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PROJECT: Strategic Housing Development

Environmental Impact Assessment Report

Volume II

for proposed development at

Santry Avenue & Swords Road, Santry, Dublin 9.

CLIENT: Dwyer Nolan Developments Ltd

DATE: 16|07|21

Planning &
Development
Consultants

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PART A - Introduction and Background

1.0. Introduction

1.1 Introduction

1.1.1. This Environment Impact Assessment Report (EIAR) has been prepared by Armstrong Fenton Associates Planning Consultants on behalf of Dwyer Nolan Developments Ltd. who intend to apply to An Bord Pleanála for a Strategic Housing Development (SHD) on lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The application is being made under the Planning and Development Act 2000 as amended by the Strategic Housing Provisions of the Planning and Development (Housing) and Residential Tenancies Act, 2016. This chapter of the EIAR was prepared by Bryan Meredith BA, MRUP, MRTPI, MIPI, of Armstrong Fenton Associates Planning Consultants.

1.1.2. The application site comprises c. 1.5 hectares located on lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (Ref.s 2713/17 & 2737/19) and to the west by the Santry Avenue Industrial Estate.

1.1.3. The proposed site is currently occupied by the Chadwicks (formerly Heiton Buckley) builder's providers in a large industrial type building and associated yard.

1.1.4. The proposed application represents the development of an area, identified within the current Dublin City Development Plan 2016-2022. Within the City Development Plan (hereafter CDP) the subject site is zoned objective Z3 Neighbourhood Centres: *"To provide for and improve neighbourhood facilities".* Permitted uses under the *"Z3"* land use zoning objective include *inter alia* childcare facility, community facility, cultural/recreational building and uses, enterprise centre, live-work units, medical and related consultants, office (max 300sq.m), open space, primary health care centre, residential, restaurant, shop (neighbourhood), training centre. (Emphasis added by Armstrong Fenton Associates – hereafter AFA)

1.1.5. The CDP was accompanied by a Strategic Environmental Assessment (SEA) and Appropriate Assessment (hereafter AA) Screening Report. In the above context, the Environmental Impact Assessment (EIA) of this project is undertaken against a background of a significant amount of environmental information and assessment which informed the preparation of the CDP and its approval by Dublin City Council (hereafter DCC).

1.1.6. The EIA process, including the preparation of this EIAR and the examination of the information presented by DCC, will inform the decision-making process. The purpose of this EIAR is to assist and inform An Bord Pleanála (hereafter ABP), as the competent authority, in undertaking an environmental assessment of this project.

Therefore, the objectives of this EIAR are summarised as follows:-

- To identify the significant environmental impacts of the proposed development during the construction and operational phases having regard to the characteristics of the receiving environment.
- To evaluate the magnitude and significance of these impacts and propose appropriate measures to mitigate potential adverse impacts.
- To identify, where appropriate, monitoring measures to be implemented during the construction and operational phases.

The nature and extent of the development being assessed is outlined in Chapter 3 of this EIAR and summarised in Section 1.2 below. This EIAR is prepared with reference to the plans and particulars submitted with the planning application.

1.2. Proposed Development

1.2.1. Dwyer Nolan Developments Ltd. intends to apply to An Bord Pleanála for permission for a strategic housing development, on a site of c. 1.5 hectares, located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the west by Santry Avenue Industrial Estate, and to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19).

1.2.2. The proposed development provides for 350 no. apartments, comprised of 113 no. 1 bed, 218 no. 2 bed, & 19 no. 3 bed dwellings, in 4 no. seven to fourteen storey buildings, over basement level, with 5 no. retail / commercial units and a community use unit located at ground floor level facing onto Santry Avenue and Swords Road. A one storey residential amenity unit, facing onto Santry Avenue, is also provided for between Blocks A & D.

The development consists of the following:

Demolition of the existing building on site i.e. the existing Chadwicks Builders Merchants (c. 4,196.8m^2).

Construction of 350 no. 1, 2, & 3 bed apartments, retail / commercial and community uses in 4 no. buildings that are subdivided into Blocks A-G as follows:

- Block A is a 7 to 14 storey block consisting of 59 no. apartments comprised of 26 no. 1 bed & 33 no. 2 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 132.4m^2 & 173m^2 respectively). Adjoining same is Block B, which is a 7 storey block consisting of 38 no. apartments comprised of 6 no. 1 bed, 20 no. 2 bed, & 12 no. 3 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 162.3m^2 & 130.4m^2 respectively). Refuse storage areas are also provided for at ground floor level.

- Block C is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. Refuse storage areas are provided for at ground floor level. Adjoining same is Block D which is a 7 to 10 storey block consisting of 51 no. apartments comprised of 25 no. 1 bed, 19 no. 2 bed, & 7 no. 3 bed dwellings, with 1 no. commercial unit / café located on the ground floor (c. 163.3m^2). A refuse storage area is also provided for at ground floor level.

- Block E is a 7 to 10 storey block consisting of 58 no. apartments comprised of 10 no. 1 bed & 48 no. 2 bed dwellings, with 1 no. community use unit located on the ground floor (c. 188.1m^2). A refuse storage area, substation, & switchroom are also provided for at ground floor level. Adjoining same is Block F which is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

- Block G is a 7 storey block consisting of 34 no. apartments comprised of 20 no. 1 bed & 14 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

Construction of a 1 storey residential amenity unit (c. 187.9m^2) located between Blocks A & D.

1.2.3. Construction of basement level car parking (c.5,470.8m^2) accommodating 173 no. car parking spaces & 719 no. bicycle parking spaces. Internal access to the basement level is provided from the cores of Blocks A, B, C, D, E, & F. External vehicular access to the basement level is from the south, between Blocks B & C. 36 no. car parking spaces & 58 no. bicycle parking spaces are also provided for within the site at surface level.

1.2.4. Public open space of c. 1,915m^2 is provided for between Blocks C, D, E, & F. Communal open space of c. 3,122m^2 provided for between (i) Blocks E, F, & G, (ii) Blocks A, B, C, & D, and (iii) in the form of roof gardens located on Blocks A, C, & F and the proposed residential amenity use unit. The development includes for hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels.

1.2.5. Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).

1.2.6. The development includes for all associated site development works above and below ground, bin & bicycle storage, plant (M&E), sub-stations, public lighting, servicing, signage, surface water attenuation facilities etc.

1.3. Definition of EIA and EIAR

1.3.1. Directive 2014/52/EU defines *'environmental impact assessment'* as a process which includes the responsibility of the developer to prepare an EIAR and the responsibility of the competent authority to provide reasoned conclusions following the examination of the EIAR and other relevant information.

1.3.2. Article 1(2)(g) 4 of Directive 2014/52/EU states that "environmental impact assessment" means a process consisting of:

"(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

The amended Directive (Directive 2014/52/EU) uses the term environmental impact assessment report (EIAR) rather than environmental impact statement (EIS).

1.3.3. A definition of EIAR has not been included in the revised directive however the EPA Guidelines (2017) provide the following definition:

"A statement of the effects, if any, which proposed development, if carried out, would have on the environment.

The EIAR is prepared by the developer and is submitted to a CA (Competent Authority) as part of a consent process. The CA uses the information provided to assess the environmental effects of the project and, in the context of other considerations, to help determine if consent should be granted. The information in the EIAR is also used by other parties to evaluate the acceptability of the project and its effects and to inform their submissions to the CA.

The EIAR consists of a systematic analysis and assessment of the potential effects of a proposed project on the receiving environment. The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and these factors must be addressed in the EIAR.

The EIAR should be prepared at a stage in the design process where changes can still be made to avoid adverse effects. This often results in the modification of the project to avoid or reduce effects through redesign".

1.3.4. In summary, EIA is a process for anticipating the effects on the environment caused by development. An EIAR is the document produced as a result of that process and provides information which the competent authority uses in deciding whether or not to grant consent. Where significant and likely environmental effects are identified that are unacceptable; the EIA process aims to quantify and minimise the impact specified development projects have on the environment through appropriate mitigation measures. The preparation of an EIAR document requires site-specific considerations and the preparation of baseline assessment against which the likely impacts of a proposed development can be assessed by way of a concise, standardised and systematic methodology.

1.4. EIA Legislation

1.4.1. 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/EC (as amended by Council Directive 97/11/EC, Directive2003/4/EC, Directive 2009/31/EC, Directive 2011/92/EU and recently Directive 2014/52/EU which amends EIA law in a number of respects by amending Directive 2011/92/EU) which are designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given.

1.4.2. Article 2 of Directive 2014/52/EU provides that Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive by 16th May 2017.

1.4.3. The Department of Housing, Planning, and Local Government brought forward amendments to the Planning and Development Act 2000, as amended, and the Planning and Development Regulations, to provide for the transposition of the Directive into the Irish planning code. To this effect, the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 have now transposed the 2014 Directive into Irish law.

1.4.4. The Department has also provided an update to the 2018 *"Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment"* to provide practical guidance on legal and procedural issues arising from the requirement to undertake EIA in accordance with Directive 2014/52/EU. These new Guidelines were published in August 2018. These Guidelines have informed the preparation of this EIAR. The 2017 draft guidelines prepared by the EPA have also informed this EIAR.

1.5. EIA Guidelines

1.5.1. EIA practice has evolved substantially since the introduction of the EIA Directive in 1985. Practice continues to evolve and takes into account the growing body of experience in carrying out EIAs in the development sector. The relevant key EIA Guidance which has been consulted in the preparation of this EIAR document is detailed below. In addition, the individual chapters of this EIAR should be referred to for further information on the documents consulted by each individual consultant.

Irish Guidance

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018.
- Draft Guidelines on the information to be contained in environmental impact assessment reports, EPA, August 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).
- Development Management Guidelines (DoEHLG, 2007).
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003).
- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003).
- Guidelines on Information to be Contained in an Environmental Impact Statement (EPA 2002).

European Union / European Commission Guidance (in addition to Directives referenced above)

- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (2017).
- Environmental Impact Assessment of Projects – Guidance on Screening (2017).
- Environmental Impact Assessment of Projects – Guidance on Scoping (2017).
- Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).
- EU Guidance on EIA Screening (DG Environment 2001).
- Guidance on EIA Scoping (DG Environment 2001).
- EIA Review Checklist (DG Environment 2001).

The most recent guidelines are the August 2018 EIA Guidelines for Planning Authorities and An Bord Pleanála, which replace previous Guidelines for Planning Authorities and An Bord Pleanála on carrying out environmental impact assessment published in March 2013.

1.5.2. The 2017 EPA draft guidelines were prepared to help practitioners interpret the amended EIA Directive and in advance of new regulations transposing Directive 2014/52/EU becoming available. They provide practical guidance to planning authorities, An Bord Pleanála, and other relevant stakeholders, on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU. Updated guidelines from the EPA will now be published following the transposition of the 2014 Directive via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). This updated EPA guidance had not yet been published at time of writing.

1.6. The EIA Process

1.6.1. The main purpose of the EIA process is to identify the likely significant impacts on the human environment, the natural environment and on cultural heritage associated with the proposed development, and to determine how to eliminate or minimise these impacts. The EIAR summarises the environmental information collected during the impact assessment of the proposed development.

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

- Screening
- Scoping
- Assessing Alternatives
- Assessing and Evaluating

Screening: Screening is 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. Consideration of alternative sites and layouts within the final chosen site are set out in Chapter 3 of this EIAR.

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.

1.7. Screening

1.7.1. 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.

Annex I of the EIA Directive 85/337/EC requires as mandatory the preparation of an EIA for all development projects listed therein. Schedule 5 (Part 1) of the Planning & Development Regulations 2001-2018 transposes Annex 1 of the EIA Directive directly into Irish land use planning legislation. The Directive prescribes mandatory thresholds in respect to Annex 1 projects.

Annex II of the EIA Directive provides EU Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of project having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

The proposed development falls below the threshold for a mandatory EIAR. The subject proposal comprises 350 no. dwellings and is on a site of less than 10 hectares. Therefore, a mandatory EIA is not required. However, when assessed in conjunction with neighbouring developments i.e.:

- directly to the south (permitted under Dublin City Council Ref. 2737/19. i.e. named Santry Place),
- lands to the northeast of Omni Park Shopping Centre (permitted under An Bord Pleanála Ref. 307011) and
- south-east (permitted under An Bord Pleanála Ref. 303358-19 and Ref. 306987 i.e. Swiss Cottage) of the application lands;

the Applicant is cognisant of the cumulative impacts which the permitted and proposed developments may have and as such has prepared this EIAR to accompany their planning application in order to allow for a comprehensive assessment of the proposed development.

1.7.2. The proposed SHD planning application subject to this EIAR comprises of, *inter alia,* 350 no. residential dwellings, a community use hub, a residential amenity space, 5 no. commercial / retail units, open spaces and associated infrastructure on a site of c. 1.50 hectares.

1.8. Scoping

1.8.1. The 2017 EPA Guidelines state that *'Scoping'* is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is stated in the European Commission guidance[1] that: *'The Directive provides that Developers may request a Scoping Opinion from the Competent Authority which identifies the content and the extent of the assessment and specifies the information to be included in the EIA Report."*

1.8.2. The applicant is committed to ensuring that all their development is conducted in a responsible and sustainable manner. 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.

1.8.3. As set out within the 2018 EIA Guidelines published by the Department of Housing, Planning and Local Government, Section 7 of the Planning and Development (Housing) and Residential Tenancies Act 2016 and Planning and Development (Strategic Housing Development) Regulations 2017 allow for a prospective applicant to make a request to An Bord Pleanála for an EIA scoping opinion in regard to a proposed Strategic Housing Development (SHD). Such requests are discretionary.

1.8.4. The EIAR prepared for the subject application has endeavoured to be as thorough as possible and therefore the provisions included in the revised EIA Directive and all of the issues listed in Schedule 6, Sections 1, 2 and 3 of the Planning and Development Regulations 2001-2018 and in recent guidance

[1] Guidance on EIA Scoping, EC, 2017

documents have been addressed in the EIAR. In this context the following topics/issues have been reviewed and addressed in the context of the proposed development:

- Introduction,
- Planning Context,
- Project Description and Alternatives Examined,
- Population and Human Health,
- Archaeology and Cultural Heritage,
- Biodiversity,
- Landscape and Visual Impact,
- Land and Soils,
- Water,
- Air Quality and Climate,
- Noise and Vibration,
- Material Assets,
- Interactions,
- Principle Mitigation and Monitoring Measures,
- Non-Technical Summary.

1.8.5. In addition to the above, a series of standalone reports have been prepared to accompany the planning application. DBFL Consulting Engineers have prepared an Engineering Services Report, Construction and Environmental Management Plan, Site Specific Flood Risk Assessment, Traffic and Transport Assessment Report, a Mobility Management Plan. Enviroguide Consulting has prepared an Appropriate Assessment (AA) Screening Report. Archaeology Plan has prepared an Archaeological Assessment. Ash Ecology and Environmental have prepared a Bat Survey Report. Armstrong Fenton Associates have prepared a Building Life Cycle Report and Property Management Strategy Report while the enclosed Construction and Demolition Waste Management Plan and Operational Waste Management Plan has been prepared by AWN Consulting Ltd. These reports have helped inform the chapters of the EIAR where relevant and are submitted as separate documents also.

1.8.6. It is necessary to examine each section of this EIAR with respect to the impacts that the proposed development may have on the environment. The purpose of this scoping exercise is to shape and mould the EIAR so as not to dismiss any potential impacts that may in fact be significant, and to focus on issues which need to be resolved.

1.8.7. The scope of this EIAR has been informed by the following:

- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018.

- Draft Guidelines on the information to be contained in environmental impact assessment reports (EPA, 2017).

- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (EC, 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, 2001-2018.
- The requirements of the Dublin City Development Plan 2016-2022.
- National and Regional 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.
- Available methods of reducing or eliminating undesirable impacts.

1.8.8. Prior to the submission of the SHD application to ABP, numerous meetings took place between the applicant and the technical staff of DCC. One no. pre-application consultation also took place between the Applicant, the Planning Authority and ABP under the SHD process which assisted in the preparation of this EIAR and planning application.

1.8.9. 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. Article 5(1) states:

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

Annex IV states:-

> *"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;

(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;

(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.

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.

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.

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), 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;

(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

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

(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;
(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;

(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.
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.

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.

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.

9. A non-technical summary of the information provided under points 1 to 8.

10. A reference list detailing the sources used for the descriptions and assessments included in the report."

1.9. Purpose of the EIAR

1.9.1. The objective of the EIAR is to:

- identify and predict the likely environmental impacts of the proposed development;
- to describe the means and extent by which they can be reduced or ameliorated;
- to interpret and communicate information about the likely impacts, and
- to provide an input into the decision making and planning process.

As provided for in the EPA 2017 guidelines, the EIAR focuses on:

- Impacts that are both likely and significant;
- Impact descriptions that are accurate and credible.

1.9.2. The objective of the EIAR will also be to identify and predict the likely environmental impacts of the proposed development; to describe the means and extent by which they can be reduced or ameliorated; to interpret and communicate information about the likely impacts; and to provide an input into the decision making and planning process.

The definition of Environmental Impact Assessment is clarified within the 2014 EIA Directive and is as

follows:

"(g) 'environmental impact assessment' means a process consisting of:

(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2);

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7;

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7;

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

1.9.3. Under Article 5(3) of the 2014 Directive, it is specifically required that the developer must ensure that the environmental impact assessment report is prepared by competent experts. Each chapter of this EIAR has been prepared by experts with the requisite qualifications and competences which are detailed in each relevant chapter.

1.9.4. The intention of this EIAR document is to provide transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes which led to the selection of the final project configuration. The EIAR documents the consideration of environmental effects that influenced the evaluation of alternatives. It also documents how the selected project design incorporates mitigation measures; including impact avoidance, reduction or amelioration; to explain how significant adverse effects will be avoided.

1.10. Objectives of this EIAR

1.10.1 The EPA guidelines list the following fundamental principles to be followed when preparing an EIAR:

- Anticipating, avoiding and reducing significant effects
- Assessing and mitigating effects
- Maintaining objectivity
- Ensuring clarity and quality
- Providing relevant information to decision makers
- Facilitating better consultation

1.10.2 This EIAR document describes the outcomes of the iterative EIA process which was progressed in parallel with the project design process. This forms the first part of the EIA process which will be completed by the competent authority, which in turn will be required to examine, analyse and evaluate the direct and indirect effects of the development on the various factors listed under Section 171A of the Planning and Development Act 2000, (as amended).

1.10.3 The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and the environmental impact assessment should identify, describe and

assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the prescribed environmental factors which are:

(a) population and human health
(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC
(c) land, soil, water, air and climate
(d) material assets, cultural heritage and the landscape
(e) the interaction between the factors referred to in points (a) to (d)

This EIAR documents the assessment process of the prescribed environmental factors in relation to the proposed SHD residential development on lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9.

1.10.4 The EIA process was based on the following four key objectives:

i. Pursuing Preventative Action
ii. Maintaining Environmental Focus and Scope
iii. Informing the Decision
iv. Public & Stakeholder Participation

i. Pursuing Preventative Action

Pursuing preventative action is the most effective means by which potential negative environmental impacts can be avoided. An assessment of anticipated likely and significant impacts was undertaken during the screening, informal scoping and the considerations of alternatives stages of the EIA process. This involved forming a preliminary opinion, in the absence of complete data, with respect to the approximate magnitude and character of the likely environmental impacts. This assessment was based on the knowledge, experience and expertise of the EIA and project design team with reference to the amended EIA Directive, EIA guidance material and local precedents.

Avoidance of impacts has been principally achieved through the consideration of alternatives and through the review of the project design in light of identified key environmental constraints. This is outlined in greater detail in Chapter 3.

ii. Maintain Environmental Scope and Focus

It is 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 has 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
- Have significant and adverse effects

iii. Informing the Decision

The EIAR document enables the competent/consenting authorities to reach a decision on the acceptability of the proposed development in the full knowledge of the project's likely significant impacts on the environment, if any.

iv. Public & Stakeholder Participation

Decisions are taken by competent/consent authorities through the statutory planning process which allows for public participation and consultation while receiving advice from other key stakeholders and statutory authorities with specific environmental responsibilities.

Public participation and consultation is an integral part of the new Strategic Housing Development process as outlined in the Planning and Development (Housing) and Residential Tenancies Act 2016, as amended, and the Planning and Development (Strategic Housing Development) Regulations 2017.

The structure, presentation and the non-technical summary of the EIAR document, as well as the arrangements for public access, all facilitate the dissemination of the information contained in the EIAR. The core objective is to ensure that the public and local community are aware of the likely environmental impacts of projects prior to the granting of consent.

Informal scoping of potential environmental impacts was undertaken with the Planning Authority through pre application meetings. Direct and formal public participation in the EIA process will be through the statutory planning application process under the new Strategic Housing Development procedures.

1.10.5 To surmise, it is the intention of this EIAR document is to provide transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes which led to the selection of the final project configuration. The EIAR documents the consideration of environmental effects that influenced the evaluation of alternatives. It also documents how the selected project design incorporates mitigation measures; including impact avoidance, reduction or amelioration; to explain how significant adverse effects will be avoided.

It is intended that this EIAR will assist ABP, statutory consultees and the public in assessing all aspects of the proposed development.

1.11. Structure Methodology

1.11.1. Structure of the EIAR

The overall structure and scope of this EIAR has regard to the information required by the EU/EC Directives, Statutory Regulations and relevant environmental guidelines prepared by the Environmental Protection Agency (EPA). The EIAR has been written and illustrated with figures in a manner which, insofar as possible, is intended to be understandable to the public generally. A Non-technical Summary has been prepared in accordance with the statutory regulations and is submitted as a separate document to this EIAR. The appendices to this EIAR contain background and technical details relating to the project and are referred to in the relevant Chapters.

The structure used in this EIAR is a Group Format structure. This structure examines each environmental topic in a separate section of the EIAR document. The Chapter Headings reflect the broadened scope of

the environmental factors introduced by the 2014 Directive.

1.11.2. Contributors

This EIAR has been prepared on behalf of the developer by a design team of qualified experts, as required by Article 5(3) of Directive 2014/52/EU. The contributor involved in the preparation of this EIAR is identified at the beginning of each Chapter and in Table 1.2 of Section 1.11 of this EIAR.

1.11.3. Methodology

A systematic approach is employed using standard descriptive methods, replicable prediction techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration. An outline of the methodology used to ensure consistency in each chapter of this EIAR and to examine each environmental topic is detailed in Table 1.1 below.

