

Figure 15-6: School Facilities within a 3km radius

Source: *education.ie,* RPS annotation

Detail of these primary and post-primary schools as per the Department of Education and Skills is presented in the **Table 15-8**.

Table 15-8: Primary and Post-Primary Schools

Electoral Division	Primary School	Address	Enrolled (boys and girls) 2018/2019	Approx. distance to site (walking)
Primary Schools				
Ballymun B	St Joseph's Junior National School	Balbutcher Lane, Ballymun 11	Boys = 80 Girls = 61 **Total = 141**	1.2km
Ballymun C	Gaelscoil Bhaile Munna	Coultry Rd, Ballymun, Dublin, 9	Boys = 85 Girls = 100 **Total = 185**	1.1km
	Virgin Mary Girls National School	Shangan Road, Ballymun, Dublin 9	Boys = 0 Girls = 162 **Total = 162**	1.3km
	Virgin Mary Boys National School	Shangan Road, Ballymun, Dublin 9	Boys = 133 Girls = 0 **Total = 133**	1.3km
Ballymun D	Scoil an tseachtar Laoch	Ballymun Road, Ballymun, Dublin 11	Boys = 103 Girls = 100 **Total = 203**	2.2km
	Holy Spirt Boys National Catholic School	Sillogue Road, Ballymun, Dublin 11	Boys = 335 Girls = 0 **Total = 335**	1.7km
	Holy Spirt Girls National Catholic School	Sillogue Road, Ballymun, Dublin 11	Boys = 0 Girls = 318 **Total = 318**	1.8km

Electoral Division	Primary School	Address	Enrolled (boys and girls) 2018/2019	Approx. distance to site (walking)
Ballygall C	Our Lady of Victories Infant School	Ballymun Road, Dublin 9	Boys = 120 Girls = 145 **Total = 265**	2.1km
	Our Lady of Victories Girls National School	Ballymun Road, Dublin 9	Boys = 1 Girls = 202 **Total = 203**	2.1km
	Our Lady of Victories Boys National School	Ballymun Road, Dublin 9	Boys = 200 Girls = 0 **Total = 200**	2.1km
Whitehall B	Holy Child National School	Larkhill Road, Whitehall, Dublin 9	Boys= 98 Girls = 309 **Total = 407**	3.0km
Total			**2,552 pupils**	**1.8km**
Post Primary Schools				
Ballymun C	St. Trinity Comprehensive School	Ballymun Rd, Santry, Dublin 9	Boys= 299 Girls = 217 **Total = 516**	2.4km
Whitehall A	St Aidan's CBS	Collins Avenue, Whitehall, Dublin 9	Boys= 721 Girls = 0	1.7km
Total			**1,237 pupils**	

Source: *education.ie*

With respect to making provision for future school places, the DES has established School Planning Areas. As illustrated in **Figure 15-6**: South Swords School Planning Area below the subject site and is located within the South Swords Area.

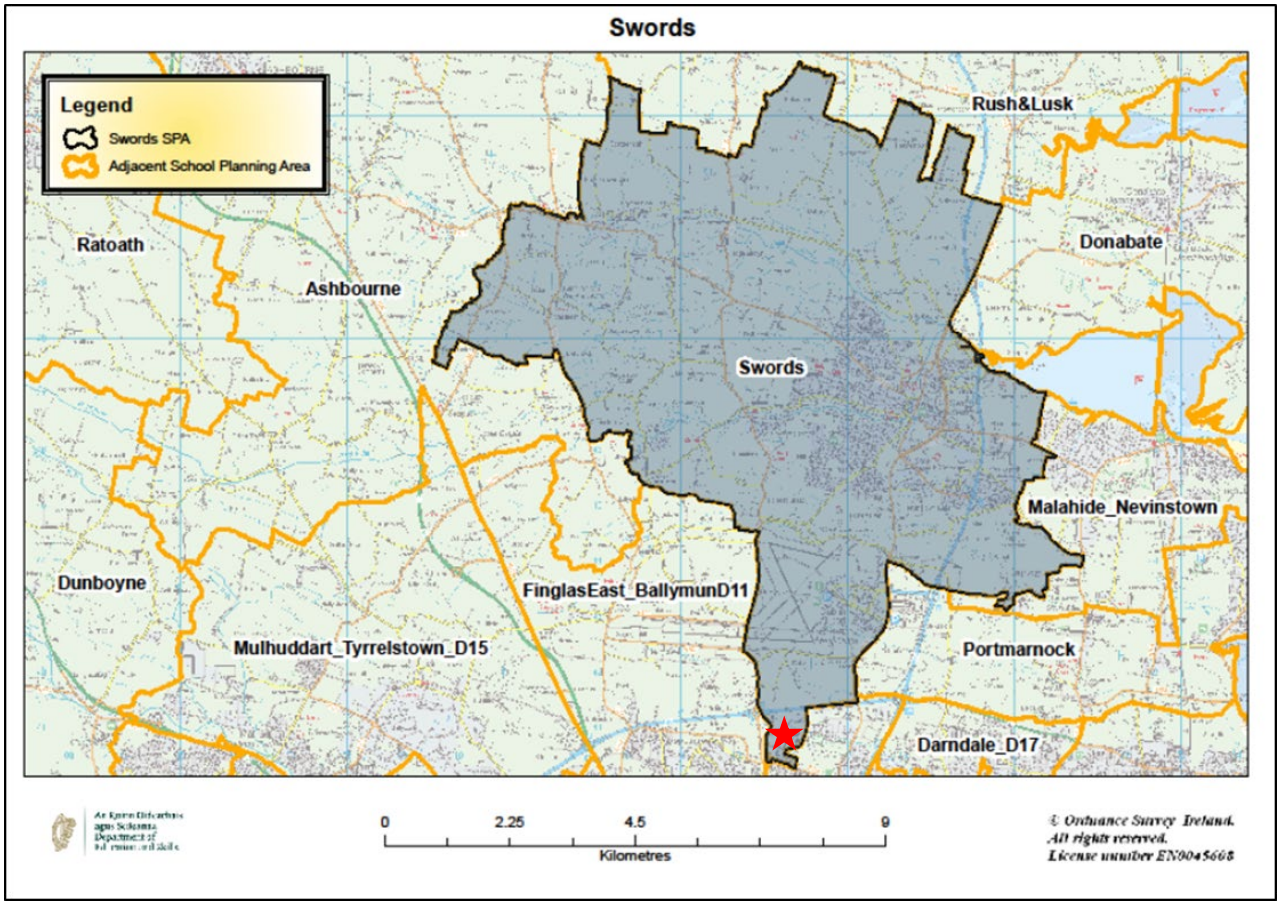

Figure 15-6: South Swords School Planning Area

Source: education.ie

The Department of Education and Skills announced in April 2018 that more than 40 no. new primary and post-primary schools are to be established throughout the country by 2022. Within this phase a new 8 classroom school is proposed for the Swords South School Planning Area which would result, assuming a 1 classroom teacher for every 26 pupils, in 208 primary school places.