Section	Description
Introduction	Provides an overview of the specialist area and specifies the specialist who prepared the assessment.
Study Methodology	Outlines the method by which the relevant assessment of the development impacts has been conducted within that chapter.
Baseline Situation	Describes and assesses the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the proposed development will fit.
Construction Impacts and Mitigation	Describes the specific, direct and indirect impacts that may arise during the construction phases of the development. A description of the appropriate mitigation measures either practicable or reasonable is also provided in this section
Operational Impacts and Mitigation	Focuses on the operational phase of the proposed development and describes the specific, direct and indirect impacts that may arise together with appropriate mitigation measures.
Do Nothing Impact	Describes a scenario in which the development does not proceed and the environment would not change as a result.
Monitoring	Describes the monitoring of the development in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring proposed is proportionate to the nature, location and size of the project and

	the significance of its effects. This involves a description of monitoring in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring, along with the methods and the agencies that are responsible for such monitoring. The level of monitoring proposed is proportionate to the nature, location and size of the project and the significance of its effects.
Reinstatement	While not applicable to every aspect of the environment considered within the EIAR, certain measures need to be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact on the environment.
Interactions	Where applicable, the assessment refers to impact interactions, including potential indirect, secondary and cumulative impacts.
Difficulties encountered	Where applicable, any difficulties encountered by the environmental specialist in compiling the required information are noted.

Table 1.5:1.1: EIAR Methodology Outline

1.11.4. Forecasting Methods

The individual forecasting methods used to assess the various effects of the proposed development on the environment are outlined in the relevant chapters of this EIAR under the subheading *'Assessment Methodology'*.

1.11.5. Difficulties Encountered

Some details of the project and the construction methodology/programme are matters which may be subject to change depending on the contractor(s) appointed and other considerations which are not finalised at this stage, and which cannot be finalised until a grant of planning permission for the proposed development has been issued.

These are matters which can be addressed prior to the commencement of development in consultation with the Planning Authority and other relevant stakeholders. Subject to these constraints in relation to the future development of the area, no other significant difficulties were encountered in the preparation of the EIAR. Any limitations or technical difficulties associated with assessment of an environmental factor are detailed in the relevant chapter.

1.11.6. Terminology

In accordance with the EPA Guidelines on the Information to be contained in Environmental Impact Statements (2002) and Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003), the following definitions are used in this EIAR. These definitions take account of the 2017 Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft) and the 2015 Advice Notes for preparing Environmental Impact Statements (Draft), prepared by the EPA: The quality of the effects is defined as:

Positive effects: A change which improves the quality of the environment (e.g. by increasing species diversity; or the improving reproductive capacity of an ecosystem, or removing nuisances or improving amenities).

Negative effects: A change which reduces the quality of the environment (e.g. lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Neutral effects: A change which does not affect the quality of the environment.

The significance of the effects is described as:

Imperceptible: An effect capable of measurement but without noticeable consequences.

Not significant: An effect which causes noticeable changes in the character of the environment but without noticeable 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 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 the majority of a sensitive aspect of the environment.

Profound effects: An effect which obliterates sensitive characteristics.

The magnitude of the effect is, where appropriate, indicated as:

Extent: Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.

Duration: Describe the period of time over which the effect will occur. (See further detail below)

Frequency: Describe how often the effect will occur. (Once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

Context: Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

The probability of the effect is, where appropriate, indicated as:

Likely Effects: The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.

Indeterminable Effects*:* When the full consequences of a change in the environment cannot be described.

'Worst case' **Effects:** The effects arising from a project in the case where mitigation measures substantially fail.

The duration of the effect is, where appropriate, indicated as:

Momentary Effects*:* Effects lasting from seconds to minutes

Brief Effects*:* Effects lasting less than a day

Temporary Effects: Effects lasting for one year or less.

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.

The type of effect is described, where appropriate, as:

Cumulative Effects: The addition of many small effects to create one larger, more significant, impact.

Do-nothing Effects: The environment as it would be in the future should no development of any kind be carried out.

Indeterminable Effects: When the full consequences of a change in the environment cannot be described.

Irreversible Effects: When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Residual Effects: The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Worst-case: The impacts arising from a development in the case where mitigation measures substantially fail.

Synergistic Effects: Where the resultant effects is of greater significance than the sum of its constituents.

Indirect Effects: Effects that arise off-site or are caused by other parties that are not under the control of the developer (such as a quarry)

Secondary Effects: Effects that arise as a consequence of a project (a new waste water treatment plant will reduce the yield of mussels in a nearby estuary)

1.11.7. Non-Technical Summary

A Non-Technical Summary of the EIAR has also been prepared. The EIA Directive states that one of the objectives of the EIA process is to ensure that the public are fully aware of the environmental implications of any decisions. The Draft EPA Guidelines note that the non-technical summary of the EIAR should facilitate the dissemination of the information contained in the EIAR and that the core objective is to ensure that the public is made as fully aware as possible of the likely environmental impacts of projects prior to a decision being made by ABP. A Non-Technical Summary of the EIAR has therefore been prepared which summarises the key environmental impacts and is provided as a separately bound document.

1.11.8. Links between EIAR and Appropriate Assessment

A Screening Report for Appropriate Assessment (AA) was carried out for the proposed development to determine if there is a risk of effects to any Natura 2000 site and accompanies this EIAR as part of the planning application.

While AA is required by the proposer of any plan or project likely to have an adverse effect on a Natura 2000 site, EIA is required for projects listed in Annex I of the EIA Directive. The requirement for EIA relative to projects listed in Annex II of the EIA Directive is determined on a case by case. While these two different types of assessment are independent and are required by separate legislation, namely the Birds and Habitat Directives (i.e. AA) and the EIA Directive (i.e. EIAR) there is a degree of overlap, particularly in the Biodiversity Chapter (Chapter 5) of the EIAR.

1.11.9. Availability of EIAR Documents.

A copy of this EIAR document and Non-Technical Summary is available for purchase at the offices of An Bord Pleanála and Dublin City Council at a fee not exceeding the reasonable cost of reproducing the document. The application can also be viewed on the SHD website www.santryavenueshd.ie set up by the applicant.

1.11.10 Impartiality

This EIAR document has been prepared with reference to a standardised methodology which is universally accepted and acknowledged. Recognised and experienced environmental specialists have been used throughout the EIA process to ensure the EIAR document produced is robust, impartial and objective.

It should be noted that, as highlighted above, an important part of the EIA process is preventative action which causes the project design team to devise measures to avoid, reduce or remedy significant adverse impacts in advance of applying for consent. As a result, where no likely significant impacts have been identified where they might reasonably be anticipated to occur, the design and layout of the proposed development has generally been amended to minimise the potential of any likely significant adverse impacts.

1.11.11 Statement of Difficulties Encountered

No particular difficulties, such as technical deficiencies or lack of knowledge, were encountered in compiling any of the specified information contained in this statement, such that that the prediction of impacts has not been possible. Where any specific difficulties were encountered, these are outlined in the relevant chapter of the EIAR.

1.11.12 EIA Quality Control and Review

Armstrong Fenton Associates is committed to consistently monitoring the quality of EIAR documents prepared both in draft form and before they are finalised, published and submitted to the appropriate competent authority taking into account latest best-practice procedure, legislation and policy. The EPA published draft guidelines on information to be contained in Environmental Impact Assessment Report[2] and the Department of Housing, Planning, Community and Local Government have published a consultation paper[3], which have been consulted in the preparation of this EIAR. This document includes a detailed EIAR Review Checklist which has been used to undertake a review of this EIAR document.

1.11.13 Errors

While every effort has been made to ensure that the content of this EIAR document is error free and consistent there may be instances in this document where typographical errors and/or minor inconsistencies do occur. These typographical errors and/or minor inconsistencies are unlikely to have any material impact on the overall findings and assessment contained in this EIAR.

1.11.14.Reference List

At the end of each chapter in Part B, each contributor has included a reference list of sources relied on in that Chapter. Below is a detailed list of references which have generally informed the descriptions and assessments included in this EIAR.

EU Directives / Legislation

- The EU Directives on Environmental Impact Assessment (85/337/EEC as amended by 97/11/EC, 2003/35/EC, 2009/31/EC (codified in 2011/92/EU) and 2014/52/EU).
- The Planning and Development Act, 2000 (as amended).
- The Planning and Development Regulations, 2001 (as amended).

EIA and related Guidance

- *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 (2017)
- *Advice Notes for preparing Environmental Impact Statements* (Draft), EPA (2015)
- *Appropriate Assessment of Plans and Projects in Ireland, Guidelines for Planning Authorities* DEHLG (2009)

[2] *Guidelines on the Information to be contained in an Environmental Impact Assessment Report, Environmental Protection Agency, 2017*

[3] *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.*

- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*, DECLG (2013)
- Circular PL1/2017 – *Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition,* DHPCLG (2017)

Planning Policy (National, Regional, Local)

- The National Planning Framework (Project Ireland 2040)
- Eastern & Midland Regional Assembly Regional & Spatial Economic Strategy 2019-2031
- Smarter Travel – A Sustainable Transport Future 2009-2020
- Spatial Planning and National Roads, Guidelines for Planning Authorities 2012
- Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities 2009 and Urban Design Manual, A Best Practice Guide.
- Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2018.
- Design Manual for Urban Roads and Streets, 2013
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities 2009
- National Cycle Manual
- Dublin City Development Plan 2016 – 2022

1.11.15. List of Abbreviations

The following is a non-exhaustive list of abbreviations used in this EIAR. Where an abbreviation is not listed below it is clarified in the relevant chapter of this EIAR.

AA: Appropriate Assessment
AADT: Annual Average Daily Traffic
ACA: Architectural Conservation Area
ABP: An Bord Pleanála
BOD: Biochemical Oxygen Demand
CAP: Climate Action Plan
CDP: City Development Plan
CEMP: Construction and Environment Management Plan
CFRAMS: Catchment Flood Risk Assessment and Management Study
CMP: Construction Management Plan
CNT: Construction Noise Threshold
CoF: Confirmation of Feasibility
DoCHG: Department of Culture, Heritage and the Gaeltacht
DCC: Dublin City Council
DECLG: Department of the Environment, Community and Local Government
DED: District Electoral Division
DEFRA: Department of Environment Food and Rural Affairs
DEHLG: Department of the Environment, Heritage and Local Government
DELG: Department of the Environment and Local Government
DHPCLG: Department of the Housing, Planning, Community and Local Government
DMURS: Design Manual for Urban Roads and Streets
EEC: European Economic Community
EIA: Environmental Impact Assessment

EIAR: Environmental Impact Assessment Report
EIS: Environmental Impact Statement
EPA: Environmental Protection Agency
ESB: Electrical Supply Board
EC: European Commission
EV: Electric Vehicle
EU: European Union
FCC: Fingal County Council
GDSDS: Greater Dublin Strategic Drainage Strategy
GSI: Geological Survey of Ireland
HDV: Heavy Duty Vehicle
INDC: Intended Nationally Determined Contributions
IOA: Institute of Acoustics
IW: Irish Water
KER: Key Ecological Receptors
NBDC: Natural Biodiversity Data Centre
NHA: Natural Heritage Areas
NPF: National Planning Framework
NPWS: Natural Parks and Wildlife Service
NRA: National Roads Authority
NTA: National Transport Authority
OPW: Office of Public Works
pNHA: Proposed Natural Heritage Areas
RMP: Record of Monuments and Places
RPS: Record of Protected Structures
RPGs: Regional Planning Guidelines
RSES: Regional Spatial and Economic Strategy
SAC: Special Area of Conservation
SCI: Site of Community Importance
SEA: Strategic Environmental Assessment
SEO: Strategic Environmental Objective
SI No: Statutory Instrument Number
SPA: Special Protection Areas
SSFRA: Site Specific Flood Risk Assessment
TII: Transport Infrastructure Ireland
TMP: Traffic Management Plan
UNFCCC: United Nations Framework Convention on Climate Change
WFD: Water Framework Direction
ZOI: Zone of Influence

1.11.16 Project Team

This EIAR has been prepared on behalf of the developer by a team of qualified experts, as required by Article 5(3) of Directive 2014/52/EU. The contributors involved in the preparation of this EIAR are identified in Table 1.2, below, and at the beginning of their relevant Chapters in Part B.

Chapter	Contributor
Non-Technical Summary	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI
1 Introduction	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI
2 Planning Policy Context	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI
3 Description of Project & Alternatives	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI
4 Population & Human Health	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI
5 Biodiversity / Species & Habitats	Enviroguide Consulting: Roazalyn O'Hara
6 Land & Soils	DBFL Consulting Engineers: Laura McLoughlin, Senior Civil Engineer, B.Eng, C.Eng.
7 Water	DBFL Consulting Engineers: Laura McLoughlin, Senior Civil Engineer, B.Eng, C.Eng.
8 Air & Climate	AWN Consulting Ltd.: Niamh Nolan BSoc Sci (Hons)
9 Noise & Vibration	AWN Consulting Ltd.: Donal Heavey BEng in Video and Sound Technology, Diploma in Acoustics and Noise Control
10 Material Assets: Built Services	DBFL Consulting Engineers: Laura McLoughlin, Senior Civil Engineer, B.Eng, C.Eng.
11 Material Assets: Transportation	DBFL Consulting Engineers : Thomas Jennings BEng (Hons) MSc MIEI CMILT MIHT
12 Material Assets: Resource & Waste Management	AWN Consulting Ltd.: Chonaill Bradley, BSc in Environmental Science
13 Archaeology & Cultural Heritage	Archaeology Plan: Steven McGlade BA MIAI
14 The Landscape	Dermot Foley Landscape Architects: Teodora Karneva
15 Identification of Significant Impact / Interactions	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI
16 Identification of Significant Impact / Interactions	Armstrong Fenton Associates Planning Consultants: Bryan Meredith BA, MRUP, MIPI, MRTPI

Table 1.2: EIAR Project Team

2.0 Planning Policy Context

2.1 Introduction

This chapter has been prepared by Armstrong Fenton Associates Planning Consultants (Bryan Meredith BA MRUP MIPI MRTPI) and outlines the planning context for the development proposal located on the lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9.

The relevant sources for this application are as follows:

National Context

- The National Planning Framework (Project Ireland 2040)
- Smarter Travel – A Sustainable Transport Future 2009-2020
- Spatial Planning and National Roads, Guidelines for Planning Authorities (2012)
- Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities and Urban Design Manual, A Best Practice Guide (2009)
- Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2018)
- Urban Development and Building Heights Guidelines for Planning Authorities (2018)
- Design Manual for Urban Roads and Streets (2013)
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)
- The National Cycle Manual
- Quality Housing for Sustainable Communities - Best Practice Guidelines (2007)
- Guidelines for Planning Authorities for Child Care Facilities (2001)
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2009)

Regional Context

- Eastern & Midland Regional Assembly Regional & Spatial Economic Strategy 2019-2031

Local

- Dublin City Development Plan 2016-2022

2.2. National Context

2.2.1. The National Planning Framework - Project Ireland 2040

The National Planning Framework (hereafter NPF) sets out a national spatial strategy for the next 20 years to support sustainable and balanced development approaches to significant demographic changes. The NPF aims to secure the highest quality of life for people and communities through the development of high quality and well managed built and natural environments. The NPF particularly focuses on compact growth and increased densities in appropriate locations. The NPF is accompanied by a 10 year capital investment plan known as the National Development Plan and together these publications as known as Project Ireland 2040

Within the NPF, Santry is noted for its strategic location. The NPF states an objective to support the future growth and success of Dublin as Ireland's leading global city of scale, by better managing Dublin's growth to ensure that more of it can be accommodated within and close to the city. Enabling significant population growth in the Dublin metropolitan area, together with better management of the trend towards overspill into surrounding counties whilst increasing housing supply in the right locations, such as the proposed development in Santry, underlines the need to develop the town in a co-ordinated manner so that sustainable growth and investment can be secured. The importance of developing of Santry in a sustainable manner of scale is emphasised in National Policy Objective 2A & National Policy Objective 6.

The NPF has a number of directly relevant national policy objectives (NPO) that articulate delivering on a compact urban growth programme. These include:

- NPO 3(a) relating to the delivery at least 40% of all new homes nationally, within the built-up footprint of existing settlements;
- NPO 4 relating to attractive, well-designed liveable neighbourhoods;
- NPO 5 relating to sufficient scale and quality of urban development;
- NPO 6 relating to increased residential population and employment in urban areas;

In addition, the NPF contains the following *inter alia* objectives:

- NPO 32 which targets the delivery of 550,000 additional households to 2040 and
- NPO 33 relates to the provision of new homes at locations that can support sustainable development and at an appropriate scale of provision relative to location.

Further details of the development proposal's compliance with the NPF policies and objectives can be found in the Statement of Consistency which accompanies this planning application.

2.2.2. Smarter Travel – A Sustainable Transport Future 2009 – 2020

The Smarter Travel document details the government's policy for delivering a more sustainable transport system and meeting an international obligation to tackle climate change. The document targets five key targets to achieve same being:

- Reduce overall travel demand and commuting distances of private car
- Maximise the efficiency of the transport network
- Reduce reliance on fossil fuels
- Reduce transport emission and
- Improve accessibility to transport

2.2.3. Spatial Planning and National Roads, Guidelines for Planning Authorities 2012

The Spatial Planning and National Roads guidelines were prepared in the context of the previous National Spatial Strategy (replaced by the NPF) and actions identified in Smarter Travel, A Sustainable Transport Future 2009-2020. The guidelines set out planning policy consideration for developments which affect national roads outside urban areas to ensure the provision of a safe and efficient network of national roads. The guidelines put forward the following key themes for prospective developers:

- Land-use and transportation policies are highly interdependent
- Proper planning is central to road safety

- Development should be plan-led
- Development Management is the key plan to plan implementation
- Planning authorities and the national roads authority and other public transport bodies must work closely together.

2.2.4. Sustainable Residential Development in Urban Areas, Guidelines for Planning Authorities 2009 and Urban Design Manual, A Best Practice Guide.

The Sustainable Residential Development in Urban Areas guidelines detail the key principles for new residential developments in urban areas while the accompanying Urban Design Manual translates the guidelines into practice. The guidelines promote a plan led / sequential approach to development, densities and location, sustainable neighbourhoods and better design / urban design. These guidelines are incorporated at a local level in the relevant development plan and/or local area plans and are to be considered in the preparation and assessment of planning applications.

2.2.5. Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities 2020.

The Sustainable Urban Housing: Design Standards for New Apartments guidelines update the previous 2018 version of same and are an acknowledgement of the growing demand for apartment living in urban areas across Ireland. The guidelines provide detailed guidance on standards of apartment design (including floor areas, room sizes, storage, community facilities etc.). These standards will be used by developers in the preparation of applications and by the relevant planning authorities in the assessment of applications.

2.2.6. Design Manual for Urban Roads and Streets, 2013

The Design Manual for Urban Roads and Streets were prepared by the Department of Transport, Tourism and Sport, together with the DoECLG to provide guidance and standards for urban roads and streets. These guidelines seek to avoid the creation of traffic corridors for private vehicles and promote a focus on creating places for pedestrians, cyclists and public transport.

DMURS encourages designers to give due consideration to creating a *'sense of place'* which is of core significance to the creation of safe and more integrated street designs. The guidance document notes that four interlinked characteristics influence the sense of place within a street, including:

- **Connectivity:** The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected.
- **Enclosure:** A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings toward the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure.
- **Active Edge:** An active frontage enlivens the edge of the street creating a more interesting and engaging environment. An active frontage is achieved with frequent entrances and openings that ensure the street is overlooked and generate pedestrian activity as people come and go from buildings.
- **Pedestrian Activity/Facilities:** The sense of intimacy, interest and overlooking that is created by a street that is enclosed and lined with active frontages enhances a pedestrian's feeling of security and well-being. Good pedestrian facilities (such as wide footpaths and well-designed crossings) also make walking a more convenient and pleasurable experience that will further encourage pedestrian activity.

The DMURS guidance emphasises that the above mentioned four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods.

2.2.7. The Planning System and Flood Risk Management – Guidelines for Planning Authorities. 2009

The Planning System and Flood Risk Management guidelines provide detailed guidance on the role that flood risk should play at different levels of the planning system. The Guidelines require the planning system at all levels to avoid development in areas at risk of flooding, particularly floodplains, and where the flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere; adopt a sequential approach to flood risk management when assessing the location for new development based on avoidance, reduction and mitigation of flood risk; and incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals. Planning Authorities must implement these guidelines to ensure that, where relevant, flood risk is a key consideration in development plans and local area plans and in the assessment of planning applications. The guidelines should also be utilised by developers and the wider public in addressing flood risk in preparing development proposals.

2.2.8. The National Cycle Manual, 2011

The National Cycle Manual was established by the National Transport Authority to ensure that prospective developments promote active travel means and support changing transport choices by incorporating cycling within transport networks more proactively. The manual embraces the principles of sustainable safety to offer a safe traffic environment for all road users, including cyclists, and offer guidance on integrating cycling routes in the design of urban areas.

2.2.9. Urban Development and Building Heights Guidelines for Planning Authorities 2018

The Urban Development and Building Heights Guidelines (2018) reflect the policies and objectives of the NPF which support a move towards performance based criteria to achieve more compact forms of urban growth. The guidelines contain 4 no. Specific Planning Policy Requirements (SPPRs) which should be applied by both Planning Authorities and ABP in their assessment of development proposals. Generally, the SPPR's seek to increase building height and density in appropriate locations even if the development proposal may contradict specific objectives of the relevant development plan or local area plan.

2.2.10. Quality Housing for Sustainable Communities - Best Practice Guidelines (2007)

The Quality Housing for Sustainable Communities Guidelines promote high standards in the design and construction of new residential developments. The Guidelines identify core principles and criteria that have been found, from experience, to be particularly relevant to the creation of high-quality living environments for future residents. Guidance within this document is arranged under five headings as follows:

- Site Selection
- Design Brief, Procurement and Cost Control
- Urban Design Objectives in the Provision of Housing
- Scheme Layout and Design
- Dwelling Design

2.2.11. Guidelines for Planning Authorities for Child Care Facilities (2001)

The Childcare Facilities Guidelines for Planning Authorities direct Planning Authorities to facilitate the provision of childcare facilities in appropriate locations. The Guidelines state that, in general, one new

facility catering for 20 childcare spaces should be developed for every 75 new residential dwellings. The Guidelines also provide broader guidance on internal standards for childcare facilities. The Guidelines state that the provision of new childcare facilities should have regard to the location of existing facilities emerging demographics in the area of development and advise that sites should from part of pre-planning consultations between applicants and Planning Authorities.

2.2.12. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2009)

The Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities sets out the different steps and stages that are needed to establish whether a plan or project can be implemented without damaging an existing Natura 2000 site. The Guidelines indicate the role to be played by professional ecologists and other professionals in identifying potential impacts on same and provide details on potential mitigation measures to avoid of such impacts. Where such impacts cannot be avoided the Guidelines detail imperative reasons of overriding public interest which may allow a project to proceed.

2.3. Regional Context

2.3.1. Regional Planning Context - Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031

The Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy 2019-2031 (hereafter RSES) was adopted in 2019 to ensure the policies and objectives of the NPF are implemented at a regional level. At this strategic level the guidelines provide a framework to better manage spatial planning and economic development throughout the Eastern & Midland region by setting the context for each local authority to develop their own county development plans / local area plans in a manner that ensures national, regional and local planning policies align.

The Strategy identifies that the region '*is home to over 800,000 households, with 4 out of 5 living in conventional housing while apartments account for around 18% or our housing stock. One of the challenges facing the region is the continued growth rates of household formation coupled with a severe slowdown in the development of new housing stock during the economic recession, resulting in housing supply and affordability pressures in both sale and rental markets, particularly in Dublin and urban areas but affecting all of the region'.*

The Strategy is underpinned by key principles that reflect the three pillars of sustainability: Social, Environmental and Economic, and expressed in a manner which best reflects the challenges and opportunities of the Region. The plan identifies that the central need is for the RSES to be people focussed, as *'quality of life'* encapsulates strong economic output and stability, good environmental performance and a good standard of living for all.

The subject site is located with the Dublin Metropolitan Area, as designated by the Strategy. The Metropolitan Area Strategic Plan (MASP) which is part of the RSES seeks to focus on a number of large scale strategic sites, based on key corridors that will deliver significant development in an integrated and sustainable fashion.

The NPF also sets out ambitious targets to achieve compact growth with 50% of housing to be provided within or contiguous to the built-up area of Dublin city and suburbs. To achieve this *'the MASP identifies strategic residential and employment corridors along key public transport corridors existing and planned, that contain development opportunities.'* The subject site is located adjacent to a high-quality public transport corridor which includes frequent bus services.

The development of the subject lands in Santry consolidate and re-intensify an brownfield site in compliance with Regional Policy Objective 4.3 which seeks to *"support the consolidation and re-intensification of infill/brownfield sites to provide high density and people intensive uses within the existing built up area of Dublin City and suburbs and ensure that the development of future development areas is co-ordinated with the delivery of key water infrastructure and public transport projects."*

Further details of the development proposal's compliance with the RSES policies and objectives can be found in the Statement of Consistency which accompanies the planning application.

2.4. Local Context

2.4.1 Dublin City Development Plan 2016 -2022

The Dublin City Development Plan 2016-2022 is the relevant development plan for the settlement of Santry and the subject site. The proposed development site is zoned objective *'Z3'* which aims *"to provide for and improve neighbourhood facilities".* Under this land use zoning objective, the CDP states that *"these are areas that provide local facilities such as small convenience shops, hairdressers, etc. within a residential neighbourhood. They can form a focal point for a neighbourhood and provide a limited range of services to the local population, within 5 minutes walking distance. These centres provide an essential and sustainable amenity for residential areas and it is important that they should be maintained and strengthened where necessary. In addition, neighbourhood centres may include an element of housing, particularly at higher densities, and above ground floor level."*

The Core Strategy of the CDP identifies Santry as a Neighbourhood outside the city centre. Santry acts as a gateway to the city from the north, located adjacent to both key public transport routes and adjacent Swords Road, a strategic national primary route entering Dublin city centre from the north.

The Development Plan sets out its overall '*Vision for the Dublin'* City which is to create a more sustainable and resilient city. Within this vision the Development Plan aims to improve quality of life for all. Section 1.2 outlines how to achieve this and the following is of relevance:

> *b) Social/Residential – Developing Dublin as a compact city with a network of sustainable neighbourhoods which have a range of facilities and a choice of tenure and house types, promoting social inclusion and integration of all ethnic communities.*

The Core Strategy sets out *'Population and Housing Figures Based on Census Data 2011, Estimate for 2013'*, and Regional Planning Guidelines allocations (now superseded by the RSES). Table A of the Core Strategy identifies a need for approximately 29,500 new residential units over the life of the Plan. Table C quantifies the area of lands zoned for residential development (4,466ha) or for a mix of uses including residential (2,043ha). Table C of the Core Strategy includes Z3 zoned lands. In this regard, the subject Z3 zoned lands are included in Core Strategy calculations for achieving sufficient zoned lands to cater for targeted population growth. The development of the lands for residential purposes supports the achievement of Core Strategy targets.

With regard to residential development '*Policy SC13'* of the CDP seeks *"to promote sustainable densities, particularly in public transport corridors, which will enhance the urban form and spatial structure of the city, which are appropriate to their context, and which are supported by a full range of community infrastructure such as schools, shops and recreational areas, having regard to the safeguarding criteria set out in Chapter 16 (development standards), including the criteria and standards for good neighbourhoods, quality urban design and excellence in architecture. These sustainable densities will include due consideration for the protection of surrounding residents, households and communities."*

The proposed residential development has been designed with regard to the permitted height of the adjoining residential development at Santry Place, to the south of the subject site.

CDP policies relevant to the development proposal are detailed below:

- *Policy CCO12 - To ensure high standards of energy efficiency in existing and new developments in line with good architectural conservation practice and to promote energy efficiency and conservation in the design and development of all new buildings in the city, encouraging improved environmental performance of building stock.*

- *Policy CCO15 - To facilitate the provision of electricity charging infrastructure for electric vehicles.*

- *Policy SC10 - To develop and support the hierarchy of the suburban centres, ranging from the top tier key district centres, to district centres/urban villages and neighbourhood centres, in order to support the sustainable consolidation of the city and provide for the essential economic and community support for local neighbourhoods, including post offices and banks, where feasible, and to promote and enhance the distinctive character and sense of place of these areas.*

- *Policy SC14 - To promote a variety of housing and apartment types which will create a distinctive sense of place in particular areas and neighbourhoods, including coherent streets and open spaces.*

- *Policy SC15 - To recognise and promote green infrastructure and landscape as an integral part of the form and structure of the city, including streets and public spaces.*

- *Policy QH1 - To have regard to the DEHLG Guidelines on 'Quality Housing for Sustainable Communities – Best Practice Guidelines for Delivering Homes Sustaining Communities' (2007), 'Delivering Homes Sustaining Communities – Statement on Housing Policy' (2007), 'Sustainable Urban Housing: Design Standards for New Apartments' (2015) and 'Sustainable Residential Development in Urban Areas' and the accompanying 'Urban Design Manual: A Best Practice Guide' (2009).*

- *Policy QH5 - To promote residential development addressing any shortfall in housing provision through active land management and a coordinated planned approach to developing appropriately zoned lands at key locations including regeneration areas, vacant sites and under-utilised sites.*

- *Policy QH6 - To encourage and foster the creation of attractive mixed-use sustainable neighbourhoods which contain a variety of housing types and tenures with supporting community facilities, public realm and residential amenities, and which are socially mixed in order to achieve a socially inclusive city.*

- *Policy QH7 - To promote residential development at sustainable urban densities throughout the city in accordance with the core strategy, having regard to the need for high standards of urban design and architecture and to successfully integrate with the character of the surrounding area.*

- *Policy QH9 - To require that larger schemes which will be developed over a considerable period of time are developed in accordance with an agreed phasing programme to ensure that suitable physical, social and community infrastructure is provided in tandem with the residential development and that substantial infrastructure is available to initial occupiers.*

- *Policy QH10 - To support the creation of a permeable, connected and well-linked city and discourage gated residential developments as they exclude and divide established communities.*

- *Policy QH11 - To ensure new developments and refurbishments are designed to promote safety and security and avoid anti-social behaviour in accordance with the Safety and Security Design Guidelines contained in Appendix 14.*

- *Policy QH12 - To promote more sustainable development through energy end-use efficiency, increasing the use of renewable energy, and improved energy performance of all new developments throughout the city by requiring planning applications to be supported by information indicating how the proposal has been designed in accordance with the development standards set out in the development plan.*

- *Policy QH16 - To promote efficient and effective property management in order to secure the satisfactory upkeep and maintenance of communal areas and facilities in the context of the Multi-Unit Developments Act 2011, the Property Services (Regulation) Act 2011 and the establishment of the Property Services Regulatory Authority.*

- *QH18 - To promote the provision of high quality apartments within sustainable neighbourhoods by achieving suitable levels of amenity within individual apartments, and within each apartment development, and ensuring that suitable social infrastructure and other support facilities are available in*
  the neighbourhood, in accordance with the standards for residential accommodation.

- *QH19 - To promote the optimum quality and supply of apartments for a range of needs and aspirations, including households with children, in attractive, sustainable, mixed-income, mixed-use neighbourhoods supported by appropriate social and other infrastructure.*

- *QH22 - To ensure that new housing development close to existing houses has regard to the character and scale of the existing houses unless there are strong design reasons for doing otherwise.*

- *Objective MT2 - Whilst having regard to the necessity for private car usage and the economic benefit to the city centre retail core as well as the city and national economy, to continue to promote modal shift from private car use towards increased use of more sustainable forms of transport such as cycling, walking and public transport, and to co-operate with the NTA, Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives. Initiatives contained in the government's 'Smarter Travel' document and in the NTA's draft transport strategy are key elements of this approach.*

- *Objective MT13 - To promote best practice mobility management and travel planning to balance car use to capacity and provide for necessary mobility via sustainable transport modes.*

- *Objective MT17 - To provide for sustainable levels of car parking and car storage in residential schemes in accordance with development plan car parking standards (section 16.38) so as to promote city centre living and reduce the requirement for car parking.*

- *Objective MTO25 - To support the growth of Electric Vehicles and e-bikes, with support facilities as an alternative to the use of fossil-fuel-burning vehicles, through a roll-out of additional electric charging points in collaboration with relevant agencies at appropriate locations.*

- *Objective MTO45 - To implement best practice in road design as contained in statutory guidance and in the DMURS (the use of which is mandatory) with a focus on place-making and permeability (for example, by avoiding long walls alongside roads) in order to create street layouts that are suited to all users, including pedestrians and cyclists.*

- *Policy SI18 - To require the use of Sustainable Urban Drainage Systems in all new developments, where appropriate, as set out in the Greater Dublin Regional Code of Practice for Drainage Works. The following measures will apply:*
    - *The infiltration into the ground through the development of porous pavement such as permeable paving, swales, and detention basins*
    - *The holding of water in storage areas through the construction of green roofs, rainwater harvesting, detention basins, ponds, and wetlands*
    - *The slow-down of the movement of water*

- *Policy SIO16 - To require the provision of adequately- sized recycling facilities in new commercial and large-scale residential developments, where appropriate.*

- *Policy SIO26 - To ensure that the design of external lighting proposals minimises light spillage or pollution in the surrounding environment and has due regard to the residential amenity of the surrounding area.*

- *Policy SIO33 - To support the development of energy efficient initiatives such as use of District Heating and Combined Heat and Power, and to promote the use of CHP in large developments.*

- *Objective GI2: That any plan/project, either individually or in combination with other plans or projects that has the potential to give rise to significant effect on the integrity of any European site(s), shall be subject to an appropriate assessment in accordance with Article 6(3) and 6(4) of the EU Habitats Directives.*

- *Objective GI5: To promote permeability through our green infrastructure for pedestrians and cyclists.*

- *Objective GIO1 - To integrate Green Infrastructure solutions into new developments and as part of the development of a Green Infrastructure Strategy for the city.*

- *Objective GI13 - To ensure that in new residential developments, public open space is provided which is sufficient in quantity and distribution to meet the requirements of the projected population, including play facilities for children.*

- *Objective GI23 - To protect flora, fauna and habitats, which have been identified by Articles 10 and 12 of Habitats Directive, Birds Directive, Wildlife Acts 1976 – 2012, the Flora (Protection) Order 2015 S.I No. 356 of 2015, European Communities (Birds and Natural Habitats) Regulations 2011 to 2015.*

- *Objective SN1 - To promote good urban neighbourhoods throughout the city which are well designed, safe and suitable for a variety of age groups and tenures, which are robust, adaptable, well served by local facilities and public transport, and which contribute to the structure and identity of the city, consistent with standards set out in this Plan.*

- *Objective SN2 - To promote neighbourhood developments which build on local character as expressed in historic activities, buildings, materials, housing types or local landscape in order to harmonise with and further develop the unique character of these places.*

- *Objective SN17 – To facilitate the provision in suitable locations of sustainable, fit-for purpose childcare facilities in residential, employment and educational settings, taking into account the existing provision of childcare facilities and emerging demographic trends in an area.*

- *Objective SN18 - To encourage and facilitate the provision of a range of community facilities in the city that caters for all.*

- *Objective SN19 - To enhance and improve the provision of playgrounds, play spaces, playing pitches and recreational spaces in residential areas and in the city centre in accordance with the City Council's standards and guidelines.*

Further details of the development proposal's compliance with the CDP housing policies and objectives can be found in the Statement of Consistency which accompanies the planning application.

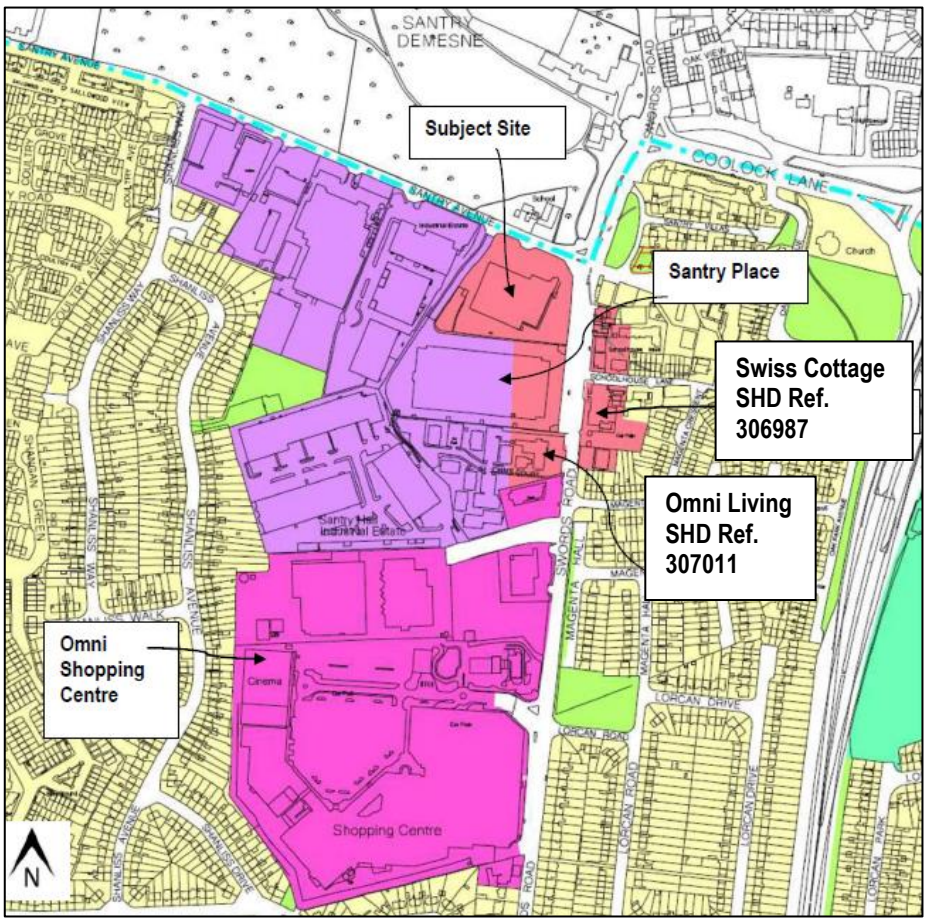

Fig. 2.1: Zoning Map B, Dublin City Development Plan 2016-2022

(Illustrating location of subject site and designated "Z3" Zoning)

2.5. Conclusion

A review of the relevant planning policy for the proposed development concludes the following:

The subject application site is located on lands subject to the CDP. The CDP has been approved by DCC and deemed to be in accordance with national and regional planning policy.

The environmental impacts arising from the implementation of the CDP have been examined in the making of the plan and the SEA assessments undertaken provide a strategic level assessment of the impacts on the receiving environment of implementing the proposals contained within the CDP. These assessments concluded that the implementation of the plan is not likely to result in significant

environmental effects.

The development proposal is put forward in compliance with the land-use zoning designation and policy objectives contained within the CDP. Compliance with the above planning policy documents demonstrates the appropriateness of the current proposal from a proper planning and sustainable development perspective.

3.0. Description of Project and Alternatives

3.1. Introduction

This chapter has been prepared by Armstrong Fenton Associates Planning Consultants (Bryan Meredith BA MRUP MIPI MRTPI) and provides a description of the project site in the context of its receiving environment and a description of the project. As required by the EIA Directive and regulations thereunder, this chapter also outlines the Main Alternatives considered.

In accordance with the EIAR preparation process, various mitigation measures are detailed in this report and can either be incorporated during the planning process or as conditions of a grant of planning permission.

The project description in Section 3.3. should be read in conjunction with the plans and particulars submitted with the planning application including the statutory planning notices and the Planning Report / Statement of Consistency.

3.2. Site Context

The subject site (i.e. the red line boundary of application detailed on the drawings accompanying the application) measures approximately 1.5ha in area and is located at the junction of Santry Avenue and Swords Road, with frontage onto both roads (being bounded to the east by Swords Road and to the north by Santry Avenue) and is currently occupied by Chadwicks building providers (formerly Heiton Buckley). Access to the subject site is currently limited to an existing site entrance off / onto Santry Avenue.

Under the CDP the subject site is zoned Z3 with the objective "*to provide for and improve neighbourhood facilities*". The CDP recognises the importance of Z3 zoned lands in the contribution of meeting the housing delivery requirements of the city. In line with the CDP, the subject site represents a highly suitable location for the provision of infill residential development. The objective of the Z3 zone is to provide for and improve neighbourhood facilities. The proposed development complies with the requirements of the zoning objective with the provision of a community use hub unit, residential amenity unit and 5 no. commercial / retail units facing onto Swords Road and Santry Avenue.

3.2.1 Adjoining Development

To the north, the site is bounded by Santry Avenue. Beyond Santry Avenue is Santry Demesne Park which provides a range of open space, sporting and recreational facilities including Morton Stadium and Santry Community Garden.

To the east, Swords Road borders the application site, with retail connivence stores opposite the site.

To the west, the subject site is bounded by the Santry Avenue Industrial Estate.

The neighbouring lands bounding the southern boundary of the site are currently being developed by the Applicant as part of the permitted residential scheme known as Santry Place (Ref.s 2713/17 & 2737/19). Permission was granted to Carnamadra Ltd, under Ref. 2713/17, on 23rd April 2018. The development as applied for included the partial demolition (c.7,781 sq.m. gfa) of an existing 8-bay warehouse (c.9,539 sq.m. gfa), and the construction of:

- 1 no. 5-storey mixed use building fronting Swords Road (Block A: c.5,932 sq.m. gfa in total), including 3 no. retail/commercial units (c.502 sq.m.) at ground level and 48 no. residential units in levels above;
- 1 no. 5-storey residential building (Block B: c.5,233 sq.m gfa, 47 no. residential units);
- 1 no. 5- storey mixed use building (Block C: c.5,383 sq.m. gfa in total), including 2 no. office units (c.373 sq.m. gfa) and 1 no. crèche (c.331 sq.m. gfa) at ground floor, and 42 no. residential units from ground to 4th floor levels;
- the refurbishment of the partially retained and reclad double height warehouse (2-bays, 1,758 sq.m. gfa) with new 4-storey extension, to accommodate commercial office use (Block D: c.6,733 sq.m. gfa in total); and
- a new 4-storey commercial office building (Block E: c.1,802 sq.m. gfa in total);

The permitted development provided for 137 no. residential units in total, comprised of:

- 25 no. 3-bed apartments;
- 88 no. 2-bed apartments;
- 24 no. 1-bed apartments.

In total, the residential buildings i.e. Blocks A, B and C have permission for the following:

- Block A: 7 no. 1 beds, 33 no. 2 beds and 8 no. 3 beds – 48 no. apartments in total;
- Block B: 9 no. 1 beds, 29 no. 2 beds and 9 no. 3 beds – 47 no. apartments in total;
- Block C: 8 no. 1 beds, 26 no. 2 beds and 8 no. 3 beds – 42 no. apartments in total.

Block A also accommodates 3 no. retail units on the ground floor (c.502 sq.m.).

Block C accommodates 1 no. crèche (c.331 sq.m. gfa) at ground floor.

It should also be noted that Condition no. 3 attached to planning permission Ref. 2713/17 required a community centre space / element of social infrastructure of at least 200 sq.m. to be provided and permanently maintained within the scheme at ground floor level in Block A, B, C, D or E (but shall not be in place of any of the proposed retail units or crèche). The permission sought under Ref. 2713/17 provided for 2 no. office units (c.373 sq.m. gfa) on the ground floor of Block C but in order to comply with condition no. 3 attached to the extant permission, a subsequent permission under Ref. 2737/19 provides for a dedicated community room of 210.3sq.m, which results in 198.4sq.m of office space being accommodated adjacent to same on the ground floor of Block C as opposed to 373sq.m as originally proposed.

Under Ref. 2713/17, Block D consists of the refurbished, partially retained and reclad double height warehouse (2-bays, 1,758 sq.m. gfa) with a new 4 storey extension, accommodating commercial office use (c.6,733 sq.m. gfa in total).

Block E is a separate 4-storey commercial office building (c.1,802 sq.m. gfa in total).

Permission was also granted under Ref. 2713/17 for all ancillary and associated site development works, including:

- new vehicular and pedestrian access via Swords Road at the north east corner of the site,
- environmental improvements along the Swords Road frontage;
- upgrading of existing vehicular and pedestrian access via Santry Avenue;
- new basement car park (c.3,988 sq m) accessed via ramp under Block A accommodating 122 no. car parking spaces (to include 6 no. disabled access), 100 no. bicycle parking spaces, plant, etc.;

- 151 no. surface car parking spaces (to include 7 no. disabled access); 100 no. surface bicycle spaces;
- bin storage at ground level in Blocks B and C;
- surface water attenuation tank; and,
- hard and soft landscaping, lighting and boundary treatment works, all on a site of c. 1.9 hectares.

Subsequent to the granting of permission under Ref. 2713/17, which has the approved name of *"Santry Place",* the site was put up for sale and purchased by Zoltorn Limited. Our client and the Applicant, Dwyer Nolan Developments Ltd is currently carrying out the construction of this permitted development on behalf of the landowner.