It is also noted that major capital projects have been completed since 2010 in Gaelscoil Bhaile Munna (2017) which is located within the Fingal East Ballymun School Planning Area and within 3km of the subject site.

Under the *Addition Accommodation Scheme*, the following school upgrades are currently under progress;

- The provision of 2 no. additional mainstream classrooms and 2 no. additional resource rooms currently at design stage for Our Lady of Victories National School.
- The provision of an ASD room at Trinity Comprehensive currently at design stage
- The provision of 1 no. additional mainstream classrooms at Bantiarna na mBuanna Girls has been approved.

In this regard the requirement for new schools and capital improvements is the subject of on-going review and which includes monitoring school place provision in all areas.

15.3.4.3 Health Facilities

The Ballymun Health Care Facility provided by the HSE at Civic Offices, Ballymun Road, Dublin 11 provides general practitioner services, public health nursing, child health services, community welfare, chiropody, ophthalmic, speech therapy, social work, addiction counselling and treatment, physiotherapy, occupational therapy, psychiatric services and home help.

There are a large number of medical General Practices located in the immediate vicinity including the following:

- Ballymun Family Practice Civic Centre First Floor, Ballymun, Dublin 9;
- Crestfield Medical Practice 14 Crestfield Drive, Whitehall, Dublin 9;
- Swords Road Medical Practice, 250 Swords Rd, Whitehall, Dublin 9;
- College Gate Clinic, 123 Ballymun Road, Glasnevin, Dublin 9;
- Medical Centre, Omni Park Shopping Centre, Santry, Dublin 9;
- General Practice, Unit 1 Northwood House, Northwood Business Park, Santry, Dublin 9;
- Shanard Family Practice, 33 Shanard Road, Santry, Dublin 9; and
- General Practice, Swords Road, Santry, Dublin 9.

A distribution of health facilities close to the subject site are illustrated in **Figure 15-8** below.

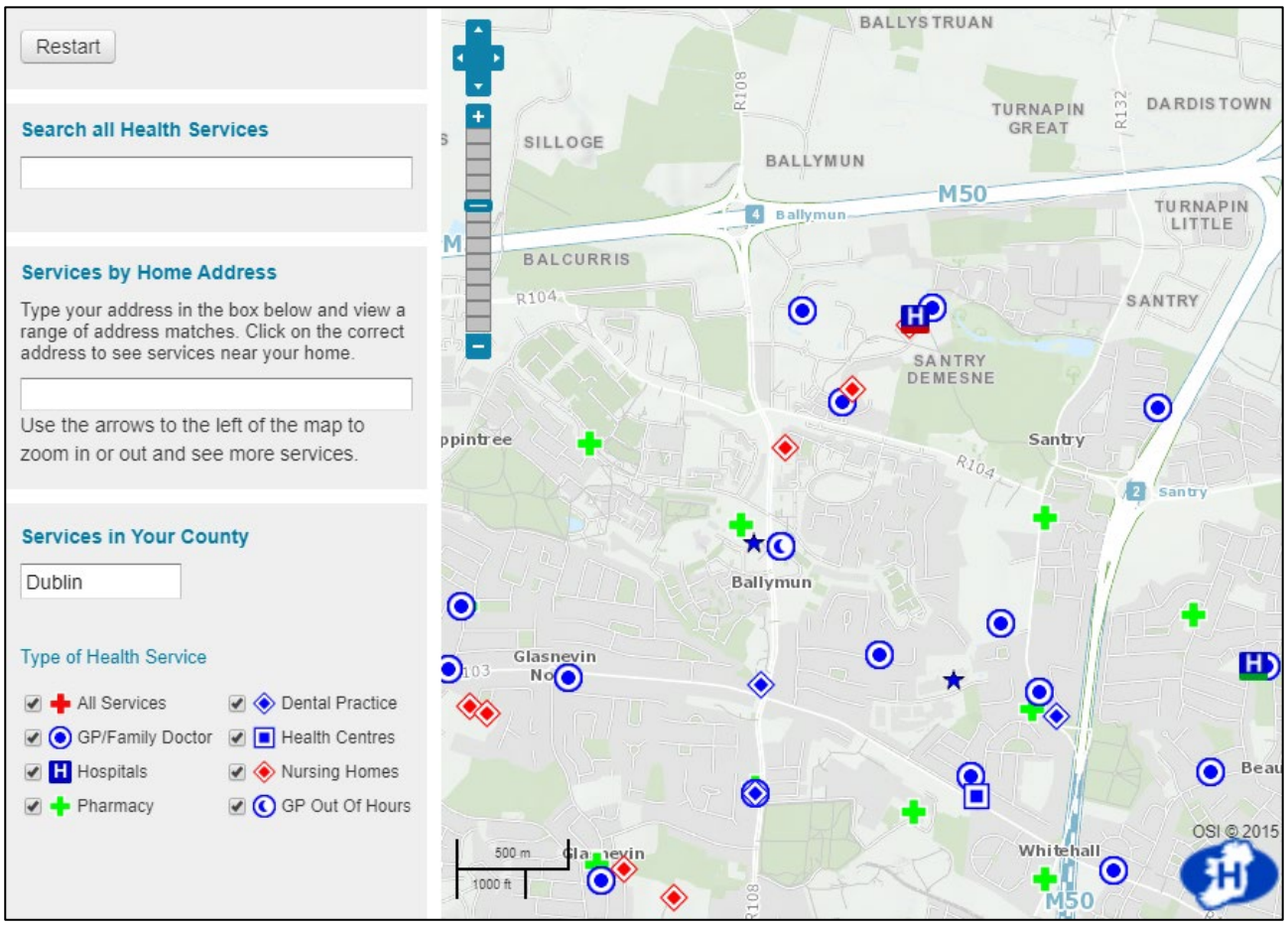

Figure 15-8: Health Services

Source: *hse.ie*

15.3.5 Human Health

The results of the 2016 Census have been collated to identify the broad health baseline for the State, Dublin and the Fingal area and these are summarised in **Table 15-9.**

The CSO reports that life expectancy at birth in Ireland is 78.4 years for males and 82.8 years for females. Within County Dublin mortality rate from cancer has fluctuated over the years, and indicates an increasing trend, but remains below the national average. Between the years of 2010 and 2013, mortality rate from respiratory diseases within County Dublin has increased but remains consistently below the national average. Mortality rate from circulatory diseases within County Dublin has decreased over the same time and remains consistently below the national average. This is contrary to the national trend which continues to increase.

Between the years of 2010 and 2015, hospital admission rate for diseases of the circulatory system in Fingal follows, but remains consistently below, the national average. Hospital admissions for diseases of the respiratory system are also lower than the national average and show a decreasing trend within Fingal compared to national figures.

When considering mental health, hospital admissions for anxiety and depression have increased in Fingal over the years, from 1.4 per 1,000 population in 2014 to 24.9 per 1,000 population in 2015. Nationally, these have remained at 1.8 per 1,000 population within the same time.