An application for permission for modifications to the parent permission, was sought under Ref. 2737/19, consisting of the following:

Permission was sought to increase the height of Blocks A, B and C from permitted 5 storeys to proposed 7 storeys and for a change in unit type and increase in number of apartments i.e. 70 no. apartments, which will result in a change from 137 no. permitted apartments to 207 no. 1, 2 & 3 bed apartments in the aforementioned buildings, including provision of balconies and roof terraces (i.e. 240sq.m each) to Blocks A, B & C. The ground floor of Block C will accommodate a unit (i.e. 210sq.m) for community use in compliance with condition no. 3 attached to planning permission Ref. 2713/17. The proposed development also seeks to provide additional office floor space to both Blocks D & E, providing an increase of 2,931sq.m of office accommodation to the overall previously permitted development. Block D will increase in height from permitted 2 & 4 storeys to proposed 3 & 5 storeys, while Block E will increase in height from permitted 4 storeys to proposed 5 storeys. Permission is also sought for an extension to the permitted basement car park, (i.e. 1,273sq.m), to accommodate 52 no. additional car parking spaces, additional bicycle parking and a new emergency escape route to the surface. The proposed development also provides for conversion of 3 no. surface car parking spaces to 3 no. "*GoCar"* spaces to the north of Block B, and all associated site development works, on a site area of 1.55ha. This permission was granted on 1st October 2019.

Construction of the permitted Santry Place development under Ref.s 2713/17 & 2737/19, is nearing completion with the Developer having submitted the Certificate of Compliance on Completion to the Building Control Management System on 18th June 2021. Further south, is the Omni Shopping Centre with industrial/commercial enterprises to the south at St. John's Business Court, to the southwest Santry Hall Industrial Estate and Santry Avenue Industrial Estate to the west.

Subsequent to the commencement of construction of the Santry Place development, the Chadwick (formerly Heiton Buckley) site (i.e. the subject site) was put up for sale, and the applicant purchased same. The subject site remains occupied by Chadwicks (formerly Heiton Buckley) building providers, until their lease expires. All buildings on site are associated with this established use.

With the Santry Place development to the south currently nearing completion, the subject application is considered to represent an ideal opportunity for an integrated mixed-use development which will continue the recent regeneration of the Santry area.

To this end, we note the following developments in the vicinity of the subject site which have been recently permitted and /or are under construction:

- **ABP-306987-20 -** Permission for the development of 120 no. apartments and associated site development works on the former Swiss Cottage lands, Swords Road, Santry, Dublin 9. The development included for building heights of 3 no. storeys to 7 no. storeys and caters for a density

of c. 250 no. dwellings per hectare. The development supersedes and amended the previously permitted development granted under ABP-303358-19. The site is located approximately 100 meters to the south-east of the subject application site.

- **ABP-307011-20 -** Permission for the development 324 no. apartments, a creche and associated site development works on lands to the northeast of Omni Park Shopping Centre, Swords Road, Santry, Dublin 9. The development included for building heights of 5 no. storeys to 12 no. storeys and caters for a density of c. 250 no. dwellings per hectare. The site is located approximately 250 meters to the south of the subject application site.

It is considered that the proposed development is in keeping with the aforementioned recently permitted developments at Santry Place, Swiss Cottage and the site to the northeast of Omni Shopping Centre, particularly in terms of height and density, and represents sustainable and coherent planning of this important corner location on an entrance route into Dublin city. The EIAR submitted at this time is deemed appropriate, to review the cumulative impact of the proposed scheme given the quantity of units permitted in the permissions listed above.

3.3. Description of the Physical Characteristics of the Proposed Development

Dwyer Nolan Developments Ltd. intend to apply to An Bord Pleanála for permission for a strategic housing development, on a site of c. 1.5 hectares, located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the west by Santry Avenue Industrial Estate, and to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19).

The proposed development provides for 350 no. apartments, comprised of 113 no. 1 bed, 218 no. 2 bed, & 19 no. 3 bed dwellings, in 4 no. seven to fourteen storey buildings, over basement level, with 5 no. retail / commercial units and a community use unit located at ground floor level facing onto Santry Avenue and Swords Road. A one storey residential amenity unit, facing onto Santry Avenue, is also provided for between Blocks A & D.

The development consists of the following:

Demolition of the existing building on site i.e. the existing Chadwicks Builders Merchants (c. 4,196.8m^2).

Construction of 350 no. 1, 2, & 3 bed apartments, retail / commercial and community uses in 4 no. buildings that are subdivided into Blocks A-G as follows:

- Block A is a 7 to 14 storey block consisting of 59 no. apartments comprised of 26 no. 1 bed & 33 no. 2 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 132.4m^2 & 173m^2 respectively). Adjoining same is Block B, which is a 7 storey block consisting of 38 no. apartments comprised of 6 no. 1 bed, 20 no. 2 bed, & 12 no. 3 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 162.3m^2 & 130.4m^2 respectively). Refuse storage areas are also provided for at ground floor level.

- Block C is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. Refuse storage areas are provided for at ground floor level. Adjoining same is Block D which is a 7 to 10 storey block consisting of 51 no. apartments comprised of 25 no. 1 bed, 19 no. 2 bed, & 7 no. 3 bed dwellings, with 1 no. commercial unit / café located on the ground floor (c. 163.3m^2). A refuse storage area is also provided for at ground floor level.

- Block E is a 7 to 10 storey block consisting of 58 no. apartments comprised of 10 no. 1 bed & 48 no. 2 bed dwellings, with 1 no. community use unit located on the ground floor (c. 188.1m^2). A refuse storage area, substation, & switchroom are also provided for at ground floor level. Adjoining same is Block F which is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

- Block G is a 7 storey block consisting of 34 no. apartments comprised of 20 no. 1 bed & 14 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

Construction of a 1 storey residential amenity unit (c. 187.9m^2) located between Blocks A & D.

Construction of basement level car parking (c.5,470.8m^2) accommodating 173 no. car parking spaces & 719 no. bicycle parking spaces. Internal access to the basement level is provided from the cores of Blocks A, B, C, D, E, & F. External vehicular access to the basement level is from the south, between Blocks B & C. 36 no. car parking spaces & 58 no. bicycle parking spaces are also provided for within the site at surface level.

Public open space of c. 1,915m^2 is provided for between Blocks C, D, E, & F. Communal open space of c. 3,122m^2 provided for between (i) Blocks E, F, & G, (ii) Blocks A, B, C, & D, and (iii) in the form of roof gardens located on Blocks A, C, & F and the proposed residential amenity use unit. The development includes for hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels.

Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).
The development includes for all associated site development works above and below ground, bin & bicycle storage, plant (M&E), sub-stations, public lighting, servicing, signage, surface water attenuation facilities etc.

The locational context of the application site and the objectives of the CDP have been carefully considered as part of the development put forward for permission, whereby the proposed site layout plan provides for:

- Integration with the Santry Place development to the south of the subject site;
- Provision of a landscape details to minimize potential noise and visual impacts;
- Provision of pedestrian and cyclist connections through the site
- Provision of 5 no. commercial units, a community use hub and a residential amenity unit.

Figure 3.1 Proposed site layout detailing the full extent of the site boundaries

3.4. Site and Development Works

The project includes the following works:

- Residential development (350 no. dwellings);
- Commercial / Community uses i.e. community use hub, residential amenity unit & 5 no. commercial / retail units;
- Public and private open spaces;
- Landscaping;
- Services infrastructure, utilities and public lighting;
- Public and private open spaces;
- Car parking and bin storage;
- Substation;
- Building and directional signage and
- All associated site and development works.

Further details are provided in the plans and reports submitted with the planning application.

3.5. Project Life-Cycle

Beyond the construction and operational phases, there are no further phases of development envisaged for this project.

3.6. Demolition

Permission is sought for the demolition of the existing buildings on site (4,196.8m^2).

3.7 Residential Development

In summary, the proposed development comprises the construction of 350 no. apartments consisting of 113 no. 1 bed units, 218 no. 2 bed units and 19 no. 3 bed units.

Unit Type	1 bed	2 bed	3 bed	Total
Apartments	113	218	19	**350**
Overall Mix	**32%**	**62%**	**6%**	**(100%)**

Table 3.1 – Overall Residential Development Mix

A wide variety of dwelling typologies are included in the proposal, comprising 350 no. apartments in 1, 2 and 3 no. bedroom units in 4 no. apartment blocks, all dispersed throughout the proposed development.

The design intent is to strategically locate apartment blocks throughout the site in order to achieve place making, fronting onto important roads and streets. In addition, variety is provided by way of building height dispersed throughout the entire application site. This built form provides variety in the street scape.

3.8 Non-Residential Development

3.8.1 Proposed Community Use Unit

The development proposal includes for a community use unit measuring c. 188.1m^2 located on the ground floor of Block E of the proposed development. The proposed community use unit fronts onto Santry Avenue. It is considered that the proposed community unit will form an important community space capable of catering for a number of potential functions and will offer focal point for both local, existing residents in the area as well as future residents of the proposed development.

3.8.2 Proposed Commercial Units

The development proposal includes for 5 no. ground floor retail / commercial units located in Blocks A, B and D of the proposed development. The 5 no. units combine to provide a total floorspace of c.900m^2. These units face onto both Santry Avenue and Swords Road.

3.8.3 Proposed Residential Amenity Unit

The development proposal includes for a residential amenity unit measuring c. 187.9m^2, located at ground floor level between Blocks A and D of the proposed development. The proposed residential amenity unit fronts onto Santry Avenue. It is considered that the proposed residential amenity unit will form an important space capable of catering for a number of potential functions relative to modern apartment type living and will offer focal point for future residents of the development.

3.9 Car Parking and Cycle Parking Provision

Car parking for the proposed development is provided for in the form of basement level parking and surface level parking. In total, the proposed development caters for 209 no. car parking spaces.

The basement level measures c. 5,470.8m^2 and includes for 173 no. car parking spaces (inclusive of 12 no. disabled parking spaces). The basement level is internally accessible from cores of Blocks A, B, C, D, E & F, while vehicular access to the basement is from the south between Blocks B & C.

An additional 36 no. car parking spaces (inclusive of 6 no. disabled parking spaces, 4 no. club car/car sharing spaces & 5 no. set down spaces) are also provided for within the site at surface level.

Cycle parking for the proposed development is also provided in the form of basement level parking and surface level parking. In total, the proposed development caters for 805 no. bicycle parking spaces.

719 no. bicycle parking spaces are catered for at basement level. At ground floor level in Block F, 18 no. bicycle parking spaces are accommodated, while the ground floor of Block G caters for 10 no. bicycle parking spaces. 58 no. bicycle parking spaces (including 42 no. visitor spaces) are also provided for within the site at surface level.

Please refer to the enclosed Traffic & Transport Assessment (TTA) carried out by DBFL Consulting Engineers for full details of parking in the proposed scheme.

3.10 Access

Vehicular access to the proposed development will be via two proposed access points: (i) on Santry Avenue to the north and (ii) off Swords Road to the east.

The proposed development provides for pedestrian and cyclist connectivity to adjoining lands as follows:

- The neighbouring lands bounding the southern boundary of the site are currently being developed as part of the permitted residential scheme known as Santry Place (Ref.s 2713/17 & 2737/19). The proposed site layout provides for direct connectivity and permeability into Santry Place. The proposed scheme has been designed to allow for it to assimilate with Santry Place to the south, with a view to developing this area of Santry as a landmark setting, creating a sense of place.

- The site is to be accessed via Santry Avenue and Swords Road which allows for direct accessibility to Santry Demesne Park and proposed retail / commercial units.

- The proposed scheme will provide footpaths facing onto both Santry Avenue and Swords Road which will enable the flow of footfall to safely visit the proposed community hub and 5 no. retail / commercial units proposed.

- The lands are easily accessible via the R132 Swords Road which connects the subject lands both to other parts of north Dublin and Dublin Airport to the north and the city centre to the south. The lands are also located in close proximity to the M50 which provides access to the Port Tunnel

- The site is well served by bus services with Dublin Bus routes No.'s 16, 16c, 33, 41m 41a, 41b and 41c connecting the site to Dublin Airport, Ballbriggan and Swords to the north and the city centre and Ballinteer to the south. The site is also located along the proposed BusConnects Corridor.

3. 11 Construction

3.11.1. Construction Management

A Construction & Demolition Waste Management Plan (CDWMP) has been prepared for the proposed development and accompanies the planning application. Certain assumptions are made in the CDWMP based on the information available at this time and, for the avoidance of doubt, it is not proposed or intended that the applicant / contractor(s) are bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

On receipt of a grant of planning and prior to the commencement of works, a detailed final Construction Management Plan (CMP) will be prepared. The contractor will be required to comply with and implement the requirements and mitigation measures as set out in this EIAR and any conditions imposed as part of planning permission. An Outline CMP has been prepared for the proposed project and is included with the planning application documentation. In addition, a Mobility Management Plan (MMP) has also been prepared and is also included as part of this application. Certain assumptions are made in both the Outline CMP and MMP based on the information available at this time and, for the avoidance of doubt, it is not proposed or intended that the applicant / contractor(s) are bound by these proposals which may change depending on the timing and circumstances pertaining at the time of construction.

A Construction and Environmental Management Plan has been prepared by DBFL Consulting Engineers which addresses noise and vibration, traffic management, working hours, pollution control, dust control, road cleaning, compound/public health facilities and staff parking associated with the construction works, and is submitted as part of this SHD planning application.

All of the aforementioned plans include further information on the construction programme and construction related activities. The plans also address issues relating to site access, compounds, site security, waste management contractors' responsibilities etc.

3.11.2. Construction Programme / Phasing

It is estimated that construction of the development will take approximately five years to complete. A phasing plan also accompanies the planning application – please refer to Davey & Smith Architects drawing no. D1809.P18 and Fig. 3.2 below. The intended sequence of development may change post grant of planning permission as a detailed construction programme is dependent on contractor appointment, market and other considerations.

- **Phase 1** will consist of the delivery of the basement, Blocks A & B (97 no. units) and communal open space beside them (west of same between Blocks C & D);
- **Phase 2** will consist of the delivery of Blocks C & D (106 no. units) and public open space;
- **Phase 3** will consist of the delivery of Blocks E, F & G (147 no. units) and the remainder of works/open space etc.

Phasing Sequence	No. of Units	Other
First Phase	97	Blocks A & B, Communal Open Space
Second Phase	106	Blocks C & D, Public Open Space
Third Phase	147	Blocks E, F & G, Remainder of Works

Table 3.2 - Summary of phasing proposals

Figure 3.2 – Proposed Phasing

3.11.3. Site Preparation

Permission is sought for the demolition of all structures on site (4,196.8m^2). Car parking is to be provided in the form of ground parking and basement car parks. Blocks A, B, C, D, E & F are located above the proposed basements, accommodating 173 no. car parking spaces and 719 no. cycle parking spaces. There are an additional 36 no. surface car parking spaces also proposed (including 4 no. car club spaces and 5 det down spaces). Excavated material on site will predominantly be re-used on site / within the developer's control.

The contractor(s) will require connections to the following services / utilities for the duration of the works:

- Water supply
- Foul sewer
- Surface water sewer
- Electricity
- Telecommunications

Existing services / utilities within and adjoining the site will be protected during construction.

3.11.4. Construction Activities

The construction works associated with the project will be contained within the application site boundary. These works will include excavation, earthworks, etc.
Some construction activity may take place off-site within the control of the developer. These activities may include access and haul routes, site compound(s), storage of materials and soil/excavated material, screening and processing of existing materials for re-use within the development works, construction

parking, staff welfare facilities etc. These areas will be identified in the detailed CMP.

Typically, construction will commence at 07.00 to 19.00 Mondays to Fridays inclusive, between 08.00 to 14.00 on Saturdays and not at all on Sundays and public holidays. During the construction period, due to exceptional circumstances, construction work may be necessary outside these standard hours. If necessary, this will be agreed in advance with DCC.

The contractor will be guided by the Construction & Demolition Waste Management Plan which accompanies the application with regard to re-use, recovery, recycle and disposal of waste produced during construction. Chapter 12 of this EIAR, Material Assets: Resource and Waste Management, also considered the re-use recovery, recycle and disposal of waste arising from the development.

3.11.5. Construction Material

The proposed development will have a requirement for imported materials, primarily concrete, steel, stone and asphalt. The estimated quantities for the overall development are provided in the C & D WMP. The majority of new materials brought to site will be used immediately. The remainder will be stored within the site boundary.

Material excavated on the site will be used in construction. The re-use of this material reduces the quantity of materials being imported to the site. Prior to use, this material will be subject to appropriate testing to ensure material is suitable for construction. Locations to stockpile this material will be identified by the contractor(s) in the CMP.

3.11.6. Construction Traffic

A Construction Traffic Management Plan will form part of the detailed CMP to be prepared by the appointed contractor prior to commencement of development and will outline proposals for construction deliveries and staff accessing the compounds and construction sites.

During all phases of construction, access to all existing properties adjoining the development lands will be maintained. Local traffic management procedures will be put in place where required.

Site access / egress routes and construction traffic generation are discussed in the Traffic and Transport Assessment and reflected in the CMP and CEMP which accompanies the application.

3.12 Energy Statement

Conservation and Renewable Technologies that will be employed in part or in combination with each other for this development. These techniques will be employed to achieve compliance with the building regulations Part L and NZEB standards currently in public consultation.

3.12.1 Environment / Global Issues

Increasing levels of greenhouse gases have been linked with changes in climate and predicted global warming. By far the biggest human contribution to the greenhouse gases is in emissions of carbon dioxide. The development is likely to increase carbon dioxide levels in the atmosphere by the embodied emissions in the building materials used, and in the operational energy consumed during the life of each building.
To minimise the embodied emissions impact, materials will be sourced locally where possible (reducing carbon dioxide emissions associated with transportation), and preference will be given to reusing materials, and using materials in their natural state (reducing the emissions associated with processing).

3.13 Emissions and Waste

3.13.1 Effluents

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 established public system in the environs. Details of the impacts and remedial and reductive measures for surface water and foul drainage are recorded at Chapter 7 *"Water"* of this Environmental Impact Assessment Report.

3.13.2 Municipal Waste/Waste Management

A Waste Management Plan (WMP) will be prepared and shall be submitted to the Planning Authority for agreement prior to commencement of development on site. The WMP will demonstrate how the Construction Phase will comply with the following relevant legislation and relevant Best Practice Guidelines:

- *Waste Management Acts 1996*
- *Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)*
- *Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008)*
- *Department of the Environment, Heritage and Local Government – Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects – July 2006*

The Waste Management Plan will present the potential environmental impacts, proposed monitoring methodologies, limit values where applicable, based on the concept of Best Practice and the proposed mitigation measures to be implemented at the development site. Reference to National and International Standards shall also be included where relevant.

Waste materials generated by construction activities will be managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication - *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.*

Waste minimisation and prevention shall be the primary responsibilities of the Construction Project Manager who shall ensure the following:

1) Materials will be ordered on an *"as needed"* basis to prevent over supply
2) Materials shall be correctly stored and handled to minimise the generation of damaged materials
3) Materials shall be ordered in appropriate sequence to minimise materials stored on site
4) Sub-contractors will be responsible for similarly managing their wastes

Construction Waste Disposal Management

It is proposed that from the outset of construction activities, a dedicated and secure compound containing bins, and/or skips, and storage areas, into which all waste materials generated by construction site activities, will be established within the active construction phase of the development site.

Contaminated Soil

In the unlikely event that contaminated soils are discovered, these areas of ground will be isolated, tested for contamination in accordance with *2002 Landfill Directive (2003/33/EC),* and pending the results of laboratory testing, will be excavated and exported off-site by an appropriately Permitted Waste Contractor holding an appropriate Waste Collection permit and that this hazardous material will be sent for appropriate treatment / disposal to an appropriately Permitted / Licenced Waste Facility.

Domestic Waste Management

It shall be the responsibility of the Facilities Management Company to ensure that all domestic waste generated by apartment residents is managed to ensure correct storage prior to collection by an appropriately waste permitted waste collection company on a weekly basis.

Sufficient domestic waste storage areas shall be provided throughout the proposed residential development. It shall be the responsibility of the Facilities Management Company to ensure that appropriate signage is provided in each area notifying apartment residents of the importance to recycle domestic waste items in accordance with the requirements of the contracted Waste Collection contractor.

The proposed development shall be constructed and developed to minimise the generation of construction waste. During the construction phase, construction waste shall be stored and segregated in dedicated waste storage areas which shall optimise the potential for off-site reuse and recycling. All construction waste materials shall be exported off-site by an appropriately permitted waste contractor.

The development shall be designed to provide adequate domestic waste storage areas for common residential areas. This will promote the appropriate segregation at source of domestic generated waste from all residential units at the development. Waste bin storage areas shall be designed in a manner to ensure that appropriate signage for the correct waste disposal and recycling is available for residents.

The residential amenity unit, community use unit and 5 no. commercial / retail units shall have designated commercial waste bins for both general and recyclable waste which shall be stored within the boundaries of the building areas. Waste shall be collected on a weekly basis by an appropriately permitted commercial waste contractor.

3.14 Emissions

The principal forms of air emissions relate to discharges from motor vehicles and heating appliances. With regard to heating appliances, the emission of nitrogen oxides and carbon monoxide will be minimised by the use of modern, efficient heating appliances and as a result, the potential impact is estimated to be negligible. Exhaust gases from motor vehicles will arise from car parking areas and will be discharged directly to the atmosphere. Car parking for motor vehicles is provided at basement and surface levels. In general, it is noted that approximately 80% of all cars in Ireland run on unleaded fuel which can be expected to have a reductive effect on air emissions. It is expected therefore that the potential impact will be negligible.

Noise may be considered in two separate stages, during construction, and when the development is operational. Construction related noise impacts are an inevitable short term, limited inconvenience feature which, in general, is accepted by members of the public, subject to the standard controls typical of planning conditions attached to urban based development projects. These impacts can be reduced in a number of ways. It is standard practice to limit construction to normal working hours during the day. In addition, there are a number of regulations relating to noise during construction which the contractor will be expected to adhere to throughout the construction phase.

3.15 Direct and Indirect Effects Resulting from Use of Natural Resources

Details of significant direct and indirect effects arising from the proposed development are outlined in Chapters 4-14 which deal with *'Aspects of the Environment Considered'*. No significant adverse impact is predicted to arise from the use of natural resources.

3.16 Direct and Indirect Effects Resulting from Emission of Pollutants, Creation of Nuisances and Elimination of Waste

Details of emissions arising from the development together with any direct and indirect effects resulting from same have been comprehensively assessed and are outlined, where relevant, in the relevant in Chapters 4-14 which deal with '*Aspects of the Environment Considered'*. There will be no significant direct or indirect effects arising from these sources.

3.17 Forecasting Methods Used for Environmental Effects

The methods employed to forecast and the evidence used to identify the significant effects on the various aspects of the environment are standard techniques used by each of the particular individual disciplines. The general format followed was to identify the receiving environment, to add to that a projection of the *"loading"* placed on the various aspects of the environment by the development, to put forward amelioration measures, to lessen or remove an impact and thereby arrive at net predicted impact.

Where specific methodologies are employed for various sections they are referred to in the Receiving Environment (Baseline Scenario) sections in the EIAR. Some of the more detailed/specialised information sources and methodologies for a number of the environmental assessments are outlined hereunder.