Table 15-9: Summary of health baseline conditions in Fingal, County Dublin and Ireland

Indicator	Fingal	County Dublin	Ireland	Source and date
Life expectancy (males)	N/A	N/A	78.4	CSO, 2011
Life expectancy (females)	N/A	N/A	82.8	CSO, 2011
Hospital admissions for circulatory disease (per 100,000 population)	3,425.8	N/A	3,794.9	IPH Community Profiles, 2015
Hospital admissions for respiratory disease (per 100,000 population)	2,597.9	N/A	2,712.5	IPH Community Profiles, 2015
Cancer Mortality (per 100,000 population)	N/A	189.40	191.90	CSO, 2013
Respiratory disease mortality (per 100,000 population)	N/A	71.21	77.96	CSO, 2013
Circulatory disease mortality (per 100,000 population)	N/A	177.99	210.18	CSO, 2013
All age all-cause mortality (per 100,000 population)	N/A	609.32	653.55	CSO, 2013
Hospital admissions for anxiety or depression (per 1,000 population)	24.9	N/A	1.8	IPH Community Profiles, 2015

Source: *cso.ie*

The receiving environment for human health in the context biophysical factors such as air, noise and water, as relevant are outlined in Land, Soils and Hydrogeology (**Chapter 7**), Water and Hydrology (**Chapter 8**), Air Quality and Climate (**Chapter 9**), Noise and Vibration (**Chapter 10**), and Material Assets: Traffic and Transport (**Chapter 13**).

15.3.6 Risk of Major Accidents and Disasters

The 2018 EIA Guidelines state that an EIAR must include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project. There are two key considerations; the potential of the project to cause accidents and/or disasters and the vulnerability of the project to potential disasters / accidents.

The location is outside the consultation zones of all SEVESO sites and outside of the Dublin Airport Outer Public Safety Zone and is therefore considered to not be susceptible to any particular exceptional human health risks.

15.4 Impact Assessment

An assessment of the specific direct and indirect impacts that the project may have during both the construction and operational phases of the project, in the absence of any remedial or reductive measures. The predicted impacts will be discussed having regard to their character, magnitude, duration, consequences and significance. Potential Impacts are considered under the following headings:

- Land use and Settlement Pattern;
- Demographics and Local Population;
- Economic Activity and Employment;
- Local Services/Amenities;
- Human Health and;
- Risk of Major Accidents or Disasters.

There are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to population and human health. This chapter of the EIAR has been instructed by updated guidance documents reflecting the changes within the 2014 EIA Directive. These documents are the *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (2018) and the *Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports*, published by the EPA in August 2017. Therefore, in line with the guidance documents referred to, this chapter of the EIAR focuses primarily on the potential likely and significant impact on population and human health in relation to health effects/issues and environmental hazards from the other environmental factors and interactions that potentially may occur. Where there are identified associated and inter-related potential likely and significant impacts which are more comprehensively addressed elsewhere in this EIAR document, these are referred to. However, the reader is directed to the relevant environmental topic chapter of this EIAR document for a more detailed assessment.

15.4.1 Do Nothing

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place. A do-nothing scenario would result in the subject lands remaining undeveloped and the potential for the delivery of key objectives of the ME land zoning would remain unrealised. There is a significant opportunity cost associated with a failure to develop the subject site.

- The local economy would not experience the direct and indirect positive effects of the construction phase of development, including employment creation.
- Under-utilisation of zoned and serviced suburban lands at a location with a planned very high level of public transport services.
- Failure to provide residential development in a timely fashion at a time of acute housing scarcity.
- Negative impact on the development of a mixed use sustainable community at Northwood, Santry. The logical growth of the area adjacent to existing housing, commercial, retail and community facilities within Northwood would be halted.

The failure to provide housing at this location would:

- Encourage unsustainable development of greenfield lands more remote from high capacity public transport services.
- Have adverse effects on the character of the area. Anti-social behaviour is often associated with vacant sites and this would have a negative effect on the local population.
- Failure to deliver the proposed residential units would result in existing housing need and demand remaining unmet. The new pedestrian and cycle links, and public open spaces to be provided in the development and serving the wider area would also not be provided.

15.4.2 Construction Phase

15.4.2.1 Land Use and Settlement Pattern

The proposed development complies with the statutory land use zoning. There will be no severance of land, loss of rights of way or amenities as a result of the construction works associated with the proposed development.

The subject site will temporarily be a construction site. The construction phase of the proposed development will primarily consist of site clearing, excavation and construction works, and has the potential to impact adversely and result in the temporary degradation of the local visual environment on a short-term basis. The visual impacts precipitated by the proposed development are assessed in greater detail in **Chapter 12**.

Secondary land use impacts include off-site activity in relation to building materials and appropriate disposal sites for removed spoil. Construction works are addressed more fully in the *Outline CEMP* and *CDWMP* prepared by JB Barry and Partners Consulting Engineers.

15.4.2.1 Demographics and Local Population

The construction phase of the project is unlikely to have any significant impact on demographic patterns within the surrounding area. Some additional temporary additional local populations may arise out of construction activity. However, this positive impact shall be imperceptible and temporary in nature and therefore not considered significant.

15.4.2.2 Economic Activity and Employment

A significant portion of the capital inputs required for construction will require the purchase of Irish sourced goods and services. The construction phase 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 60 or more 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 or those construction workers already working in the immediate area will be employed. It is unlikely that the proposed development will increase the population of the area as a result of the construction phase.

In addition to direct employment, there will be 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.

There will be significant short term positive effects arising in respect of economic activity and employment.

15.4.2.3 Local Services/Amenities

All of the facilities and local amenities will remain in place during the construction phase of the project. It is envisaged that any discernible impact will be chiefly on local convenience shopping in the immediate vicinity of the site. The impact will be positive, not significant and temporary in nature.

15.4.2.4 Human Health

The construction phase of the project may give rise to temporary, short-term constructed related air and noise emissions within the site boundary associated with construction traffic, migration of surface contaminants, dust, noise and littering. Potential exposure however, is largely limited to an occupational setting, with little opportunity for community exposure beyond the site boundary.

The main aspects with the potential to influence local communities and their health, comprises secondary activities that extend beyond the site boundary, namely:

- Potential change in vehicular nature, number and routes resulting from increased traffic arising from hauling building materials to and from the site as further detailed in **Chapter 13**;
- Potential fugitive emissions (noise, dirt and dust generation/resuspension) as detailed in **Chapter 9** and **Chapter 10**; and,
- Potential impacts to drinking water supplies as further detailed in **Chapter 8**.

Construction impacts are likely to be short term and are dealt with separately in the relevant chapters of this EIAR document and will be subject to control through a CEMP. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts. The development will comply with all Health & Safety Regulations during the construction of the project. Where possible, potential risks will be omitted from the design so that the impact on the construction phase will be reduced.

Construction sites pose potential risks to the health and safety of the public. However, access by the public would be considered trespassing on private property.

15.4.2.5 Risk of Major Accidents or Disasters

Having regard to the topography, geology and location of the subject site, and its low risk of flooding as established in the *Flood Risk Assessment* submitted with the application (and set out in **Chapter 8**), it is not considered likely that there will be any impact related to a major accident or disaster during the construction phase of the proposed development, stemming internally from within the development, or externally.

The works proposed in proximity to roadways will be governed by best practice and appropriate safety procedures, ameliorating any risk of a major accident in those contexts. The entrance arrangements including the segregation of the construction traffic and operational accesses have been designed so as to avoid any risk of a major accident associated with the surrounding road network.

15.4.3 Operational Phase

15.4.3.1 Land Use and Settlement Pattern

The proposed development complies with the statutory land use zoning. There will be no severance of land, loss of rights of way or amenities as a result of the construction of the proposed development. Landscaped public space and pedestrian routes connecting with the planned Northwood Metro Station, Santry River Amenity Walk and Santry Park are proposed.

Development of the subject site is aligned with the objective to achieve compact growth contained within the *National Planning Framework* and will realise the efficient use of currently-underutilised land with higher housing density that is proximate to planned high capacity public transport. The impact will have a permanent significant positive effect that will achieve local and wider county, regional and national objectives.

15.4.3.2 Demographics and Local Population

Once the development has been constructed and is occupied, the most significant impact will be the resident population increase. The proposed development of 331 no. units and be expected to accommodate not more than 910 no. people (based on an average household size of 2.75).

There will also be a modest number of people employed in the proposed childcare facility, mixed use units/café, concierge and maintenance/operations. These facilities will increase the levels of visiting population to the site and the surrounding area having a permanent moderate positive impact.

15.4.3.3 Economic Activity and Employment

The constrained housing supply has been identified as a potential threat to the competitiveness and continued economic growth of the Greater Dublin Area. The proposed apartments represent a small increase in housing supply and as such contributes positively to economic activity.

The future resident population will generate additional spending within the area which will likely have a permanent moderate positive impact on economic activity in the adjacent Gulliver's Local Centre. This increase in population will also support the planned public transport provision.

15.4.3.4 Local Services/Amenities

The proposed development includes a childcare facility and local mixed use street/café units. The development also includes landscaped public spaces, play facilities and enhanced pedestrian links to the Santry River Amenity Walk and the planned Northwood Metro Station. The provision of these facilities within the development will be of benefit to future residents and existing residents in the local environs.

The proposed open space and recreational provision including new cycle links and pedestrian walkways, playgrounds will help provide a high quality residential environment with provision for exercise and play and will be a valuable amenity and cultural resource to surrounding residential areas. Such provisions shall also promote psychological comfort, aesthetic pleasure and a sense of belonging and civic pride.

The increased population facilitated by the proposed development will undoubtedly make some additional demands on social infrastructure. *Childcare Demand Analysis* and *Social and Community Audit of Schools Reports* accompany the overall planning application package.

15.4.3.4.1 Childcare Facilities

The proposed development comprises 331 no. units with 6 no. of those units comprising of one bed only. Based on an average household size of 2.75 it is anticipated that the resident population within the subject development will be no more than 910. This represents a robust analysis given that only 33 no. units are 3 beds. A strict application of the Childcare Guidelines for Planning Authorities 2001 would suggest a requirement for 88 no childcare spaces. The Fingal County Childcare Committee advocate adherence to these guidelines. Census 2016 demonstrates that approximately 7% of the population is pre-school age. Application of this percentage generates a projected demand of 62 no. childcare spaces. However following an analysis of the childcare facilities in the vicinity of the site, those which are committed on sites directly adjacent to the subject development and industry operators in response to items raised in the opinion issued by An Bord Pleanála it was considered that a childcare facility with the potential to cater for 48 no. spaces would be appropriate.

15.4.3.4.2 School Facilities

Census 2016 demonstrates that approximately 12% of population will be primary school age and 8% of population will be secondary school age.

Based on national average household size and proportion of the population of school going age it is estimated that appropriately 109 primary school places (or 14 for each school year based on an 8-year primary school cycle) and 72 secondary school places (or 12 for each school year based on an 6-year secondary school cycle) will be required.

It is considered that the increase in school place demand in the context of overall capacity is considered to be insignificant.

Considering the elements of the proposed development which include additional mixed use commercial units, childcare facilities and landscape open spaces it is concluded that the its impact on social infrastructure and local amenities will be permanent moderate and positive.

15.4.3.5 Human Health

The operational stage of the development is unlikely to precipitate any significant impacts in terms of human health. The design of the proposed development has been formulated to provide for a safe environment for future residents and visitors alike. The paths, roadways and public areas have all been designed in accordance with best practice and the applicable guidelines. Likewise, the proposed residential units and commercial units accord with the relevant guidelines and will meet all relevant safety and building standards and regulations, ensuring a development which promotes a high standard of health and safety for all occupants and visitors.

The proposed development incorporates design principles such as permeability, shared surfaces and a layout which prioritises walking and cycling, providing links to the Santry Walkway and the planned Northwood Metro Station and therefore has the potential to positively impact on population and human health.

The main aspects with the potential to influence local communities and their health, comprises secondary activities that extend beyond the site boundary, namely:

- Potential impacts to drinking water supplies;
- Potential change in vehicular nature, number and routes resulting from increased traffic arising from the operation of the site; and
- Potential fugitive emissions (noise, dirt and dust generation/resuspension).

Separate chapters of the EIAR assess these impacts and include mitigation measures which are intended to ensure that the population does not experience an unacceptable diminution in aspects of quality of life as a result of the proposed development.

The proposed development will not result in any significant impacts on human health and safety once completed and operational.

15.4.3.6 Risk of Major Accidents or Disasters

The proposed development will be located on land which is not at any significant risk of flooding. The entrance arrangements have been designed so as to avoid any risk of a major accident associated with the surrounding road network. For further details in relation to the junction and entrance layout please refer to the TTA and associated documentation prepared by JB Barry Consulting Engineers.

The subject site is located outside the zone for any potential major accident or disasters airing from the SEVESO site activities and outside the Airport Outer Public Safety Zone.

Therefore, it is considered that there is no significant risk related to major accidents or disasters, external or internal, man-made or natural in respect of the proposed development.

15.5 Mitigation Measures

15.5.1 Construction Phase Mitigation

During the construction phase, the legal duties under the Construction Regulations (Safety, Health and Welfare at Work (Construction) Regulations 2013) will be adhered to. In accordance with these duties, a Project Supervisor Design Process (PSDP) will be appointed by the relevant contractor to co-ordinate the design effort and minimise the construction risks during the design period. In addition, a Project Supervisor - Construction Stage (PSCS) will be appointed to coordinate and supervise all safety aspects of the project.