3.18 Transboundary Impacts

Large-scale transboundary projects[4] are defined as projects which are implemented in at least two Member States or having at least two Parties of Origin, and which are likely to cause significant effects on the environment or significant adverse transboundary impact.

Having regard to the nature and extent of the proposed development, which comprises a residential development, located in Santry, within the administrative area of County Dublin, transboundary impacts on the environment are not considered relevant, in this regard.

3.19. Alternatives Examined

The consideration of Alternatives is an important part of the EIA process. By examining alternatives considered and indicating the main reasons for choosing the proposed development, it is possible to reduce or minimise environmental impacts and ensure that better solutions are not overlooked.

The EIA Directive (2014/52/EU) requires that Environmental Impact Assessment Reports include *"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."*

[4] The definition is based on Articles 2(1) and 4 of the EIA Directive and Article 2(3) and (5) of the Espoo Convention, respectively. http://ec.europa.eu/environment/eia/pdf/Transboundry%20EIA%20Guide.pdf

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001 (as amended) provides for, an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment, i.e.:

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

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

- Alternative locations;
- Alternative uses;
- Alternative layouts;
- Alternative processes.

Pursuant to Section 3.4.1 of the Draft Environmental Protection Agency (EPA) Guidelines on the *Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2017), the consideration of alternatives also needs to be cognisant of the fact that "*in some instances some of the alternatives described below will not be applicable - e.g. there may be no relevant 'alternative location'…"*

In accordance with Draft EPA Guidelines (EPA, 2017), different types of alternatives may be considered at several key phases during the process. As environmental issues emerge during the preparation of the EIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The Draft 2017 Guidelines also state *"Analysis of high-level or sectoral strategic alternatives cannot reasonably be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics'".*

The DHPLG 2018 EIA Guidelines state:

"Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. ***A 'mini- EIA' is not required for each alternative studied."*** *(Emphasis added).*

Thus, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process, and the main alternatives considered are identified below.

The location and type of development proposed has been determined by the land use zoning objectives contained in the Dublin CDP, which has been environmentally assessed, and statutorily adopted.

In the preparation of the CDP, screenings for SEA and AA were carried out. The SEA screening concluded that the Plan will not have significant adverse effects on the environment if implemented. The AA screening concluded that six European sites that have the potential to be significantly affected by the implementation

of the Dublin City Development Plan 2016– 2022 and therefore, a Stage 2 Appropriate Assessment of the plan was carried out. The Natura Impact Report concluded that *"assuming the successful implementation of the mitigatory objectives contained within the plan, there will be no adverse effects on the integrity of European sites arising from the development plan in isolation or in combination with other plans and projects".*

As the CDP, approved and adopted by Dublin City Council, already provides a strategic framework indicating the manner in which the site may be developed, the range of alternatives was therefore lessened. The overall development for the site in this case should comprise of:

- Residential uses
- Commercial uses
- Recreational uses
- Employment uses
- Open Space uses
- Development of pedestrian and cycle routes

Numerous considerations of alternatives for the overall form and content for the proposed development considered during the design stage explored details such as:

- Residential layout and mix
- Residential density
- Design and layout of open spaces
- Form and layout of the new access routes
- Form and layout of pedestrian and cycle routes

The development proposal in this case considered alternatives which are in keeping with the local, regional and national guidelines. In the first instance, the proposed development is considered relative to the *"do-nothing*", "*do-minimum*" and "*do-maximum"* scenarios.

3.19.1. Alternative Locations

The suitably of the proposed development location has been directed by the land use zoning objectives contained in the CDP.

The area of Santry is identified as a Neighbourhood Centre in the CDP. DCC states that the Neighbourhood Centres are areas that provide local facilities such as small convenience shops, hairdressers, hardware etc. within a residential neighbourhood and range from the traditional parade of shops to neighbourhood centres. Neighbourhood centres provide an essential and sustainable amenity for residential areas and it is important that they should be maintained and strengthened, where necessary.

Within the CDP, the subject site is zoned *'Z3'* with a stated objective *'to provide for and improve neighbourhood facilities*' where residential development is a *'permissible use'.* This land bank represents a considerable resource not only in the context of the CDP but in the context of Dublin city realising the population targets prescribed for the city in national, regional and local policy. The overarching policies and objectives contained in the CDP guide the proposed development, with the proposal designed to be consistent with provisions of the CDP and the Core Strategy contained therein.

Taking all the aforementioned into consideration, it is put forward that the most logical and practical location solution to addressing the current housing shortage is through facilitating the development of lands which consider residential development as an acceptable, permissible land use. The subject site comes within this category and therefore it seems appropriate that the proposed development is sited here. This

approach is in line with EPA Guidelines (2002 and 2017 Draft Guidelines) which recognises that it is not realistic to consider alternative options for projects which have been previously determined by a higher plan as detailed below:

"Hierarchy EIA is only concerned with projects. Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon. It is important to acknowledge that ***in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority*** *(such as a national plan or regional programme for infrastructure or a spatial plan)."* (Source: EPA Guidelines on the information to be contained in Environmental Impact Statements, Section 2.4.3 Alternatives, page 12).

3.19.2. Alternative Uses

The subject lands are currently occupied by the Chadwicks (formerly Heiton Buckley) builder's providers in a large industrial type building and associated yard and have no specific / relevant previous grant of permission for similar residential development attached to them.

As noted above, the development proposal is located on lands zoned in the existing CDP for land use objective '*Z3'*, which aims '*to provide for and improve neighbourhood facilities'* where residential development is a *'permissible use',* therefore; it is evident that the local authority supports the provision of residential development on the subject lands.

The CDP states that in both new and established residential areas, a range of uses will be permitted in principle, which has the potential to strengthen communities and encourage the enjoyment of residential amenity. Such uses include the provision of local shops, open space and recreation facilities, provided they are appropriate in scale.

The design parameters for the development proposal are set down in the first instance in the CDP which has determined the land use mix, the building height / plot ratio and other physical characteristics. The development proposal is put forward having been guided by detailed discussions with the relevant DCC departments, Planning, Roads & Traffic, Parks and Water and Drainage prior to the proposed development being prepared. These detailed discussions highlighted the environmental issues to be addressed, which informed the design process.

Alternative site layouts and siting progressed throughout the design process in order to minimise the impact on the receiving environment at the earliest opportunity. The initial stage involved a constraints analysis of the land within the proposed development site to identify all high-level constraints and aggregate them against the site to allow a suitable layout to be developed.

The main alternative use for the subject lands would be to keep a tenant in place in the large industrial type building and associated yard. In any event, it is envisaged that in the long term, these lands will be developed for residential purposes to accommodate much needed new housing in Dublin.

As such it was not considered necessary to consider alternative uses for the proposed development. This approach is in line with EPA Guidelines (2002 and 2017 Draft Guidelines) which recognises that it is not realistic to consider alternative options for projects which have been previously determined by a higher plan as detailed below:

"Hierarchy EIA is only concerned with projects. Many projects, especially in the area of public infrastructure, arise on account of plans, strategies and policies which have previously been decided upon.

*It is important to acknowledge that **in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority** (such as a national plan or regional programme for infrastructure or a spatial plan)."* (Source: EPA Guidelines on the information to be contained in Environmental Impact Statements, Section 2.4.3 Alternatives, page 12).

3.19.3. Alternative Design & Layouts

The development proposal is put forward with the consent of the landowner (the Applicant) and as such, the development process has seen the applicant and the local authority work together to ensure that a number of design alternatives and layouts have been considered.

The design parameters for the development proposal are set down in the first instance in the CDP which has determined the land use mix, the building height / plot ratio and other physical characteristics. The development proposal has been guided by detailed discussions with the relevant DCC departments, Planning, Roads & Traffic, Parks & Water and Drainage prior to the Proposed Development being prepared. These detailed discussions highlighted the issues to be addressed, which informed the design process.

Alternative site layouts and siting progressed throughout the design process in order to minimise the impact on the receiving environment at the earliest opportunity. The initial stage involved a constraints analysis of the land within the proposed development site to identify all high-level constraints and aggregate them against the site to allow a suitable layout to be developed.

The following analyses the alternative development options that were considered for the subject site, and then describing design options and changes which were incorporated into the scheme as the proposals progressed through the design process and pre-application discussions with the Planning Authority (S.247 pre-planning consultation) and with An Bord Pleanála (S. 5 Pre-application consultation).

The earliest proposals for the development of the site considered a greater focus on the layout and form of apartment blocks for the subject site as shown in Figure 3.3 over.

Figure 3.3 Earlier alterative design layout for the subject lands

The development proposal has been guided by the pre planning guidelines by both the local authority and the applicant's design team.

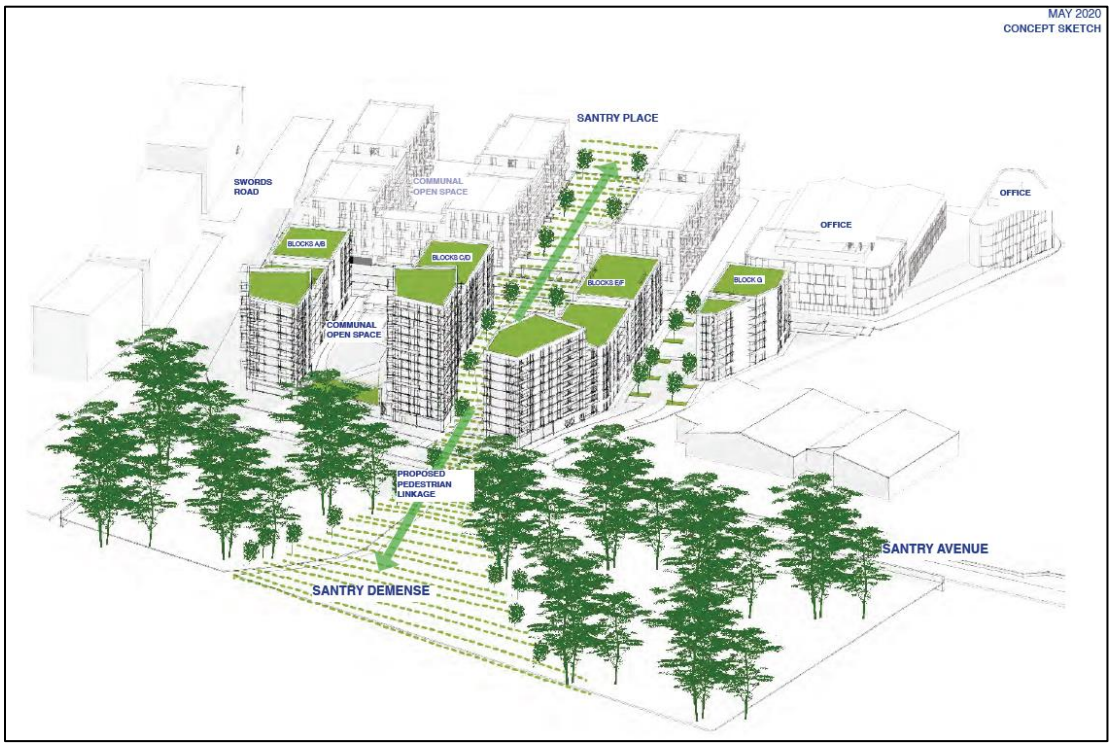

Figure 3.4 Earlier Sketch Layout of the proposed scheme

These considerations have informed the consideration of alternative layouts and designs, open space provision, the layout of the proposed north-south throughway through the subject lands, addressing the issues of population and human health, biodiversity, archaeology and traffic and access arrangements.
The layout put forward for permission has also been informed by the feedback received at numerous pre-application consultation meetings held with DCC Planning Department under Section 247 of the Planning and Development Act. A series of meetings have been held with the City Council's Planning Department on the substance of the proposed development. These meetings were held with the following people from the Planning Department: Siobhan O'Connor (Senior Executive Planner), Natalie de Roiste (Executive Planner) and Maria Treacy (Executive Engineer).

In addition, meetings and consultation took place with officials from the Roads & Traffic Section, Drainage, Parks and Housing Departments, between the applicant and various relevant members of the design team. The outcome of the various aforementioned meetings have been carefully considered, taken on board and incorporated into the development proposal now submitted to An Bord Pleanála for pre-application consultation.

Figure 3.5 below details the layout submitted to An Bord Pleanála.

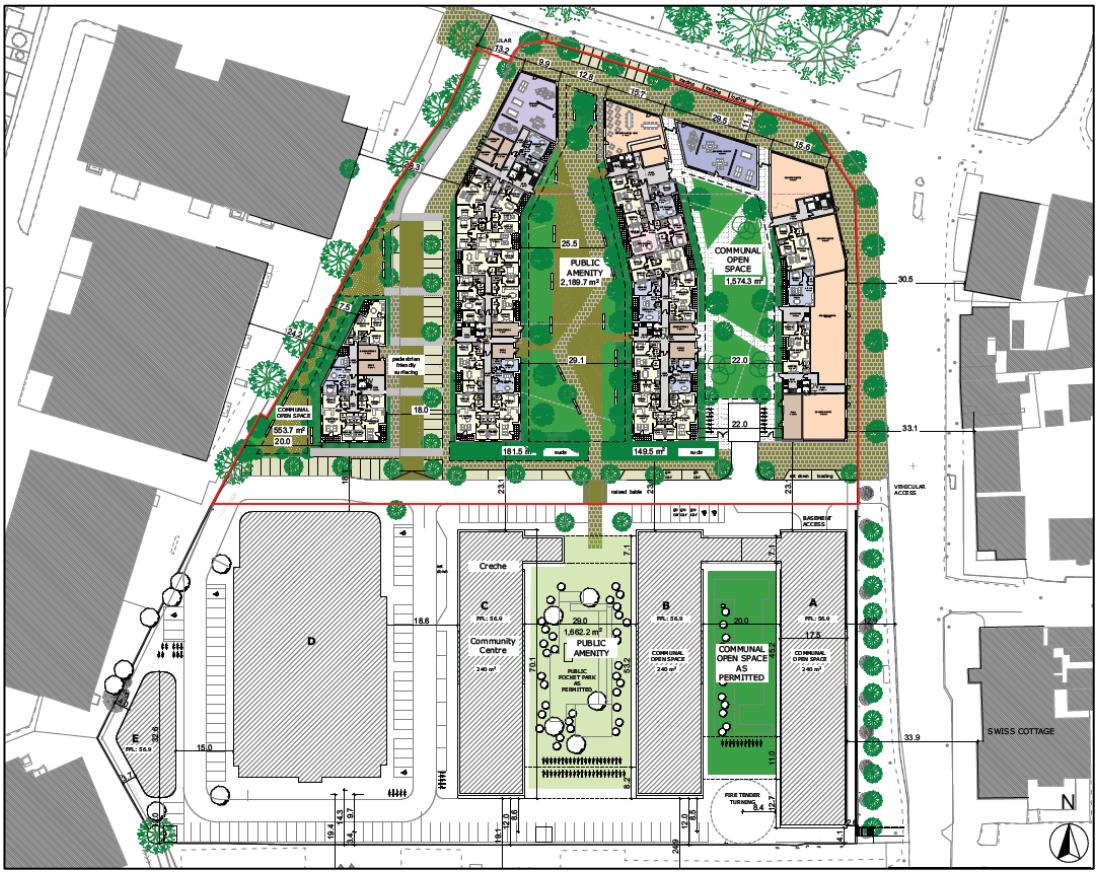

Figure 3.5 Layout submitted to An Bord Pleanála

Insofar as the EIA is concerned, a number of iterations of the site layout and alternative designs were prepared and considered for the project. This involved taking into account the various technical and environmental considerations which are addressed in the EIA and which informed the design of the proposed development.

The design process, having taken into consideration the discussions held with the DCC, individual consultants who inform the chapter of this EIAR, and the feedback received from An Bord Pleanála at the Pre-Application Consultations, has resulted in the layout now put forward for permission. It is considered that this layout represents the best utilization of these zoned lands, complies with the objectives for the lands contained in the CDP and mitigates against significant environmental impacts.

In summary, the development proposal will, *inter alia*:

- Comply with the land-use zoning designation for the subject site
- Provide appropriate accommodation which can cater for different life stages by delivering apartments in a mix of 1, 2 & 3 bedroom units
- Provide an appropriate density of development, which will develop a new urban quarter in Santry
- Comply with the Planning Authority's detailed quantitative standards for residential development as set out in the existing Dublin CDP and, where appropriate, Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities (2018)

- Provide a level of social housing (35 no. units) with equates to circa 10% of the overall quantum of proposed dwellings

- Support sustainable transport modes via the creation of pedestrian and cycle connections

- The proposed development also provides for 5 no. commercial / retail units at ground floor level facing onto Santry Avenue and Swords Road. The development provides a community use unit (188.1m^2) at ground floor level of Block E and a residential amenity unit (187.9m^2) at ground floor level located between Blocks A and D.

- Protect the existing residential amenity enjoyed by the residents of neighbouring developments

- Preserve, where feasible, the natural amenity characteristics of the site, and provide for new features where necessary in order to ensure that the visual impact of the development is minimised. This has been achieved by allocating areas of open space for recreation, all of which will be developed in accordance with the overall Landscape Plan for this proposed development.

Figure 3.6 Site Layout Plan being put forward for permission

With regard to the layout put forward for permission, the iterative process included alternative site layouts that were considered with the objective of submitting an overall high-quality designed scheme which has undergone a robust consideration of relevant alternatives in reference to the comparison of environmental effects and meets the requirements of the EIA Directive, based on the multidisciplinary review across all environmental topics.

The final design now put forward for permission presents the most effective utilization of this significant site whilst also fulfilling the objectives of the Planning Authority and providing for long term, sustainable housing for which there is a considerable demand at present and providing for a use of material, architectural form and colour to create a high level of visual amenity.

An Bord Pleanála Opinion

During the course of the pre-application tri-partite meeting with the Board, and within the Opinion of the Board, which was issued thereafter, details were set out regarding the specific information to be included as part of a SHD planning application and included an Urban Design Analysis, Public Realm detailed drawings and cross sections of the same, a Daylight / Sunlight Analysis of the proposal, detailed Landscaping Plan, a Taken In Charge drawing, report to detail the proposed materials and finishes, a housing quality assessment, a Construction Traffic Management Plan and a Material Contravention Statement where necessary.

The proposed design consideration for the subject lands were the subject of 2no. formal pre-application meetings with DCC as well as one formal SHD meeting with An Bord Pleanála (which DCC attended).

Following the receipt of detailed feedback from An Board Pleanála during the course of the pre-application meeting, and following receipt of the opinion of the Board (as well as that received from DCC) which advised on further consideration relating to aspects of the proposed development, the applicant and design team have undertaken a number of revisions to the development proposal which is reflected within the final development proposal submitted for permission as part of a SHD planning application.

As noted within the development description sections of this chapter, the scheme now comprises a quantum of residential development consisting of 350 no. dwellings.

The key changes proposed related to:

- Moving of the location of the proposed 14 storey block of apartments from Block D to Block A
- Changes to the mix of dwelling types;
- Greater enclosure of streets through the location of buildings, notably Block G;
- Changes to the layout, distribution and function of open spaces;

Responses to each of these items have been provided as part of the SHD planning application pack, and the scheme has been updated and improved where necessary as a result.

The proposed development takes into account all effects raised with respect to the pre-application design submitted to An Bord Pleanála, and within the Board's Opinion, and provides for a sustainable development that has been optimised to emphasise positive environmental effects whilst reducing negative environmental impacts wherever possible.

The main consideration has been to achieve a design solution for the preferred layout which would enable all of the functional and operational requirements of the scheme to be met, whilst also ensuring the sensitive siting of new elements within the site. Having established the quantum, type and mix of residential units, a series of alternatives were considered by the design team. This process has enabled the final proposal to evolve. The need to provide for an appropriate level of enclosure of open spaces through the built form, in addition to landscaping, has driven the final layout form and design solution as proposed as part of the SHD planning application.

Alternative locations for the various built elements of the development were considered and examined at the design stage.

3.19.4. Alternative Processes

This is a residential / urban development and therefore there are no alternative processes to be considered.

3.20. The *"Do Nothing"* Scenario

The "*Do Nothing"* Scenario describes the impacts of the proposed development, if it were not carried out. The positive benefits to the national, regional and local community arising from the development of this site would not materialise in the *"Do Nothing"* scenario. In addition, the *"Do Nothing"* scenario would result in non-compliance with the NPF which contains the following relevant objectives:

- **National Policy Objective 3a** - Deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements;

- **National Policy Objective 32** - To target the delivery of 550,000 additional households to 2040.

This alternative is therefore not attractive with the site possibly remaining occupied by a tenant in the large industrial type building and associated yard on site.

3.21. The *"Do Minimum"* Scenario

The *"Do Minimum"* Scenario could involve the construction of the subject site at the minimum density prescribed in the CDP for this area, i.e. net residential density of c.35 units per hectare. As outline in the Planning Report which accompanies the application the net developable area is c. 1.50 hectares which would result in a development of approximately 233 no. dwellings. However, the current proposal is supported by national and local planning policy to provide housing and intensify land use through increased densities. The CDP supports higher densities in appropriate areas in line with the standards set out in the CDP will promote the development of high quality, sustainable densities and the consolidation of urban form. This approach is consistent with, and has been informed by, Guidelines for Planning Authorities on Sustainable Urban Development (Cities, Towns and Villages), (Department of Environment, Heritage and Local Government, 2009), and its companion document, Urban Design Manual: A Best Practice Guide.

Alternatively, the *"Do Minimum"* scenario could involve the construction of the application site via a number of individual planning applications. While this alternative may reduce the level of construction activity in the short term, it is considered that it would have the effect of spreading construction over a longer period of time and could result in incoherent development which will not deliver the objectives of the CDP. The *"Do-Minimum"* scenario would also result in reduced efficiencies in construction and delays.

3.22. The "*Do Maximum"* Scenario

The *"Do Maximum"* Scenario could involve the construction of the entire site in one phase of development i.e. circa 350 no. residential units. This would involve a greater degree of disruption to the receiving environment in the short term. This alternative was discounted on the basis of practical considerations relating to phasing of development, funding and feasibility.

3.23. Conclusion on Assessment of Alternatives

Based on the foregoing, it is considered that all reasonable alternatives to the proposed development were considered and no alternatives have been overlooked which would significantly reduce or further minimise environmental impacts.

3.24. The Existence of the Project

Pursuant to the EIA Directive an EIAR document is required to set out a description of the project processes, activities, materials and natural resources utilised; and the activities, materials and natural resources and the effects, residues and emissions anticipated by the operation of the project.

The proposed development is a residential development including associated infrastructural works, 5 no. commercial / retail units, a community use unit, a residential amenity unit and areas of open space. The primary, direct, significant environmental effects will arise during the construction stage. As a result, post-construction, the operation of the proposed development is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on population and human health, biodiversity, soils, water, air, climate, or landscape.