The Outline CEMP for the project, which will be submitted with the planning application, sets out the basic measures to be employed in order to mitigate potential negative effects during construction. This document represents a comprehensive approach to construction phase mitigation which in accordance with good practice, will be refined and added to as the project proceeds on site. The Outline CEMP includes the following with regard to population and human health

> *"It is recommended that a rodent and pest control plan is put in place so as to manage and limit any potential disturbance to populations that may utilise the site. The pest control plan should be in accordance with the Chartered Institute of Environmental Health's "Pest minimisation Best practice for the construction industry" guidelines or a similar appropriate standard."*

Procedures shall also be adopted to ensure that noise impacts from construction operations are minimised, to protect local amenity. Prior to the commencement of construction, a detailed *Construction Environmental Management Plan* (CEMP) will be prepared by the selected contractor prior to work commencing on site. The main purpose of a CEMP is to provide a mechanism for implementation of the various mitigation measures which are described in this EIAR and contained within the *Outline CEMP* that accompanies this application under separate cover.

All personnel will be required to understand and implement the requirements of the CEMP and shall be required to comply with all legal requirements and best practice guidance for construction sites.

Adherence to the construction phase mitigation measures presented in this EIAR will ensure that the construction of the proposed development will have an imperceptible and neutral impact in terms of health and safety.

15.5.2 Operational Phase Mitigation

No significant risks to population or human health have been identified within this discipline in relation to the operational phase of the development. Accordingly, no further mitigation measures are required.

15.6 Monitoring Measures (Construction and Operational)

Measures to avoid negative impacts on population and human health are largely 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.

It is considered that the monitoring measures outlined in regard to the other environmental topics will ensure that the proposed development is unlikely to result in any impact in relation population and human health.

15.7 Cumulative Impact

With regard to population and human health, the cumulative impact of the proposed development in conjunction with other nearby developments will provide for the growth of high quality new neighbourhoods in the area with a high level of accessibility and amenity.

A *Daylight and Sunlight Assessment* on the proposed development has been undertaken by Geraghty Engineers and is submitted as part of the application documentation. This report assessed sunlight access and daylight access to neighbouring dwellings with the proposed development in place. The report concludes that sunlight levels at 29 no. relevant neighbouring dwellings to the north within the Pappan Grove/Bridgefield development will be largely unaffected. The calculations show that all relevant dwellings will comfortably exceed the guidelines and continue to receive excellent levels of direct sunshine throughout the year. With regard to daylight levels in the relevant neighbouring dwellings to the north, the majority (18 no.) will continue to receive daylight (ADF) levels above the minimum guidelines, 9 no. will fall only marginally below the threshold while 2 no. are well below. The impact of the development on those units below the recommended ADF would be considered negative, slight in magnitude and long-term in duration. However, having regard to the largely unaffected sunlight penetration and to the need to achieve the appropriate density in the proposed scheme, this limited shortfall is considered to be acceptable.

The overall cumulative impact of the proposed development will therefore be long term and positive with regard to population and human health, as residents will benefit from a high quality, visually attractive living environment, with ample opportunity for active and passive recreation and strong links and pedestrian permeability, with a direct and convenient link to existing high frequency public transport modes and the planned Metro Link.

15.8 Residual Impact

Adherence to the mitigation measures recommended in this EIAR will ensure that there will be no negative residual impacts or effects on population and human health from the construction and operation of the proposed scheme. Indeed, the delivery of much needed housing will realise a likely significant positive effect for the local area.

15.9 References

Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports Environmental Protection Agency (EPA), 2017. Available at: https://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf

EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003 and revised draft advice notes 2015) - https://www.epa.ie/pubs/advice/ea/guidelines/EPA_advice_on_EIS_2003.pdf

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018 - https://www.housing.gov.ie/sites/default/files/publications/files/guidelines_for_planning_authorities_and_an_bord_pleanala_on_carrying_out_eia_-_august_2018.pdf

Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92EU amended 2014/52/EU) - https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf

Fingal Development Plan 2017 -2023 - https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement_compressed_compressed.pdf

Department of Education Additional Accommodation Scheme - https://www.education.ie/en/Schools-Colleges/Services/Building-Works/Additional-Accommodation/

The Planning System and Flood Risk Management Guidelines 2009 - https://www.opw.ie/media/Planning%20System%20and%20Flood%20Risk%20Management%20Guidelines.pdf

Construction Regulations (Safety, Health and Welfare at Work (Construction) Regulations 2013) - https://www.hsa.ie/eng/Legislation/New_Legislation/SI_291_2013.pdf

16 CUMULATIVE EFFECTS AND ENVIRONMENTAL INTERACTIONS

The EIA Directive and its transposing regulations requires that in addition to assessing impacts on population & human health, biodiversity, land & soils, water, air, climate, landscape, material assets and cultural heritage on the environment, the inter relationship between these factors must be considered.

It is also required that the cumulative effects of the proposed development and other permitted development in the study area be considered.

This chapter of the EIAR was prepared and collated by Michael Higgins, BA, MRUP, MIPI, TPP, a Senior Planner with RPS. The interactions were provided by the relevant EIAR specialists.

16.1 CUMULATIVE EFFECTS

Cumulative assessment is undertaken to ensure that the combined effects of the proposed development and other influences are assessed together, and not as individual aspects of the environmental assessment.

Cumulative effects are defined as changes to the environment that are caused by an action in combination with other actions, arising from:

- the interaction between all of the different (existing and/or approved) projects in the same area; as required by Annex IV, point 5(e) of the EIA Directive;

- the interaction between the various impacts within a single project.

The EU Guidance on the preparation of the Environmental Impact Assessment Report guidance states that it is important to consider effects, not in isolation, but cumulatively, as this may show that individually analysed impacts can become significant when they are added together, or with, other effects.

The coexistence of impacts may increase or decrease their combined impact. Impacts that are considered to be insignificant, when assessed individually, may become significant when combined with other impacts.

The overall summary of the assessment of the likely cumulative effects, and interactions, between the proposed development and other projects in the vicinity is presented herein, along with appropriate mitigation measures to address any identified cumulative effects.

The following guidelines and publications were considered when determining the other projects to be considered for their potential to generate cumulative effects with the proposed development site:

- *Draft Guidelines of the Information to be Contained in Environmental Impact Assessment Reports* Environmental Protection Agency (EPA), 2017; and,

- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Dept. Housing Planning and Local Government, 2018).

16.1.1 Identification of “Existing and/or Approved Projects”

The first stage in determining cumulative effects entailed the identification of projects in the locality that exist or have been approved. Existing and/or approved projects have the potential to have an impact in combination with the subject development based on available information. This stage involved a desktop study to review all existing and/or approved projects that are located in close proximity to the site and those that fall outside of the site boundary but still have the potential to interact with the development.

This review was carried out using the local authority planning web portals and any other sources to identify other projects that have the potential to interact with the proposed development.

Following on from this inclusion or exclusion criteria were applied to the existing and/or approved projects to determine whether they had any potential to give rise to cumulative effects in each of the technical specialisms (**Chapters 6 – 15**) with respect to the following criteria *inter alia*:

- Temporal Scope – is there any temporal overlap and potential for interaction between the subject development due to the relative construction operation and decommissioning programmes of other projects?