The primary likely and significant environmental impacts of the operation of the proposed development are fully addressed in this EIAR document; and relate to Population and Human Health, Landscape and Visual Impact and Noise and Air impacts associated with the traffic generated.

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic – which in many instances – are often difficult to quantify due to complex inter-relationships. However, all cumulative secondary and indirect impacts are unlikely to be significant; and where appropriate, have been addressed in the content of this EIAR document.

3.24.1 Description of Changes to the Project

Draft Guidelines on the information to be contained in environmental impact assessment reports were published by the EPA in August 2017.

The draft guidelines state in relation to change:

"Very few projects remain unaltered throughout their existence. Success may bring growth; technology or market forces may cause processes or activities to alter. All projects change and- like living entities - will someday cease to function. The lifecycles of some types of projects, such as quarries, are finite and predictable. Such projects often consider their closure and decommissioning in detail from the outset, while for most projects a general indication of the nature of possible future changes may suffice. While the examination of the potential consequences of change (such as growth) does not imply permission for such growth, its identification and consideration can be an important factor in the determination of the application."

- *Descriptions of changes may cover:*
- *Growth*
- *Decommissioning*
- *Other Changes."*

As per the draft EPA guidelines and in the interests of proper planning and sustainable development, it is important to consider the potential future growth and longer-term expansion of a proposed development in

order to ensure that the geographical area in the vicinity of the proposed development has the assimilative carrying capacity to accommodate future development.

Given the proposed site layout extent, the limitations of physical boundaries and adjoining land uses, the potential for growth of the proposed development is considered limited and confined which will have a negligible impact.

The parameters for the future development of the area in the vicinity of the subject site are governed by the CDP. The future (re)development of adjacent lands will be the subject of separate planning applications in the future, where they are identified as being suitable for development, and where the provision of the requisite physical and other infrastructure is available.

3.24.2 Description of Secondary and Off-Site Developments

No significant secondary enabling development is deemed necessary to facilitate the proposed development. The planning application includes details of the necessary road works, which are required to facilitate this development. These works are assessed within this Environmental Impact Assessment Report.

3.24.3 Risks of Major Accidents and/or Disasters

The surrounding context consists of a mix of residential, agricultural, employment, educational and open space public amenity lands. It does not include any man-made industrial processes (including SEVESO II Directive sites (96/82/EC & 2003/105/EC) which would be likely to result in a risk to human health and safety.

Article 3 of the Environmental Impact Assessment (EIA) Directive 2014/52/EU, requires the assessment of expected effects of major accidents and/or disasters within an EIA. Article 3(2) of the Directive states that *"The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned".*

3.25. Construction Phase

The Construction Phase would be expected to commence in Q1 2022, and accordingly, the projected completion of the buildings by Q4 2026.

The Construction Environmental Management Plan (CEMP) and Construction & Demolition Waste Management Plan (CDWMP), which are included with this planning application, should be referred to for more detail on the Construction Phasing and Environmental Measures associated with same. The appointed Contractor will prepare a detailed final CEMP, including detailed construction phasing and a Traffic Management Plan (TMP).

3.26. Description of the Operational Phase

The proposed development consists of residential apartments in buildings ranging in height from 7 to 14 no. storeys. The proposed development also provides for 5 no. commercial / retail units at ground floor level facing onto Santry Avenue and Swords Road. The development provides a community use unit (188.1m^2) at ground floor level of Block E and a residential amenity unit (187.9m^2) at ground floor level located between Blocks A and D.

The primary direct significant environmental effects will arise during the Construction Phase. As a result,

the Operational Phase of the development is therefore relatively benign and not likely to give rise to any significant additional impacts in terms of activities, materials or natural resources used or effects, residues or emissions which are likely to have a significant impact on human beings, flora and fauna, soils, water, air and climate.

3.27. Related Development and Cumulative Impacts

The proposed development also has the potential for cumulative, secondary and indirect impacts particularly with respect to such topics as traffic which in many instances are often difficult to quantify due to complex inter-relationships. However, all cumulative, secondary and indirect impacts are unlikely to be significant and, where appropriate, have been addressed in Chapter 15 (Interactions) and the cumulative impacts are fully addressed in the relevant specialist Chapters of this EIAR.

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

As such, with the necessary mitigation for each environmental aspect, it is anticipated that the potential cumulative impact of the proposed development in conjunction with the other planned developments will be minimal.

Part B – Effects on the Environment

4.0. Population and Human Health

4.1. Introduction

This chapter of the EIAR provides an assessment of the potential impacts of the development proposal on human beings, population, and human health within the vicinity of the application site and an assessment of these issues.

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development. Ultimately, all the impacts of a development impinge on human beings, directly and indirectly, positively and negatively.

The potential impacts on people identified in this EIAR, arising from the proposed development, relate to noise and dust nuisance, visual amenity and traffic etc. Most of these issues are addressed in specific chapters within the EIAR, including the risk of major accidents / disasters associated with same.

This Chapter has been prepared by Armstrong Fenton Associates Planning Consultants (Bryan Meredith, BA, MRUP, MIPI, MRTPI).

4.2. Assessment Methodology

European Commission guidance relating to the implementation of the 2014 Directive, in reference to "human health" states: *"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 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*[5]".

The assessment involved a desktop study of the relevant planning sources and other demographic information relevant to the area outlined in Chapter 2 of this EIAR and information from the Central Statistics Office (CSO).

Census information used in this chapter has been divided into State, County, Town and District Electoral Division (DED) level where possible. While the primary focus of this EIAR is the lands located within the immediate vicinity the development proposal i.e. Santry lands, Census statistics at a DED level have been used to assess the effects on the existing population as the DED level data generally provides the most accurate picture of existing population in the vicinity of a development. The proposed development lies within Whitehall C DED, as shown in Figure 4.1, with the 2016 Census declaring the total population of the Whitehall C DED as 2,153 persons.

Based on this study, it was possible to consider the presence, importance and sensitivity of the population and the potential likely significant impacts on both the local and wider community. Based on these sources, the assessment involved a desk study of a range of planning and other sources. A profile of the residential communities adjacent to the proposed development is presented under the following headings:

- Land Use/ Settlement Patterns;
- Population Growth;

[5] *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report,* European Commission, 2017 http://ec.europa.eu/environment/eia/eia-support.htm

- Socio-economic Profile;
- Community Facilities;
- Movement and Transportation.
- Landscape and Visual
- Human Health

Chapter 1 of this EIAR noted the likely environmental effects which were assessed at a Strategic Level as part of the CDP. The public was consulted in the making of the CDP and their views taken into account by DCC in finalising and adopting the CDP.

Perceptions of the proposed development are subjective however it is considered that the impacts presented are representative of the impacts on the majority of those residing/working within the study area.

4.2.1. Significant of Impacts

In line with the EPA's "*Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports"* (EPA, 2017); seven generalised degrees of impact significance are used to describe impacts as detailed in Table 4.1 below.

Significance of Effect	Definition
Imperceptible	An effect capable of measurement but without significant consequences
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 4.1 Definition of Significance of Effects

In addition, the following terms detailed in Table 4.2 & 4.3 below are defined when quantifying the quality of effects and the duration and frequency of effects.

Quality	Definition
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 forecast error*
Negative / Adverse Effects	*A change which reduces the quality of the environment*

Table 4.2 Definition of Quality of Effects

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-Term Effects	Effects lasting one to seven years
Medium-Term Effects	Effects lasting seven to fifteen years
Long-Term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

Table 4.3 Definition of Duration of Effects

4.3. Characteristics of Proposed Development

The development proposal is described in detail in Section 1.2 of this EIAR. The development proposal comprises of, *inter alia*, 350 no. residential dwellings, 5 no. commercial / retail units at ground floor level facing onto Santry Avenue and Swords Road. The development provides a community use unit (188.1m^2) at ground floor level of Block E and a residential amenity unit (187.9m^2) at ground floor level located between Blocks A and D, public open space and all associated site development works.

Vehicular access to the proposed development will be via two proposed access points: (i) on Santry Avenue and (ii) off Swords Road, and as permitted under the adjoining development at Santry Place. Permission is sought for the demolition of the existing buildings on site (4,196.8m^2).

4.4. The Existing Receiving Environment (Baseline Situation)

4.4.1. Introduction

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.

The existing environment is considered in this section under the following headings:

- Land-Use Planning / Settlement Patterns;
- Population Growth
- Socioeconomic Profile
- Community and Outdoor Facilities
- Movement and Transport
- Landscape and Visual
- Human Health

4.4.2. Study Area

The application site measures c. 1.50 hectares and forms part of the lands zoned *'Z3'* in the CDP which permits in principle residential development. The application site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (Ref.s 2713/17 & 2737/19) and to the west by the Santry Avenue Industrial Estate.

The application site is currently occupied by the Chadwicks (formerly Heiton Buckley) building providers in a large type building and associated yard.

The primary focus of this EIAR are the lands in the immediate vicinity of the application site. The entirety of the development site, is contained within the Whitehall C DED. A DED is the smallest area for which Census statistical data is published and therefore provides a detailed analysis of population fluctuations and demographic trends. For purpose of this EIAR the study area is therefore the Whitehall C DED.

The EPA Guidelines (2002) and Advice Notes (2003) identify sensitive receptors as neighbouring landowners, local communities and other parties which are likely to be directly affected by the project. In particular homes, hospitals, hotels, schools, community facilities and commercial premises are noted. Regard is also given to transient populations including drivers, tourists and walkers.

The sensitive receptors impacted upon by Air, Noise and Visual effects are identified in the relevant Chapters of this EIAR (Chapters 8, 9 and 10). The existing receptors specifically relevant to this Chapter include:

- The residents of the Santry Place to the south of the subject site and the former "Swiss Cottage" site to the south-east
- Users of Santry Demesne Park to the north
- Staff of the Santry Avenue Industrial Estate to the west of the subject site

Future receptors will be the residents of the proposed development and the users of the proposed 5 no. commercial / retail units at ground floor level facing onto Santry Avenue and Swords Road, the community use hub unit at ground floor level of Block E and the residential amenity unit at ground floor level located between Blocks A and D.

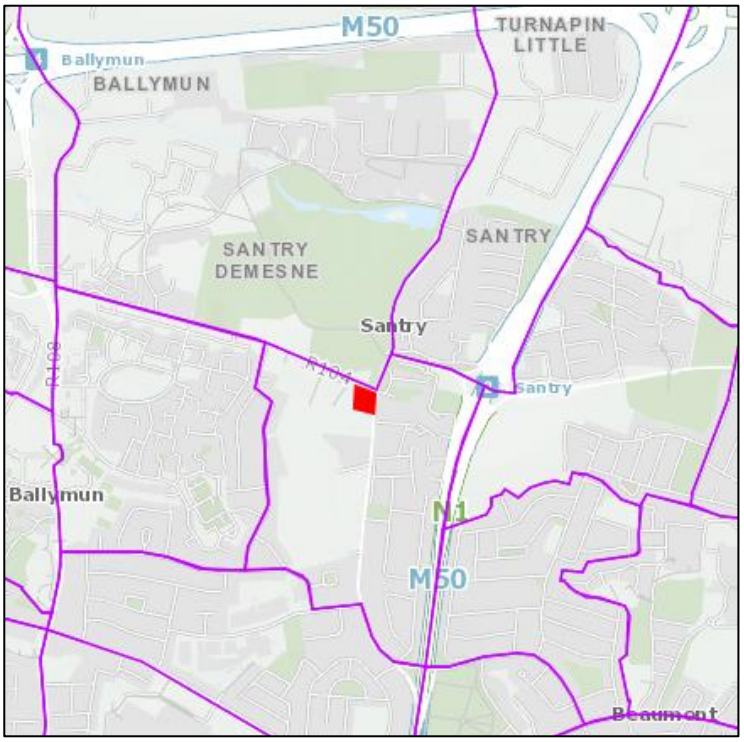

Figure 4.1 Whitehall C DED (subject site in red)

4.4.3. Land Use Planning/Settlement Patterns

The application site is currently occupied by the Chadwicks (formerly Heiton Buckley) builder's providers in a large industrial type building and associated yard. There is no other relevant or significant planning history attached to the site.

To the immediate west of the site is Santry Avenue Industrial Estate. The application site is bound to the north by the Santry Avenue, north of which lies Santry Demesne Park. To the south of the subject site, the permitted Santry Place development (Ref.s 2713/17 & 2737/19), is currently being developed by the Applicant. To the east, the site abuts Swords Road.

Within the study area, the existing settlement pattern provides for a varied mix of uses including residential, light industrial, recreational, retail and service uses. Residential and proposed residential uses occupy the largest proportion of the study area. Enterprise and employment uses are concentrated to the south of the study area. Education, community and institutional uses also permeate the study area.

4.4.4. Population Change

For the purposes of population evolution and growth forecasting, this EIAR has examined Census results from both the 2011 and 2016 Census in terms of the State, County and Local Level i.e. both the catchment area of Santry and the Whitehall C DED. The Study Area for the purposes of this methodology is therefore the Whitehall C DED.

The Whitehall C DED experienced minor decrease in population between 2011 and 2016 with the population decreasing by 42 persons from 2011 to a total population of 2,153 persons in 2016. This equates to a decrease of circa 1.9% for the study area over the five year period. Prior to this, the Whitehall C had a growth rate of circa 0.7% between 2006 and 2011.

Please refer to Table 4.4 below for details of population changes at State, County and Local Level from 2011 to 2016.

	2011 Population	2016 Population	Actual Change	% Change
State	4,588,252	4,761,865	173,613	4%
Dublin County	1,273,069	1,347,359	74,290	5.8%
Santry Catchment Area	14,832	15,679	847	5.7%
Whitehall C DED	2,195	2,153	42	-1.9%

Table 4.4 Population Change at State, County and Local Level 2011-2016

In addition to the resident population, there is also a significant working population within the study area.

4.4.5. Socioeconomic Profile

The socio economic profile of the study area is presented using 2011 and 2016 Census data under the headings of household formation, age profile, dependant age cohorts (0-14 and 65+ years), the working age group (15-64 years) and the 25-44 age cohort.

4.4.5.1. Household Formation

The 2016 Census results state that the total number of households in the study area was 824. This is a decrease of 5 no. dwellings (-0.6% change) from the 2011 Census.

The average household size for the State as a whole was 2.75 persons in 2016 with county Dublin having average household size of 2.76. Based on the above, the study area has a generally consistent household size when compared with both the State as a whole and county Dublin.

4.4.5.2. Age Profile

This section provides a comparative demographic breakdown of the study area with Whitehall C DED, County Dublin and the State. For the purposes of analysing the receiving environment, three factors will be examined:

(i) the dependant population (i.e. those persons within the 0-14 and 65+ age cohorts)

(ii) the working/independent population (i.e. those persons residing in the 15-64 year age cohorts) and

(iii) those persons within the family formation age cohorts, aged 25-44

Tables 4.5 & 4.6, below, detail the demographic breakdown of the Whitehall C, County Dublin and the State from both the 2011 and 2016 Census.

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years	Total Population
State	979,590	580,250	1,450,140	1,042,879	535,393	4,588,252
Dublin	245,792	172,951	444,900	270,690	139,276	1,273,069
Santry Catchment Area	2,368	3,309	4,014	3,102	2,421	15,217
Whitehall C DED	349	300	622	527	397	2,195

Table 4.5 Age Profile at State, County and Local Level 2011

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years	Total Population
State	1,006,552	576,542	1,406,291	1,135,003	637,567	4,761,865
Dublin	259,953	170,731	455,749	295,942	164,984	1,347,359
Santry Catchment Area	2,410	3,160	4,279	3,248	2,582	15,679
Whitehall C	322	300	585	549	397	2,153

Table 4.6 Age Profile at State, County and Local Level 2016

Tables 4.7 & 4.8, below, detail the percentile of each age cohort in Whitehall C DED, County Dublin and the State from both the 2011 and 2016 Census.

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years
State	21.35%	12.65%	31.60%	22.73%	11.67%
Dublin	19.3%	13.6%	34.9%	21.3%	10.9%
Santry Catchment Area	15.6%	21.7%	26.4%	20.4%	15.9%
Whitehall C DED	15.9%	13.7%	28.3%	24.1%	18%

Table 4.7 Age Profile as percentile at State, County and Local Level 2011

	0-14 years	15-24 years	25-44 years	45-64 years	65+ years
State	21.14%	12.11%	29.53%	23.84%	13.39%
Dublin	19.3%	12.7%	33.8%	22%	12.2%
Santry Catchment Area	15.4%	20.1%	27.3%	20.7%	16.5%
Whitehall C DED	15%	13.9%	27.2%	25.5%	18.4%

Table 4.8 Age Profile as percentile at State, County and Local Level 2016

Figure 4.2, below, illustrates the demographic breakdown of age cohorts in Whitehall C DED, Santry Catchment Area, County Dublin and the State from the 2016 Census

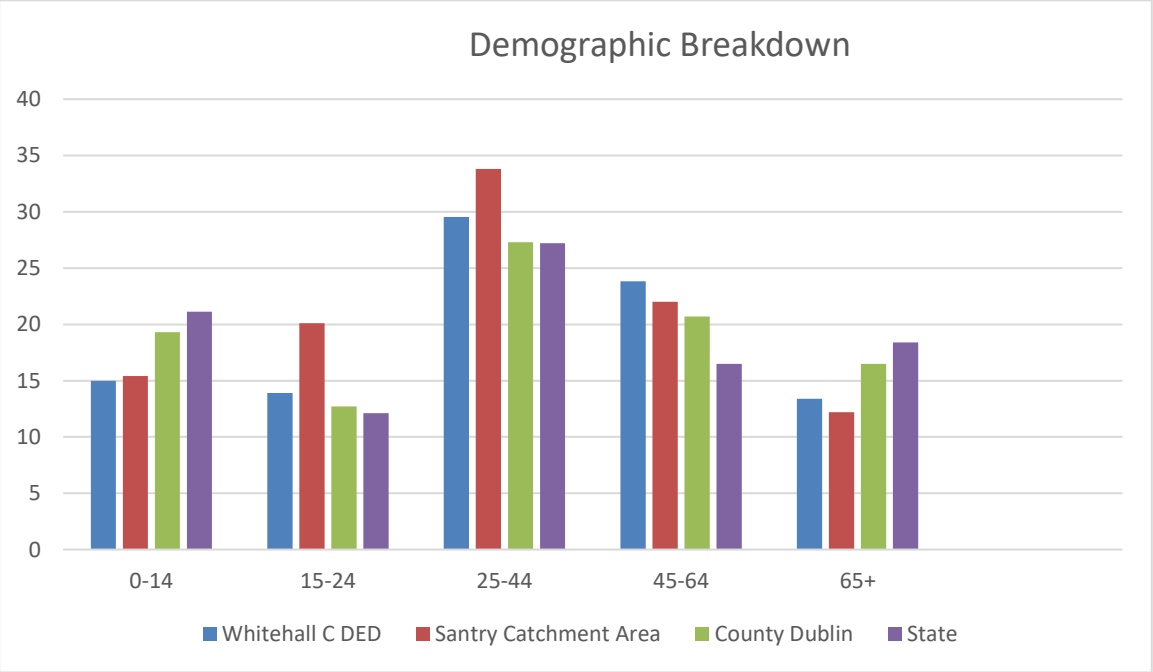

Figure 4.2 Age profile of the defined areas

4.4.5.3. Dependant Age Cohorts (0-14 and 65+ years)

The proportion of dependants (aged 0-14 and 65+ years) within the study area was recorded at 32.9% of the population in the 2016 Census. This is a slight decrease from the 2011 Census results which recorded the age dependant cohort within the study area at 34%.

The proportion of dependants (aged 0-14 and 65+ years) for the State as a whole was recorded at 35% of the population in the 2016 Census. This is a slight increase from the 2011 Census results which recorded the age dependant cohort for the State at 33%.

Based on the above, the study area can be seen to be not following the national trend for an increase in the age dependant cohort. At the study level, the younger age group (0-14 years) represents the minority of the age dependant cohort (44% of the study area dependant age population and 56% of the State dependant age population).

These figures indicate that the study area has a slightly older population likely made of up older dependants than young families. It is evident that it is the 65+ age cohort that contributes most heavily to the dependant population, which has implications for the level and type of service provision across CDP area with a likely demand for retirement care facilities. However, it should be noted that the split of the dependant age cohorts is a 44/56 split and as such over the next decade the younger proportion of this age cohort will move into the working age groups and will likely increase pressure on future housing demands.

4.4.5.4 The Working Age Group (15-64 years)

The Working Age Group is defined as those persons residing within the 15-64 year age cohort. The majority of the population, in all areas examined, resides within this age cohort, which again reflects the youthful population structure of the study area and the State as a whole.

The working age group demographic within the study area represented 66.6% of the population in the 2016. This is a slight increase from the 2011 Census results which recorded the working age group demographic within the study area at 66%.

The working age group demographic for the State represented 65.5% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the working age group demographic for the State at 67%.

Based on the above, the study area can be seen to be not following the national trend for an decrease in the working age cohort. Notwithstanding same, the high percentile of the working age group residing in the study area (66.6% of the population) has implications on demand for housing, services, etc. in order to service this population age, which the proposed development may contribute to satisfying this demand.

4.4.5.5. The 25-44 Age Cohort

The 25-44 age cohort is most likely to look to purchase a home, start a family and settle into a long-term community. It is therefore important to analyse this age cohort in particular as they will have the greatest impact on the social and economic conditions for the short and medium term, with regard to housing, employment and childcare facilities.

The 25-44 age cohort within the study area represented 27.17% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the 25-44 age cohort within the study area at 28.33%.

The 25-44 age cohort for the State as whole represented 29.53% of the population in the 2016. This is a slight decrease from the 2011 Census results which recorded the 25-44 age cohort for the State at 31.60%.

For both the study area and the State the 25-44 age cohort represents the largest age demographic of the population. It is considered that the current demand for housing reflects the large percentage of this age cohort in the existing population. It is largely this age cohort that begins to have families and set up independent households, all of which has medium and long term social and economic implications and impacts on the demand for housing. The provision of housing for these group will also have an impact on workforce retention and therefore future economic growth of the area.

4.4.6 Community and Outdoor Facilities

The subject site area and its environs are well served with a range of existing community facilities.

To the immediate north of the subject lands, Santry Demesne hosts a number of sporting and recreation facilities, including the Morton Stadium, Clonliffe Harriers Athletic Club, Trinity College Sports Ground and playing fields and open areas.

South of the subject site the Omni Shopping Centre is located, providing retail options, restaurants and cinema. Numerous creche, national schools and secondary schools are within a 2km catchment area of the site also. Trinity Comprehensive School, Ballymun Comprehensive School and St. Aidan's CBS are within that stated catchment area.

The Whitehall C DED also includes a number industrial centres with a wide variety of business operating from there. Please refer to the Social Infrastructure Assessment which accompanies the planning application for a complete list of said business.

4.4.7 Movement and Transport

4.4.7.1. Road Network

Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).

4.4.7.2. Pedestrian & Cycle Network

The proposed development also provides for pedestrian and cyclist access from both Swords Road and Santry Avenue, whilst enabling direct access to the permitted development south of the application site at Santry Place. The proposed connections are made in compliance with Greater Dublin Area Cycle Network Plan, 2013 and the Transport Strategy for the Greater Dublin Area 2016-2035.

The front of the site will be highly accessible to pedestrians with the opening up of the lands to the public realm, as opposed to the current gated situation as a result of the existing builders merchants. In addition, a strong, pedestrian frontage on Santry Avenue and Swords Road will be provided, providing access for the public to access the proposed commercial units, open spaces and residential units, through the set back of the buildings from the public realm.

4.4.7.3. Public Transport

The site is served well by public transport. The subject lands are in close proximity to a high frequency public transport (Swords Road Quality Bus Corridor), and the accessibility of M50 / M1 motorways. The

current layout of the proposed development also takes into account the latest route proposal[6] along Swords Road for BusConnects and will not impact on the delivery of same.

4.4.8. Landscape and Visual

The application site measures c. 1.5 hectares and is currently occupied by Chadwicks Builders Merchants (formerly Heiton Buckley Builders Merchants) in a large industrial type building with an associated yard and car parking. The site is roughly square in shape and is generally level with the road but raises slightly at the southern end.

The existing boundary to the Swords Road comprises a steel fence and mature hedging, while the boundary at Santry Avenue, consists of a low wall with a steel fence on top. Existing vehicular access to the site is from Santry Avenue to the north.

The site is currently fenced off from the Santry Place development to the south, and the existing access to same from the Swords Road; however, the proposed development will see integration between permitted and proposed developments in this regard upon completion of both developments.

As part of the subject application, a number of views have been taken from sensitive points where the site maybe visible from third party lands. Verified views and 3D CGI's have been prepared by 3D Design Bureau and are submitted as separate document(s) as part of this SHD planning application. In addition, Chapter 14 "*The Landscape*" of this EIAR takes into account the visual receptor sensitivity from the selected view locations.

4.4.9. Human Health

Health, as defined by the World Health Organization (WHO), is "*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*". The Healthy Ireland Framework 2013-2025 defines health as '*everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'*. This Framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country, affects the quality of everyone's living experience.

Health is an essential resource for everyday life, a public good, and an asset for health and human development. A healthy population is a major asset for society and improving the health and wellbeing of the nation is a priority for the Government. The Healthy Ireland Framework 2013-2025 is a collective response to the risks that threaten Ireland's future health and wellbeing.

Health Status of Whitehall C DED	Very Good	Good	Fair	Bad	Very Bad	Not Stated
Total Number of People	1,201	631	183	45	9	84

[6] Core Bus Corridor No. 2 – Swords to City Centre - Preferred Route Corridor – information taken from Map No. 19 from the corridor information Brochure (Third Round of Public Consultation November 2020 – www.busconnects.ie)

Total Percentage of People	55.8	29.3	8.5	2.1	0.4	3.9

Table 4.9 Health Status of Whitehall C DED

Table 4.9 above shows that most people (a combined 85.1%) in the Whitehall C DED have identified themselves as being in '*very good'* or *'good'* health.

4.5. Construction Impacts, Mitigation and Monitoring Measures

Overall, subject to adherence to best practice and implementation of appropriate mitigation measures detailed below and elsewhere in this EIAR, the overall temporary impacts associated with the construction phase (excluding employment ,which will be positive) are considered to be negative and slight/moderate.

The main areas of impact are as follows:

Population and Demographic

There will be no impact on the demographic profile during the Construction Phase.

Residential Amenity

Construction of the proposed development will last for approximately five years. During this time, the proposed development will cause a certain amount of loss of amenity, disruption and inconvenience to local residents, particularly the residents of the existing Santry Place and Swiss Cottage residential developments located to the south and south-east and users of Santry Demesne Park to the north.

These impacts will be related to construction traffic (particularly HGVs) and travel disruption and also to the generation of noise and dust which is generally associated with the construction of such infrastructural projects. These issues are considered elsewhere in this EIAR and mitigation measures identified. In particular, the access constraints arising in respect of receptors are considered in Chapter 11 - Materials Assets: Transportation and impacts arising from the generation of noise and dust are considered in Chapter 9 – Noise and Chapter 8 – Air and Climate respectively. The visual impacts of the development are considered in Chapter 14 – The Landscape.

The overall impacts associated with the construction phase are temporary/short term and moderate.

Land Take, Use and Planning Policy

The construction works associated with the proposed development will generally be contained within the application site boundary and the lands under the control of the applicant. The development proposal is for a residential development on lands zoned to accommodate / permit for such use.

Planning Permissions

It is possible that other construction projects may be taking place at the same time as the proposed development. Where relevant, the cumulative effect of any adjoining projects being under construction at the same time will be considered in the relevant sections of this EIAR, which have also been considered under the aforementioned environmental reports and EISs/EIARs for the subject and adjoining lands.

Employment

During the Construction Phase, the proposed development will have a short-term positive effect in terms generating economic activity. It is anticipated that up to c.200 no. construction personnel will be employed either directly or indirectly during the Construction Phase which is anticipated to extend over a period of approximately 60 months. Apart from the direct employment associated with the project, additional employment will be generated through the multiplier effect. In this case, the multiplier effect refers to the indirect impact that new spending has when it is circulated through the local economy. In the context of the overall economy of the area, the impact of the project in terms of employment (direct and indirect) will be slight and positive.

Travel and Commuting

During the Construction Phase there will be some traffic impacts on the receiving environment by virtue of the works related traffic. Measures to address these impacts are detailed in the CDWMP and they will be slight and short-term.

Health and Safety

The construction of any project of this nature has potential to give rise to an impact on health and safety of human beings if such activities are not managed properly. These concerns are addressed in the CDWMP and Outline CMP submitted as part of this planning application.

Landscape and Visual

Impacts on the visual amenity of the surrounding area are fully addressed in Chapter 14 Landscape of this EIAR. During the Construction Phase, general construction, disturbance and site development has the potential to result in significant temporary and short-term negative landscape and visual impact on the surrounding areas.

Human Health

The proposed development is likely to give rise to a short-term direct negative impact on the surrounding settlements during the Construction Phase, in particular the existing Santry Place and Swiss Cottage residential developments located to the south and south-east. This will be a short-term significant effect on a localised scale and this is further discussed in Chapter 8 (Air Quality) Chapter 9 (Noise) and Chapter 14 (Landscape and Visual Amenity) of this EIAR.

The Construction Phase will result in an element of noise, mobility of heavy vehicles, dust and the arrival and departure of construction workers into the area. This impact will be negative, short-term, significant and localised.

Mitigation

Mitigation measures for the Construction Phase are outlined in each of the relevant chapters (No.s 4-14) and are also provided in Chapter 16 "*Summary of EIA Mitigation and Monitoring Measures*". During the Construction Phase a number of mitigating measures should be considered, including *inter alia:*

- Maintain a Construction Environment Management Plan (CEMP) in effect for duration of works;
- Restrict working hours from 07:00 to 18:00; Monday to Friday and from 08:00 to 14;00 on Saturdays. No general works are envisaged to be carried out on Sundays. Should there be a need to work Sundays/Bank Holidays, a written request will be made to DCC for permission to do so. Any conditions from DCC relating to out of hours working will be followed including any required notifications to relevant parties;
- Maintain a Traffic Management Plan (TMP) in effect for duration of works;
- The CEMP will be agreed with the Planning Authority upon receipt of planning permission. The construction of the proposed development shall adhere to the relevant provisions of this Plan; and;
- As part of the CEMP, maintain a Dust and Noise abatement plan in operation.

Monitoring

Measures to monitor potential negative effects on people in respect of noise, air, traffic etc. are included in the following relevant Chapters of this EIAR.

In respect of the impacts assessed above, the contractor will monitor development during the construction phase to ensure compliance with the parameters of the Construction Management Plan. Remedial action will be taken, if required, to ensure construction activities conform to its requirements.

Reinstatement

It is not considered that reinstatement works are required during the Construction Phase.

4.6. Operational Impacts, Mitigation and Monitoring Measures

Population and Demographic

During the Operational Phase of the proposed development, the demographic profile will change with additional people moving into the locality. The changing demographic profile during the Operational Phase of the proposed development is likely to ensure a balanced age profile within the local area. Projected residential population from the proposed development will be approximately 931 persons. This is based on the average number of persons per household 2.66 persons.

The impact on population is considered to be permanent but slight, and appropriate to the land-use zoning designation for the site, and the Core Strategy of the Development Plan.

Residential Amenity

All of existing local amenities will remain in place during the Operational Phase of the proposed development. Furthermore, the potential viability of these amenities going forward will be strengthened from the increased population of the area. The population increase will result in a greater demand for

community and outdoor facilities in the study area. The CDP's zoning of the subject site has made provision for the development of new community facilities and requires for a detailed land use and function strategy, which sees the Developer provide for the delivery of 5 no. commercial / retail units on the subject lands. The subject development proposal also includes for a new community use unit and residential amenity unit which will act as focal points for future residents.

Therefore, the effects on community and amenities is deemed to be slightly positive or neutral in the long-term.

Land Take, Use & Planning Policy

The existing CDP set out the overall land use patterns for the lands on which this residential project is proposed. The nature of the development is permanent and will in time change the character of the area from a brownfield site to residential. The proposed land use (i.e. residential, open space, amenity and employment) and will not impact on human health. Overall, the impact on land use and settlement is considered to be moderate, permanent and positive.

Planning Permissions

It is possible that other construction projects may be take place subsequent to the carrying out of the development of the subject application (should it be permitted). The development proposal is put forward in compliance with the land use and function set out for the lands in the CDP. Future development during the operational phase will be subject to the planning process and compliance with planning policy.

Employment

During the Operational Phase, the proposed development will have a slight, positive long-term impact. The proposed development will result in the creation of jobs associated with the proposed 5 no. commercial / retail units, permanent apartment building management jobs and transient employment in the proposed community use unit and residential amenity unit. Other associated jobs such as gardening and window cleaning, with spin-off economic activity created for local retail and service providers.

Travel and Commuting

During the Operational Phase of the proposed development, there are likely to be some impacts on the receiving environment in relation to travel and commuting. The proposed development will provide additional people to sustain the public transport network. The impact due to the increase in number of persons potentially travelling and commuting will be significant and permanent, with a neutral long-term effect. Detailed information on the traffic impacts of the proposed development are set out in Chapter 11 Material Assets: Transportation.

Health and Safety

The operational phase of the development is unlikely to give rise to any additional risks of health and safety on human beings. Maintenance and building management plans will form part of the programme of development upon receipt of a grant of permission.

Landscape and Visual

The proposed development is designed to seamlessly integrate into the surrounding urban context. A Daylight & Sunlight Analysis, prepared by Chris Shackleton Consulting, demonstrates that the proposed heights will not negatively impact the amenity areas of the development. Therefore, during the Operational Phase, the landscape or visual impacts arising from the proposed development will be not significant from these areas. Chapter 14 of this EIAR examines the landscape visual impact of the proposed development in detail.

Human Health

The changes in the area will have a positive impact in terms of changing the age profile and increasing the longevity of local schools and facilities. The proposed development will create a modern living environment adjacent to a wide range of amenities, within easy commuting distance of Dublin city centre, providing locally positive health benefits to its residents.

Mitigation

Where relevant, mitigation measures to address the potential impacts of noise, air traffic etc. on people are included in the appropriate chapters of this EIAR. No likely significant impacts have been identified for population, or land use, accordingly no mitigation measures are required for the Operational Phase.

The proposed development has been designed to avoid significant impacts in relation to local amenities and recreational facilities by:

- Incorporating the provision of a new community use facility within the design proposal;
- Incorporating the provision of a new residential amenity facility within the design proposal;
- Incorporating the provision of 5 no. commercial / retail facilities within the design proposal;
- The provision of c.1.915 sq.m of public open space representing c. 13% of the site area.

Accordingly, no further mitigation measures are required.

Monitoring

No additional monitoring is proposed for the Operational Phase other than that proposed in other Chapters of this EIAR.

Reinstatement

It is not considered that reinstatement works are required during the Operational Phase.

4.7 Residual Impacts

The residual effects of the construction and operational phase of the project on the socio-economic character of the area and the local community (i.e. population and human health), subject to the implementation of the various mitigation measures outlined in this EIAR are identified as follows:

- The development will facilitate the implementation of the CDP proposals for the subject lands;

- The proposed development will provide new pedestrian and cycling links through the subject site connecting to the public realm and onwards to Santry Demesne Park.

4.8 Interactions

As noted above, there are numerous inter-related environmental topics described in detail throughout this EIAR which are of relevance to human health. During the Construction Phase noise, air, traffic and consumption of materials will be the key environmental factors that will have an impact on 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 Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA in August 2017 and the Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems, published by the Department of Environment, Community and Local Government in May 2017. In line with the guidance documents referred, 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.

During the Operational Phase, it is anticipated that water and traffic will be the key environmental factors impacting upon population and human health during the Operational Phase as a new residential landscape will be created. The increase in population will result in increased traffic and increased demands on water supply and increased requirements for wastewater treatment. These are addressed in the appropriate sections of this EIAR.

4.9 Reinstatement

While not applicable to every aspect of the environment considered within the EIAR, certain measures may be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.

There are no reinstatement works proposed specifically with respect to population and human health.

4.10 Cumulative Impacts

An increase in local housing, and some increase in employment opportunities and service provision (commercial / retail units, residential amenity unit and community use unit) have the potential to generate direct, indirect impacts. The visual appearance of the landscape will be altered with the introduction of the proposed built elements including infrastructure, in cumulation with other development in the area. Implementation of the remedial and reductive measures in respect of noise/traffic management etc. in the EIAR would ensure a minimal impact on the existing communities of this area during the construction phase.

The development of the proposed scheme will open up the lands to improved connectivity from Santry Place to the south to Santry Demesne Park to the north whilst also catering for public transport services and will require works that will likely entail some localised impacts to residents. It is anticipated that a Construction Traffic Management Plan would be agreed with DCC, by the contractor. The objective of which is to minimise the short term disruption to existing local residents.

There will be some short term impacts during the construction phase as the infrastructural / site development works are undertaken, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and disturbance to residents in the vicinity of the works. However, the works would normally be undertaken in sections on a phased/rolling programme so that the number of persons experiencing local inconveniences at any one time is kept to a minimum.

4.11 Difficulties Encountered in Compiling

No difficulties were encountered when compiling this Chapter.

4.12 *'Do Nothing'* Scenario

A do-nothing scenario would result in the site remaining in brownfield use. If the proposed development were not to proceed there would be no immediate impact on the existing population, or economic activity for residents living in the area.

If the lands were to remain undeveloped, this would be an under-utilisation of zoned lands from a sustainable planning and development perspective, particularly considering the location of the lands and the objectives of the CDP. The positive benefits to the national, regional and local community arising from implementing the residential development proposals of the CDP for the subject lands would therefore not materialize.

4.13 References

- Central Statistics Office www.cso.ie
- Dublin City Development Plan 2014–2020
- Healthy Ireland Framework 2013-2025

5.0. Biodiversity

5.1 Introduction

5.1.1 Overview and Aims

This chapter was prepared by Rozalyn O'Hora[7] of Enviroguide Consulting and Aisling Walsh[8] of Ash Ecology Environmental Ltd.

A separate stand-alone Appropriate Assessment (AA) Screening Report is also included in the planning application documentation. Under Article 6(3) of the Habitats Directive a screening for '*appropriate assessment'* of projects must be carried out to determine if significant effects are likely to arise to Natura 2000 sites. This assessment is carried out by the competent authority, in this case An Bord Pleanála.

This section assesses potential impacts that may arise from the proposed development on biodiversity within the receiving environment; in accordance with the following guidance documents:

- Environmental Protection Agency (Draft, August 2017). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports,*
- Environmental Protection Agency (Draft, September 2015). *Advice Notes for Preparing Environmental Impact Statements,*
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018), *Guidelines for Ecological Impact Assessment in the UK and Ireland.*
- National Roads Authority (2009). *Ecological Assessment Guidelines*

It aims to discuss the existing ecological environment, the potential impacts of the scheme and avoidance and mitigation measures in relation to habitats, flora and fauna in the zone of influence (ZOI) of the proposed development. This section was prepared by Rozalyn O'Hora and Aisling Walsh of Enviroguide Consulting

5.1.2 Legislative Context

Specific focus is placed on protected species/habitat features as well as those of local or national importance. The Planning and Development Acts, 2000–2015 and the European Communities (Environmental Impact Assessment) Regulations, 1989 (as amended) are particularly important in that regard and include a number of provisions directly concerned with the protection of natural heritage and biodiversity.

Nationally, the Wildlife Acts, 1976 and amendments are the principal mechanism for the legislative protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. They outline strict protection for species that have significant conservation value. With regard to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from the National Parks and Wildlife Service (NPWS). This list includes all birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of March to the 31st of August. The act also provides a

[7] Project Ecologist has a M.Sc. Hons. (Ecological Assessment) from University College Cork, a BSc (Honours) in Environmental Science from National University of Ireland Galway

[8] Professional Ecologist and director of Ash Ecology Environmental Ltd., MSc in Biodiversity and Conservation (TCD), A BSc (Hons) Zoology (NUIG), a Diploma in Applied Aquatic Sciences (GMIT), a Post Graduate Diploma in Statistics (TCD), and a Certificate in Environmental Noise (Institute of Acoustics); full membership of the Chartered Institute of Ecology and Environmental Management (CIEEM).

mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011. Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats Directive, any person who, in regard to the listed species, *"Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence."*

Sites of national importance for nature conservation are afforded protection under planning policy and the Wildlife Acts, 1976–2012. NHAs are sites that are designated under statute for the protection of flora, fauna, habitats and geological interest. Proposed NHAs (pNHAs) are published sites identified as of similar conservation interest but have not been statutorily proposed or designated.

The Flora (Protection) Order (S.I. No. 356/2015) affords protection to several species of plant in Ireland, including 68 vascular plants, 40 mosses, 25 liverworts, 1 stonewort and 1 lichen. This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species and it also forbids anyone from altering, interfering, or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

Internationally, the EU Birds Directive – Council Directive 2009/147/EC constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland and a total of 153 Special Protection Areas have been designated.

EU Habitats Directive -Council Directive 92/43/EEC aims to protect some 220 habitats and approximately 1000 species throughout Europe. The habitats and species are listed in the Directives annexes, where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive form a network of protected sites called Natura 2000.

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second (current) cycle runs from 2016 – 2021.The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least *'good'* ecological status, through River Basin Management Plans (RBMP), by 2027.

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982)

was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced to give protection to migratory species across borders in Europe.

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994 Ha.

5.1.3 Consultation

Consultation was undertaken with Dwyer Nolan Developments Ltd / Dublin City Council with regard to the scope of works within the proposed project.

5.2 Methodology

5.2.1 Scope of the Assessment

The specific objectives of the study were to:

- Undertake a baseline ecological survey of the site and evaluate the nature conservation importance of the site;
- Identify and assess the direct, indirect, and cumulative ecological implications or impacts of the project during its lifetime;
- Where possible, proposed mitigation measures to remove or reduce those impacts at the Design, Construction and Operational Phases; and
- Achieve the best possible biodiversity outcome for the future of the site.

5.2.2 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's natural environment. The desk study, completed in June 2021, relied on the following sources:

- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at https://maps.biodiversityireland.ie/
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.gis.epa.ie ;
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at www.gsi.ie ;
- Information on the network designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at www.npws.ie ;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland;
- Information on the existence of permitted development, or developments awaiting decision, in the vicinity of the proposed development from Dublin City Council, available at: https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de and An Bord Pleanála .
- Information on the extent, nature and location of the proposed development, provided by the applicant and/or their design team;

- Information on the proposed works to be followed as part of the proposed development, taken from the Final Project description provided by the design team.

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in 5.8.

Field Survey Work

Habitat surveying, mapping and evaluation

A habitat survey of the site of the proposed development was carried out by Enviroguide Ecologists on the 13th of May 2021. Habitats were categorised according to the Heritage Council's '*A Guide to Habitats in Ireland'* (Fossitt, 2000) to Level 3. The habitat mapping exercise had regard to the *'Best Practice Guidance for Habitat Survey and Mapping'* (Smith et al., 2010) published by the Heritage Council. Habitat categories, characteristic plant species and other ecological features and resources were recorded on field sheets. Habitats within the surrounding area of the proposed development were classified based on views from the site and satellite imagery where necessary (Google Earth, Digital Globe and OSI).

Bird Surveys

Bird surveys were carried out in conjunction with the habitat and mammal surveys on the 13th of May 2021.

Invasive Species Surveys

The site was assessed for the presence of invasive plant species during the habitat surveys undertaken on the 13th of May 2021.

Mammal Surveys and Evaluation

Mammal surveys of the site were carried out in conjunction with other field surveys. The site was searched for signs of mammals such as droppings, footprints, or sightings as per Bang and Dahlstrom (2001). The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area.

Other Fauna

During the course of the habitat surveys at the site of the proposed development, other species of fauna were noted, and are included in the report where applicable.

Baseline Assessment

The value of the ecological resources – the habitats and species present or potentially present was determined using the ecological evaluation guidance provided in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009). This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal. The NRA (2009a) defines key ecological receptors as those ecological features which are evaluated as Locally Important (higher value) or higher, that are likely to be impacted significantly by the proposed development. Internationally important receptors would include Special Areas of Conservation (SAC) or Special Protected Areas (SPA)

while those of national importance would include Natural Heritage Areas (NHA).

This evaluation scheme has been adapted here to assess the value of habitats and fauna within the site of the proposed development. The value of habitats is assessed based on the condition, size, rarity, conservation, and legal status. The value of fauna is assessed on its biodiversity value, legal status, and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends.

Using the evaluation criteria as described above, some of the habitats and species identified as being present were assessed. As per the NRA guidelines, impact assessment is only undertaken of those deemed to be Key Ecological Receptors (KERs).

Value of Ecological Resources

The ecological features identified within the site of the proposed development and the wider area are evaluated based on their value. These values are detailed in Table 5.1 below and are taken from the Guidelines for Assessment of Ecological Impacts of National Road Schemes published by the NRA (2009b), now Transport Infrastructure Ireland (TII).