- Scale and Nature of the other existing and/or approved projects - Due to the scale and nature of the other projects, are they likely to interact with the proposed development to result in a cumulative effect? Statutory definitions of major development and EIA screening thresholds were considered in determining issues of scale.

- Other Factors - such as the nature and/or capacity of the receiving environment, that would make significant cumulative effects with 'other developments' more or less likely. A source-pathway receptor approach was used to inform the assessment of other factors.

16.1.2 Information Gathering and Assessment of Cumulative Effects

For the developments, all available information was compiled to inform the assessment of cumulative effects. The relevant data was sourced from websites of the relevant planning authorities (An Bord Pleanála / Fingal Council Council) and included information such as:

- The design and location of the existing and/or approved project;

- The proposed programme of construction, operation and decommissioning (if applicable);

- Compilation and review of relevant environmental assessments and planner reports that set out baseline data and effects arising from the other developments and;

- A review of the mitigation measures that will be applied to the subject development to ensure they are sufficient to remove any cumulative effects when considered in combination with the other developments.

16.1.3 Assessment of Cumulative Effects

Each of the technical chapters has considered the cumulative impact of the subject development and other pertinent projects. The cumulative impact is detailed in each of these chapters. Other projects identified in these chapters include Reg. Ref. F15A/0440 (as amended) which permitted 355 no. residential units on a site adjacent to the proposed development and is currently under construction.

No significant cumulative impact of the development and other projects has been identified.

16.2 Inter-Relationships Interactions

The potential interaction between environmental aspects, arising from within the development were considered, to ensure that the combination of impacts was correctly examined, and any required mitigation measures included.

Each technical chapter of the EIAR details, individual environmental baseline information and identifies the significant potential and residual construction and operational effects/impacts of the proposed development. In addition, the potential for other environmental interactions are identified and the relevant impact either on, or from, these other aspects is analysed via data exchange between and assessment review by the relevant experts.

Table 16-1 is a matrix table indicating the significant interactions that are likely to occur between the various environmental disciplines regarding the proposed scheme. Where a tick exists in a box in a table, this indicates that a relationship exists between the two environmental areas. The purpose of the table is to allow interaction between two various disciplines to be recognised, although the level of interaction will vary in

each case. It is assumed in presenting this table that an environmental discipline has a potential inter-relationship during either the construction or operational phase of the scheme, or both.

Table 16-1: Interactive Effect on Receptors

Interactive / Cumulative Effect on Receptors	Biodiversity	Land, Soils and Hydrogeology	Water and Hydrology	Air Quality and Climate	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets: Traffic and Transport	Material Assets: Built Services	Material Assets: Waste Management	Population and Human Health
Biodiversity		√	√		√		√				
Land, Soils and Hydrogeology	√			√	√	√		√		√	√
Water and Hydrology	√										
Air Quality and Climate		√						√			√
Noise and Vibration	√	√						√	√		√
Cultural Heritage		√									
Landscape and Visual	√				√						
Material Assets: Traffic and Transport		√		√	√						√
Material Assets: Built Services					√						
Material Assets: Waste Management		√									
Population and Human Health		√		√	√			√			

16.3 Interdisciplinary Interactions

The principal interactions requiring information exchange between the environmental specialists and the design team are summarised below. The assessment of impacts described in **Chapters 6 -16** have taken into account the interactions listed below.

16.4 Biodiversity

16.4.1 Construction Interactions

Biodiversity and Land, Soils and Hydrogeology

Exposed soils during the construction phase of the development may run-off into the Santry River during periods of heavy rain. This would have the potential to affect water quality and fauna species present in the river. The management measures outlined in the CEMP will ensure no pollution of the Santry stream. For reasons outlined in the AA Screening accompanying this planning application (Scott Cawley, 2019) there will be no impacts on European sites in Dublin Bay as a result of surface water pollution arising from this proposed development.

Biodiversity and Water and Hydrology

There is potential for surface waters carrying silt and other pollutants to enter the Santry River. This would impact the water quality and fauna species present in the river. The mitigation measures outlined in the CEMP will ensure no pollution of the Santry River during the construction phase of the development. SUDS measures proposed as part of the development will prevent the pollution of the Santry River during the operational phase of the development. For reasons outlined in the AA Screening accompanying this planning application (Scott Cawley, 2019) there will be no impacts on European sites in Dublin Bay as a result of surface water pollution arising from this proposed development.

Foul waters will be produced as a result of this development. For reasons outlined in the AA Screening accompanying this planning application, there will be no impacts on European sites in Dublin Bay as a result of foul waters arising from this development.

Biodiversity and Noise and Vibration

Noise and vibration resulting from the construction phase of the development may cause disturbance to wildlife. No long-term impacts on wildlife are expected as a result of the proposed development due to the reasons outlined in **Chapter 6** (Biodiversity) of the EIAR including the existing high level of human activity associated with the existing retail centre.

Biodiversity and Landscape and Visual

Vegetation removal is proposed as part of the landscape management plan. The removal of dry meadows and hedgerow habitat will impact on birds, bats and other mammals within the subject lands. The mitigation measures (i.e. avoidance of vegetation clearance in the breeding bird season) proposed in the biodiversity chapter of the EIAR will reduce the negative impacts of the development on wildlife.

Proposed infilling of the drainage ditch on-site has the potential to impact on amphibian species. The mitigation measure (i.e. the amphibian check) proposed in **Chapter 6** (Biodiversity) the of the EIAR will prevent the accidental mortality of amphibians.

All potential cumulative effects and environmental interactions of the project's construction phase are included **in Chapter 16**. All mitigation measures for the project resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapter 16** and in the CEMP. Provided the prescribed mitigation measures as listed in the environmental chapters are employed during construction and/or operation, the overall impact to the environment, even considered in combination, is considered negligible.

16.4.1 Operational Interactions

Biodiversity and Noise and Vibration

Noise and vibration resulting from the operational phase of the development may cause disturbance to wildlife. No long-term impacts on wildlife are expected as a result of the proposed development due to the reasons outlined in **Chapter 6** (Biodiversity) of the EIAR including the existing high level of human activity associated with the existing retail centre.

Biodiversity and Landscape and Visual

All potential cumulative effects and environmental interactions of the project's operational phase are included **in Chapter 16**. All mitigation measures for the project resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapter 16** and in the CEMP. Provided the prescribed mitigation measures as listed in the environmental chapters are employed during construction and/or operation, the overall impact to the environment, even considered in combination, is considered negligible.

16.5 Land, Soils and Hydrogeology

16.5.1 Construction Interactions

Land, Soils and Hydrogeology and Biodiversity

Earthworks involving removal of trees and hedgerows has the potential to impact on habitats. The removal of trees, hedges and thicket will result in habitat fragmentation of the hedgerow and reduce its suitability to support fauna. Therefore, the development is predicted to result in a permanent significant impact on hedgerows at a local scale.

Best practice mitigation measures are proposed for the construction phase of the proposed development which will ensure runoff from exposed ground and construction areas does not affect surface water resources and aquatic biodiversity.

Land, Soils and Hydrogeology and Air Quality and Climate

The construction activities will generate dust which will have an impact on air quality. The impacts of dust which are found to be short-term and not significant and proposed mitigation measures are discussed in **Chapter 9** Air Quality and Climate.

Land, Soils and Hydrogeology and Noise and Vibration

The activities associated with the land and soil environment (earthworks) will contribute to the noise emission from the site. These activities have been considered and are presented in the noise assessment in **Chapter 10** (Noise and Vibration). It is concluded that noise generated during construction shall be below those levels considered to be acceptable.

Land, Soils and Hydrogeology and Cultural Heritage

Information on the depths of earthworks and excavations were provided to the Cultural Heritage specialist to assist in determining the likelihood of unearthing buried archaeology during construction works. The assessment of the impact is presented in **Chapter 11 (**Cultural Heritage). There are no extant remains for any of the archaeological monuments and features located within, or in the immediate environs of, the subject development area and, consequently, it is not considered that development, as proposed, will cause any direct impacts to any previously identified archaeological monuments. A number of mitigation measures are set out to address any archaeological features which may be uncovered in construction.

Land Soils & Hydrogeology and Material Assets - Traffic

Soil excavation will influence the traffic volumes entering and leaving the site during construction. The impacts of the construction phase traffic are discussed in **Chapter 13** (Material Assets: Traffic and Transport) and it is found that the construction traffic generated during the Construction Phase tends to be outside of peak hours and shall be lower than the peak hour predicted volumes for the Operational Phase.

Land Soils & Hydrogeology and Material Assets – Waste Management

Surplus soil arising from excavation that cannot be reused on site will require disposal. The impacts of the disposal of surplus soils and potentially contaminated soils are assessed in **Chapter 7** (Land, Soils and Hydrogeology) and residual impacts are projected to be neutral.

Land Soils and Hydrogeology and Material Assets

Geological Heritage site assessments are required for the assessment of impacts on Material Assets. There are no impacts on geological heritage predicted.

16.6 Water and Hydrology

16.6.1 Construction and Operation Interactions

Water and Hydrology and Biodiversity

The proposed development will interact with the water environment by discharging surface water runoff to the surface water network. Discharges of wastewater will be to the public sewer. An adverse impact to surface water quality during either the construction or operational phases has the potential to cause impacts on aquatic biodiversity. The water quality and SUDS mitigation measures that will be put in place on-site during construction and operational phases will ensure that the impact of the development on water is insignificant.

The water specialist provided details on the discharges and impacts on water quality to assist the Biodiversity specialist in his assessment. The impacts on Biodiversity are presented in **Chapter 6 Biodiversity** and no significant impacts on water quality are identified.

16.7 Air Quality and Climate

16.7.1 Operation Interactions

Air Quality and Climate and Population and Human Health

In relation to interactions between air quality and human health during the operational phase, the results of the quantitative assessment conducted to assess the air quality and climate impacts from changes in traffic flows during the operational phase of the assessment demonstrate that the impacts will be long-term and imperceptible. Results show that concentrations of ambient air pollutants with the proposed development in place will be compliant with all ambient air quality limit values which are based on the protection of human health.

Air Quality and Climate and Traffic and Transportation

The most significant interaction with respect to air quality and climate is with respect to traffic and transportation. Traffic data for the local road links affected by the proposed development for the opening and design years was provided for both the Do Nothing and Do Something Scenarios. This information has been used as an input for the air quality and climate assessment of the operational phase of the proposed development. The results of this assessment predict that the impacts to air quality and climate from a change in traffic flows as a result of the proposed development will be long-term and imperceptible.

16.7.2 Construction

Air Quality and Climate and Population and Human Health

Interactions between air quality and human beings (population and human health) are also considered. An adverse impact to air quality during either the construction or operational phases has the potential to cause health impacts and dust nuisance issues. The dust mitigation measures that will be put in place on-site during construction will ensure that the impact of the development complies with all ambient air quality legislative limits and therefore the predicted impact is short-term and imperceptible with respect to air impacts on human health during the construction phase.

16.8 Noise and Vibration

16.8.1 Construction and Operation Interactions

Noise and Vibration and Material Assets (Transport)

Construction traffic will have the potential for noise and vibration impacts. The Noise & Vibration chapter has been prepared in close co-operation with the traffic consultant and potential noise and vibration impacts in respect of construction traffic are assessed in **Chapter 10** (Noise and Vibration). The noise impact assessment concludes that the construction traffic noise level increases associated with the proposed development will be imperceptible at the nearest noise sensitive properties. The traffic levels associated with the operational phase will be substantially lower than any levels of traffic that could contribute to increasing the road traffic noise in the study area and hence there will be a negligible noise impact.

Noise and Vibration and Material Assets: Built Services

Services noise associated with the building services has a potential to impact on existing noise sensitive locations and new noise sensitive locations that will be built as part of this development. traffic will have the potential for noise and vibration impacts. Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria included in the noise and vibration chapter (i.e. 40dB $L_{Aeq,15min}$ at noise sensitive locations within the proposed development itself) is achieved within the development it is expected that there will be no negative impact at sensitive receivers off site, and therefore no further mitigation required.

Noise and Vibration and Population and Human Health

Construction noise and vibration may have an impact on sensitive locations in the vicinity. Residents and Landowners will be consulted with throughout the project and mitigation to prevent these potential impacts is included in **Chapter 10** (Noise and Vibration). The application of noise limits and limits on the hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum. Due to the distance between the site and the nearest sensitive locations, vibration impacts generated during construction are expected to be negligible. Construction noise and vibration will be typically limited to daytime periods only. In terms of health effects these are typically associated with long term exposure to elevated levels of noise and/or vibration which will not be the case in relation to construction sources which would be expected to be the order of or below existing ambient levels in the vicinity of the site for the vast majority of the construction period. There are no health risks associated with operational noise resulting from the construction of the development subject to implementation of good site management practices and mitigation measures as required, as outlined in the relevant sections of the noise assessment and referenced documents.

In essence, the noise levels from the proposed development on a day to day basis at the nearest noise sensitive locations are predicted to be within relevant noise criteria that have been adopted here. The noise limits at the nearest noise sensitive locations are set in line with EPA NG4 (2016) guidelines and those espoused by the WHO *Guidelines for Community Noise (WHO 1999)* document in order to avoid any daytime annoyance or speech interference and/or night time sleep disturbance, etc. Taking the above into consideration, operational noise from the development will be deigned to be below the adopted criteria that are based on the thresholds below which, there is no evidence of significant effects in relation long-term

exposure to noise on human health. There are no health risks associated with operational noise resulting from the development.

The proposed development will not generate any perceptible levels of vibration during operation and therefore there will be no impact from vibrations on human health.

16.9 Cultural Heritage

16.9.1 Construction and Operation Interactions

All environmental interactions of the project's construction and operational stages are included in **Chapter 16**. All mitigation measures for the project resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapters 6 - 16** and the CEMP. Provided the suggested mitigation measures as listed in the environmental chapters are employed during construction and/or operation the overall impact to the environment, even considered in combination, is considered negligible.

16.10 Landscape and Visual

16.10.1 Construction and Operation Interactions

All potential environmental interactions of the project's construction and operational stages are included in **Chapter 16**. All mitigation measures for the project resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapters 6 - 16** and the CEMP. Provided the suggested mitigation measures as listed in the environmental chapters are employed during construction and/or operation the overall impact to the environment, even considered in combination, is considered negligible.

16.11 Material Assets: Traffic and Transport

16.11.1 Construction and Operation Interactions

Material Assets Transport and Land & Soils

Soil excavation will influence the traffic volumes entering and leaving the site during the construction phase. This has been considered in the traffic assessment and mitigation in the form of a traffic management plan (to be agreed with FCC's Roads Department) is proposed. There will be minor impacts on the safety or operation of the road network as a result of the construction phase of the proposed development. Having consideration for the mitigation measures outlines above, any impacts during the construction phase will be negligible.

Material Assets: Traffic and Transport and Air Quality and Climate

The future traffic volumes were required to predict the associated change in the air quality. The change in air quality was assessed against standard thresholds required to avoid impacts on public health. The impacts of traffic on air quality and proposed mitigation measures are discussed in **Chapter 9** (Air Quality and Climate). The results of this assessment predict that the impacts to air quality and climate from a change in traffic flows as a result of the proposed development will be long-term and imperceptible.

Material Assets: Traffic and Transport and Noise and Vibration

The future traffic volumes were reviewed to predict the noise levels during construction and operation. These predicted traffic volumes were input to the noise model to predict the future noise levels. The noise impacts and proposed mitigation are discussed in **Chapter 10** (Noise and Vibration). The noise impact assessment concludes that the construction traffic noise level increases associated with the proposed development will be imperceptible at the nearest noise sensitive properties. The traffic levels associated with the operational

phase will be substantially lower than any levels of traffic that could contribute to increasing the road traffic noise in the study area and hence there will be a negligible noise impact.

Material Assets Transport and Population and Human Health

There will be a potential nuisance to the local population resulting from possible traffic delays due to increased traffic. Changes in air quality due to increase in traffic have the potential to impact human health. These impacts are discussed in the **Chapter 13** (Material Assets: Traffic and Transport) and **Chapter 9** (Air Quality and Climate).

The predicted impact is short-term and imperceptible with respect to air impacts on human health during the construction phase. Results show that concentrations of ambient air pollutants with the proposed development in place will be compliant with all ambient air quality limit values which are based on the protection of human health.

All potential cumulative effects and environmental interactions of the project's construction and operational stages are included in **Chapter 16**. All mitigation measures for the project resulting from the individual assessments, and the cumulative effects and environmental assessment are listed in detail in **Chapter 16 Summary of Mitigation Measures** and the CEMP. Provided the suggested mitigation measures as listed in the environmental chapters are employed during construction and/or operation the overall impact to the environment, even considered in combination, is considered negligible.

16.12 Population and Human Health

16.12.1 Construction Interactions

16.12.1.1 Water and Hydrology

Provision of water infrastructure for the proposed development would involve construction activities within the subject lands. Provided that the proposed remedial or reductive measures as set out in **Chapter 8 (Water and Hydrology)** of this EIAR are implemented, the impact of the proposed development during the construction stage will be of a temporary nature and will be minimised. Therefore, the impact on human health and population in this regard is considered to be insignificant.

A number of mitigation measures are outlined in **Chapter 8** (Water and Hydrology). An Outline CEMP which details mitigation measures for the above issues has been prepared JB Barry & Partners Consulting Engineers and is included under separate cover.

16.12.1.2 Traffic and Accessibility

The increase in traffic flows because of the construction of the site is considered negligible compared to the existing traffic and is not predicted to give rise to adverse impacts for the existing residential or working community in the area. There will be no change to site access, no change to existing road alignments, layout and sight lines of the site traffic

Potential impacts in respect of traffic are examined further in the respective sections of this EIAR and are not considered to be of a magnitude, duration or timing to impact on health and are not considered significant.

As set out in **Chapter 13** (Material Assets: Traffic and Transport) a construction traffic management plan will include measures to safeguard safety and prevent traffic hazard.

16.12.1.3 Noise and Vibration

During the construction phase there will be extensive site works, involving construction machinery, construction activities on site, and construction traffic, which will all generate noise. The highest noise levels will be generated during the general construction activities. The closest noise sensitive locations to the main building works will be the residential units to the east of the site which are at a distance of approximately 60m from the potential construction works.

During periods when construction works are occurring at distances of up to 30m from the nearest noise sensitive locations to the site boundary, there is potential for temporary, negative, moderate to significant noise impacts to occur.

Mitigation measures with respect to noise emissions are detailed in **Chapter 10** (Noise and Vibration).

16.12.1.4 Air Quality and Climate

During the construction phase, site clearance and ground excavation works have the potential to generate dust emissions rising from the operation and movement of machinery on site. This has a potential impact on population and human health.

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short- term and imperceptible with respect to human health.

Mitigation measures with respect to air quality and climate are detailed in **Chapter 9** (Air Quality and Climate).

16.12.1.5 Landscape and Visual Impact

The construction phase will have short term landscape and visual impacts. The impacts are not considered significant on population and human health, particularly given the level of screening to site boundaries and the setting back of the main residential elements of the scheme from land uses.

16.12.2 Operational Interactions

16.12.2.1 Water and Hydrology

The impact of the operational phase of the proposed development on the public water supply will increase the demand on the existing supply. The estimated peak demand from the development will be 11.4 l/s.

The foul and storm sewer networks will be on the separate systems. No foul effluent will discharge to the storm water system.

SUDS will be implemented in accordance with the recommendations of the GDSDS and Fingal County Council requirements. In addition, The *Planning System and Flood Risk Management Guidelines for Planning Authorities* will be adhered to. The quality of the surface water run-off will also improve as a result of the SUDS measures.

The potential impact on population and human health in this regard is considered to be insignificant.

16.12.2.2 Noise and Vibration

The main potential for altering the noise environment once the development is operational, and thus impacting neighbouring residential receptors, is road traffic noise associated with the development as a result of increased movements on the site. However, in the context of the existing noise environment, the overall contribution of induced traffic is considered to be of neutral, imperceptible and long term impact to nearby residential locations.

Noise levels associated within building services plant are expected to be well within the adopted day and night time noise limits at the nearest noise sensitive properties taking into account the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels for not exceed the adopted design goals, the resultant residual noise impact from this source will be neutral, imperceptible, long term impact.

16.12.2.3 Air Quality and Climate

The operational phase of the proposed development will result in a slight impact on local air quality primarily as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results, emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health, as stated in **Chapter 9** (Air Quality and Climate).