Importance	Criteria
International Importance	- *'European Site'* (as now defined in section 177R of the Planning and Development Act 2000, as amended, to include: a candidate site of Community importance, a site of Community importance, a candidate special area of conservation, a special area of conservation, a candidate special protection area and a special protection area; - including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. - Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a *'European Site'* (see Annex III of the Habitats Directive, as amended). - Features essential to maintaining the coherence of the Natura 2000 Network - Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive - Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). - World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). - Biosphere Reserve (UNESCO Man & The Biosphere Programme)

	- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). - Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). - Biogenetic Reserve under the Council of Europe. - European Diploma Site under the Council of Europe. - Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	- Site designated or proposed as a Natural Heritage Area (NHA). - Statutory Nature Reserve. - Refuge for Fauna and Flora protected under the Wildlife Acts. - National Park. - Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Acts; and/or a National Park. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive
County Importance	- Area of Special Amenity. - Area subject to a Tree Preservation Order. - Area of High Amenity, or equivalent, designated under the County Development Plan. - Resident or regularly occurring populations (assessed to be important at the County level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. - County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of

	naturalness, or populations of species that are uncommon within the county. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP if this has been prepared. - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; - Sites or features containing non-native species that is of some importance in maintaining habitat links.

Table 5.1: Description of values for ecological resources based on geographic hierarchy of importance (NRA, 2009b).

Impact Assessment Criteria

Once the value of the identified Key Ecological Receptors (KERs) was determined, the next step was to assess the potential effect or impact of the proposed development on these KERs. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009b; CIEEM, 2018) that set down a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the proposal could constitute impact or sources of impacts. Once impacts are defined, their significance was categorised using EPA Guidelines (EPA, 2017).

Identification of a risk does not constitute a prediction that it will occur, or that it will create or cause significant impact. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk and the characteristics of the ecological receptor.

Criteria used to Define Quality of Effects

In line with the EPA EIAR Guidelines (EPA, 2017), the following terms are defined when quantifying the

quality of effects. See Table 5.2 below.

Quality	Definition
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative/adverse Effects	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).

Table 5.2: Definition of Quality of Effects

Criteria Used to Define Significance of Effects

EC Guidance on EIAR (EC, 2017) states that assessment of significance should be determined using appropriate, clear, and unambiguous criteria which take *'the characteristics of the impact and the values associated with the environmental issues affected into account'.* Consequently, in line with the EPA EIAR Guidelines (EPA, 2017), the following terms are defined when quantifying the significance of impacts. See Table 5.3, below.

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics

Table 5.3: Definition of Significance of Effects

Criteria Used to Define Duration of Effects

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying duration and frequency of effects. See Table 5.4 below.

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

Table 5.4: Definition of Duration of Effects

5.2.2 Limitations

An extensive search of available datasets for records of rare and protected species within proximity to the proposed development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

5.3 Proposed Development

The proposed works relate to a mixed use development. Full details of the proposed development are discussed in Chapter 3.

The design incorporates mitigation measures as described in relevant sections of this EIAR. A Construction Environmental Management Plan (CEMP) accompanies this application and provides additional management measures which will be implemented during construction.

The CEMP has detailed methods relating to the control of potential impacts such as:

- Chemicals – Other Than Fuel, Lubricants and Solvents;
- Dust;
- Waste;
- Noise.

5.4 The Existing Receiving Environment (Baseline Scenario)

5.4.1 Overview

An extensive search of available datasets for records of rare and protected species within proximity to the proposed development has been undertaken as part of this assessment. However, the records from these

datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

Geology, Hydrology and Hydrogeology

The site is located within the *Dublin* groundwater body (EU Code: IE_EA_G_008). The overall status of this waterbody is recorded as *Good* and the risk status assigned to the Dublin GWB is identified as *Under Review* (EPA,2021). The Dublin GWB covers some 837km^2 and is located in the Greater Dublin City area and extends southwest towards Kildare (EPA,2021).

The proposed development is within the *Liffey and Dublin Bay* Water Framework Directive (WFD) catchment (Catchment I.D.09), and *Mayne_SC_010* SubCatchment (SubCatchment I.D. 09_17) and the *Santry_010* River Sub Basin (IE_EA_09S010300).

The Santry River is approximately 675m to the north of the site and flows in a south-east direction into North Dublin Bay. The Santry River was assigned a Q-value of 2-3 (Poor Status) in the most recent EPA monitoring survey carried out (2019, station code: RS09S010300). This river is *At Risk* of not meeting its Water Framework Directive (WFD) status objectives (EPA,2021).

The Santry River flows into the North Bull Island transitional waterbody. The status and risk category of this transitional waterbody is currently unassigned. The WFD status of the Dublin Bay Coastal Waterbody is *Good* and *Not at Risk* of not meeting its WFD status objectives (EPA,2021).

The GSI database (GSI,2021) has mapped the bedrock beneath the site as the Lucan Formation (New Code: CDLUCN) which comprises of Dark limestone and shale (‘calp). The bedrock aquifer beneath the proposed development site and surrounding area is classified as a Locally Important Aquifer (LI), Bedrock which is moderately productive only in local zones. The GSI has assigned a groundwater vulnerability rating of *Low* (L) for the groundwater beneath the proposed development site. It is noted that there are no gravel aquifers mapped within a 2.0km radius of the proposed development site (GSI,2021).

The soil (Teagasc Soils) beneath the proposed development are mapped by Teagasc (Teagasc, 2021) as *Urban*. The subsoils or quaternary sediments beneath the site are mapped by the GSI (GSI, 2021) as *Till derived from limestones* (TLs).

5.4.2 Designated Areas

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs), and the Birds Directive 79/409/EEC (as amended by Directive 2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

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

Error! Reference source not found.Error! Reference source not found. below presents details of the ke y ecological features of the designated sites within a 15km radius of the proposed development. The result of this preliminary screening concluded that there is a total of eight SACs, seven SPAs and fifteen pNHAs located within the Zone of Influence (hereafter ZOI) of the proposed development site. In addition, all Natura 2000 sites within the 15km outfall point of Ringsend Wastewater treatment plant are included in this analysis. Ten SACs and eight SPAs are located within the ZOI of the outfall point at Ringsend WwTP. The distances to each site listed are taken from the nearest possible point of the proposed development site boundary to nearest possible point of each Natura 2000 site or pNHA.
The methodology used to identify relevant European sites comprise the following:

The methodology used to identify relevant European sites comprise the following:

1. Use of up-to-date GIS spatial datasets for European designated sites and water catchments – downloaded from the NPWS website (www.npws.ie) and the EPA website (www.epa.ie) on 05-05-2021 – to identify European sites which could potentially be affected by the proposed development.
2. All European sites within 15km of the site of the proposed development were identified and are shown in Error! Reference source not found.. In addition, the potential for c onnectivity with European sites at distances greater than 15km from the site of the proposed development was also considered in this initial assessment. In this case, there is no potential connectivity between the site and European sites located over 15km from it.
3. The catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any European sites.
4. In relation to Special Protection Areas, in the absence of any specific European or Irish guidance in relation to such sites, the Scottish Natural Heritage (SNH) Guidance, *'Assessing Connectivity with Special Protection Areas (SPA)'* (2016) was consulted. This document provides guidance in relation to the identification of connectivity between proposed development and Special Protection Areas. The guidance takes into consideration the distances species may travel beyond the boundary of their SPAs and provides information on dispersal and foraging ranges of bird species which are frequently encountered when considering plans and projects.
5. The site synopses and conservation objectives of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report in May 2021.
6. Where potential pathways for Significant Effect are identified, the site is included within the precautionary Zone of Influence and further assessment is required.

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
Special Areas of Conservation			
North Dublin	[1140] Tidal Mudflats and Sandflats Inadequate [1210] Annual Vegetation of Drift Lines Inadequate	5.8 km	1.7km

[9] Status of qualifying interests of SACs are based on NPWS (2019) and status of qualifying interests of SPAs are based on Colhoun and Cummins (2013).

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
Bay SAC (000206)	[1310] Salicornia Mud **Favourable** [1330] Atlantic Salt Meadows **Inadequate** [1410] Mediterranean Salt Meadows **Inadequate** [2110] Embryonic Shifting Dunes **Inadequate** [2120] Marram Dunes (White Dunes) **Inadequate** [2130] Fixed Dunes (Grey Dunes)* **Bad** [2190] Humid Dune Slacks **Inadequate** [1395] Petalwort (*Petalophyllum ralfsii*) **Favourable**		
Baldoyle Bay SAC (000199)	[1140] Tidal Mudflats and Sandflats **Inadequate** [1310] Salicornia Mud **Favourable** [1330] Atlantic Salt Meadows **Inadequate** [1410] Mediterranean Salt Meadows **Inadequate**	6.9 km	7.2km
South Dublin Bay SAC (001266)	[1140] Tidal Mudflats and Sandflats **Inadequate** [1210] Annual vegetation of drift lines **Inadequate** [1310] Salicornia and other annuals colonising mud and sand **Favourable** [2110] Embryonic shifting dunes **Inadequate**	7 km	0.2km
Malahide Estuary SAC (001232)	[1140] Mudflats and sandflats not covered by seawater at low tide **Inadequate** [1310] Salicornia and other annuals colonising mud and sand **Favourable** [1330] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) **Inadequate** [1410] Mediterranean salt meadows (Juncetalia maritimi) **Inadequate** [2120] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) **Inadequate** [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)* **Bad**	7.8 km	11.1km
Howth Head SAC (000202)	[1230] Vegetated Sea Cliffs of the Atlantic and Baltic coasts **Inadequate** [4030] Dry Heath **Bad**	10.2 km	6.6km
Rockabill to Dalkey	[1170] Reefs **Inadequate**	10.9 km	6.2km

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
Island SAC (003000)	[1351] Harbour Porpoise (*Phocoena phocoena*) **Favourable**		
Ireland's Eye SAC (002193)	[1220] Perennial vegetation of stony banks **Inadequate** [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts **Inadequate**	11.7 km	10.4km
Rogerstown Estuary SAC (000208)	[1130] Estuaries **Inadequate** [1140] Mudflats and sandflats not covered by seawater at low tide **Inadequate** [1310] Salicornia and other annuals colonising mud and sand **Favourable** [1330] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) **Inadequate** [1410] Mediterranean salt meadows (Juncetalia maritimi) **Inadequate** [2120] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) **Inadequate** [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)* **Bad**	11.7 km	>15km
Wicklow Mountains SAC (002122)	[3110] Oligotrophic Waters containing very few minerals **Bad** [3130] Mixed *Najas flexilis* lake habitat **Inadequate** [3160] Dystrophic Lakes **Inadequate** [4010] Wet Heath **Bad** [4030] Dry Heath **Bad** [4060] Alpine and Subalpine Heaths **Bad** [6130] Calaminarian Grassland **Inadequate** [6230] Species-rich Nardus Grassland* **Bad** [7130] Blanket Bogs (Active)* **Bad** [8110] Siliceous Scree **Inadequate** [8210] Calcareous Rocky Slopes **Inadequate** [8220] Siliceous Rocky Slopes **Inadequate** [91A0] Old Oak Woodlands **Bad** [1355] Otter (*Lutra lutra*) **Favourable**	*>15 km*	13.3km
Knocksink Wood	[7220] Petrifying Springs* **Inadequate** [91A0] Old sessile oak woods with Ilex and Blechnum in the British	*>15 km*	14.4km

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
SAC (000725)	Isles **Bad** [91E0] Alluvial Forests* **Bad**		
Ballyman Glen SAC (000713)	[7220] Petrifying springs with tufa formation (Cratoneurion)* **Inadequate** [7230] Alkaline fens **Bad**	*>15 km*	14.9km
Special Protection Areas			
South Dublin Bay and River Tolka Estuary SPA (004024)	[A046] Light-bellied Brent Goose *Branta bernicla hrota* **Amber** [A130] Oystercatcher *Haematopus ostralegus* **Amber** [A137] Ringed Plover *Charadrius hiaticula* **Green** [A141] Grey Plover *Pluvialis squatarola* **Amber** [A143] Knot *Calidris canutus* **Amber** [A144] Sanderling *Calidris alba* **Green** [A149] Dunlin *Calidris alpina alpina* **Red** [A157] Bar-tailed Godwit *Limosa lapponica* **Amber** [A162] Redshank *Tringa totanus* **Red** [A179] Black-headed Gull *Chroicocephalus ridibundus* **Red** [A192] Roseate Tern *Sterna dougallii* **Amber** [A193] Common Tern *Sterna hirundo* **Amber** [A194] Arctic Tern *Sterna paradisaea* **Amber** [A999] Wetlands	4.1 km	0.2km
North Bull Island SPA (004006)	[A046] Light-bellied Brent Goose *Branta bernicla hrota* **Amber** [A048] Shelduck *Tadorna tadorna* **Amber** [A052] Teal *Anas crecca* **Amber** [A054] Pintail *Anas acuta* **Red** [A056] Shoveler *Anas clypeata* **Red** [A130] Oystercatcher *Haematopus ostralegus* **Amber** [A140] Golden Plover *Pluvialis apricaria* **Red** [A141] Grey Plover *Pluvialis squatarola* **Amber** [A143] Knot *Calidris canutus* **Amber** [A144] Sanderling *Calidris alba* **Green** [A149] Dunlin *Calidris alpina alpina* **Red** [A156] Black-tailed Godwit *Limosa limosa* **Amber** [A157] Bar-tailed Godwit *Limosa lapponica* **Amber**	5.8 km	1.7km

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
	[A160] Curlew *Numenius arquata* **Red** [A162] Redshank *Tringa totanus* **Red** [A169] Turnstone *Arenaria interpres* **Green** [A179] Black-headed Gull *Chroicocephalus ridibundus* **Red** [A999] Wetlands		
Baldoyle Bay SPA (004016)	[A046] Light-bellied Brent Goose *Branta bernicla hrota* **Amber** [A048] Shelduck *Tadorna tadorna* **Amber** [A137] Ringed Plover *Charadrius hiaticula* **Green** [A140] Golden Plover *Pluvialis apricaria* **Red** [A141] Grey Plover *Pluvialis squatarola* **Amber** [A157] Bar-tailed Godwit *Limosa lapponica* **Amber** [A999] Wetlands	7.2 km	7.2km
Malahide Estuary SPA (004025)	[A005] Great Crested Grebe *Podiceps cristatus* **Amber** [A046] Brent Goose *Branta bernicla hrota* **Amber** [A048] Shelduck *Tadorna tadorna* **Amber** [A054] Pintail *Anas acuta* **Red** [A067] Goldeneye *Bucephala clangula* **Red** [A069] Red-breasted Merganser *Mergus serrator* **Green** [A130] Oystercatcher *Haematopus ostralegus* **Amber** [A140] Golden Plover *Pluvialis apricaria* **Red** [A141] Grey Plover *Pluvialis squatarola* **Amber** [A143] Knot *Calidris canutus* **Amber** [A149] Dunlin *Calidris alpina alpina* **Red** [A156] Black-tailed Godwit *Limosa limosa* **Amber** [A157] Bar-tailed Godwit *Limosa lapponica* **Amber** [A162] Redshank *Tringa totanus* **Red** [A999] Wetlands	7.8 km	11.8km
Ireland's Eye SPA (004117)	[A017] Cormorant *Phalacrocorax carbo* **Amber** [A184] Herring Gull *Larus argentatus* **Red** [A188] Kittiwake *Rissa tridactyla* **Amber** [A199] Guillemot *Uria aalge* **Amber** [A200] Razorbill *Alca torda* **Amber**	11.5 km	10.1km

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
Rogerstown Estuary SPA (004015)	[A043] Greylag Goose Anser anser **Amber** [A046] Brent Goose Branta bernicla hrota **Amber** [A048] Shelduck Tadorna tadorna **Amber** [A056] Shoveler Anas clypeata **Red** [A130] Oystercatcher Haematopus ostralegus **Amber** [A137] Ringed Plover Charadrius hiaticula [A141] Grey Plover Pluvialis squatarola **Amber** [A143] Knot Calidris canutus **Amber** [A149] Dunlin Calidris alpina alpina **Red** [A156] Black-tailed Godwit Limosa limosa **Amber** [A162] Redshank Tringa totanus **Red** [A999] Wetlands	12.1 km	>15km
Howth Head Coast SPA (004113)	[A188] Kittiwake *Rissa tridactyla* **Amber**	12.6 km	8.9km
Dalkey Islands SPA (004172)	[A192] Roseate Tern *Sterna dougallii* **Amber** [A193] Common Tern *Sterna hirundo* **Amber** [A194] Arctic Tern *Sterna paradisaea* **Amber**	*>15 km*	9.0km
Wicklow Mountains SPA (004040)	[A098] Merlin *Falco columbarius* **Amber** [A103] Peregrine *Falco peregrinus* **Green**	*>15 km*	13.5km
National Heritage Areas (NHAs)			
	There are no NHAs within 15km of the Proposed Development		
Proposed National Heritage Areas pNHAs[10]			
Santry Demesne (000178)	This site is located immediately north of old Santry Village, Co. Dublin, and comprises the remnants of a former demesne woodland. A species legally protected under the Flora Protection Order 1987, Hairy St. John's wort *Hypericum hirsutum*, was	20 m	n/a

[10] Where available, brief site synopses are provided for pNHA sites. These synopses are available from the NPWS (https://www.npws.ie/protected-sites/nha). It is noteworthy that these synopses are based in many cases on old survey data and may not accurately reflect the status of the site at the current time.

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
	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.		
Royal Canal (002103)	The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tarmonbarry. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The rare and legally protected Opposite-leaved Pondweed *Groenlandia densa* (Flora Protection Order 1987) is present at one site in Dublin, between Locks 4 and 5. *Tolypella intricata* (a stonewort listed in the Red Data Book as being vulnerable) is also in the Royal Canal in Dublin, the only site in Ireland where it is now found. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	3.9km	n/a
North Dublin Bay (000206)	See qualifying interests of North Dublin Bay SAC	4.1km	n/a
Feltrim Hill (001208)	Feltrim Hill is situated in North Co. Dublin less than 1km east of the M1 motorway and west of Portmarnock. It is a knoll-reef dating from the Carboniferous period. The site was previously known to contain two rare plant species, namely Spring Squill (*Scilla verna*) and Long-stalked Crane's bill (*Geranium columbinum*).	5.3km	n/a
Grand Canal (002104)	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. The rare and legally protected Opposite-leaved Pondweed *Groenlandia densa* (Flora Protection Order 1987) is present at a number of sites in the eastern section of the Main Line, between Lowtown and Ringsend Basin in Dublin. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming	5.9km	n/a

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
	methods.		
Sluice River Marsh (001763)	This site is located about 1 km west of Portmarnock village. This site is of importance as a relatively intact freshwater marsh, a habitat that is now rare in County Dublin.	6.8 km	n/a
Dolphins, Dublin Docks (000201)	Dolphins, Dublin Docks pNHA is comprised of two mooring 'dolphins' in the River Liffey near Pigeon House Harbour. These 'dolphins' are used by nesting terns with approximately 350 pairs of Common Tern *Sterna hirundo* recorded in 2006 (Dublin City Biodiversity Action Plan, 2008 – 2012).	6.8km	n/a
Baldoyle Bay (000199)	See qualifying interests of Baldoyle Bay SAC and SPA	6.9km	n/a
South Dublin Bay (000210)	See qualifying interests of South Dublin Bay SAC and South Dublin Bay and River Tolka Estuary SPA.	7 km	n/a
Malahide Estuary (000205)	See qualifying interests of Malahide Estuary SAC and SPA	7.8km	n/a
Liffey Valley (000128)	The Liffey Valley site is located along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weird at Glenaulin, Palmerstown, Co. Dublin. The threatened Green Figwort *Scrophularia umbrosa*, a species listed in the Irish Red Data Book, is recorded from a number of stations along the river within the site. This stretch of the river Liffey has the greatest number of recently recorded populations of this species in Ireland. The rare and legally protected Hairy St. John'swort *Hypericum hirsutum* (Flora Protection Order 1987) has been recorded from the woodlands in this site. The threatened Yellow Archangel *Lamiastrum galeobdolon*, listed in the Irish Red Data Book, is also recorded from these woodlands. This site is part of the Liffey Valley Special Amenity Areas Order 1990. The site is important because of the diversity of the habitats within the site, ranging from aquatic to terrestrial. A number of rare and threatened plant species have been recorded from the site.	8.4 km	n/a
Howth Head	See qualifying interests of Howth Head SAC and Howth Head	9.7km	n/a

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
(000202)	Coast SPA		
Booterstown Marsh (001205)	Booterstown Marsh lies approximately 5km south of Dublin City. It is separated from Merrion Strand to the east by an embankment which carries the Dublin to Wexford railway, and to the west it is bounded by the road from Dublin to Blackrock. Booterstown Marsh is the only saltmarsh in south Dublin and, despite some concerns about the increasing salinity of the site, it remains a valuable habitat for many birds as well as containing a diverse flora including the protected plant Borrer's Saltmarsh grass *Puccinellia fasciculata*.	9.9km	n/a
Rogerstown Estuary (000208)	See qualifying interests of Rogerstown Estuary SAC and SPA	11.7km	n/a
Ireland's Eye (000203)	See qualifying interests of Ireland's Eye SAC and SPA	11.7km	n/a
Portraine Shore (001215)	This site is located about 3km east of Donabate. The site is mostly a stretch of rocky shore, with some intertidal sands at the south end. This site is a good example of a rocky bedrock shore with a typical flora and fauna. The grassy vegetation above the shore adds habitat diversity. The site is also an important geological site.	12.4km	n/a
Dodder Valley (000991)	This stretch of the River Dodder extends for about 2 km between Firhouse Bridge and Oldbawn Bridge in the south-west of Dublin City. The site represents the last remaining stretch of natural riverbank vegetation on the River Dodder in the built-up Greater Dublin Area.	13.2km	n/a
Dalkey Coastal Zone and Killiney Hill (001206)	The site includes the coastal stretch from Scotman's Bay to south of White Rock, the Dalkey Island group and Dalkey Sound, and Killiney Hill. The site represents a fine example of a coastal system with habitats ranging from the sub-littoral to coastal health. The flora is well developed and includes some scarce species. The islands are important bird sites and also has geological importance.	13.9km	n/a
Fitzsimon's Wood (001753)	Fitzsimon's Wood occupies an area of approximately 8ha near Lamb's Cross in Sandyford, Co. Dublin. The woodland consists of mature birch (*Betula spp*.) with some oak (*Quercus spp.)* together with a well-developed understorey of Holly *(Ilex aquifolium*). The site is subject to significant recreational pressure, nonetheless, the	14.1km	n/a

Site Name & Code	Qualifying Interests (*= priority habitats) & Status[9]	Distance to Site	Distance to Ringsend WwTP
	basic woodland structure remains intact and is of ecological importance as birch woodland is very rare in Co. Dublin.		

Table 5.5: Designated sites of Conservation Importance within the Precautionary Zone of Influence of the Proposed Development (15km)

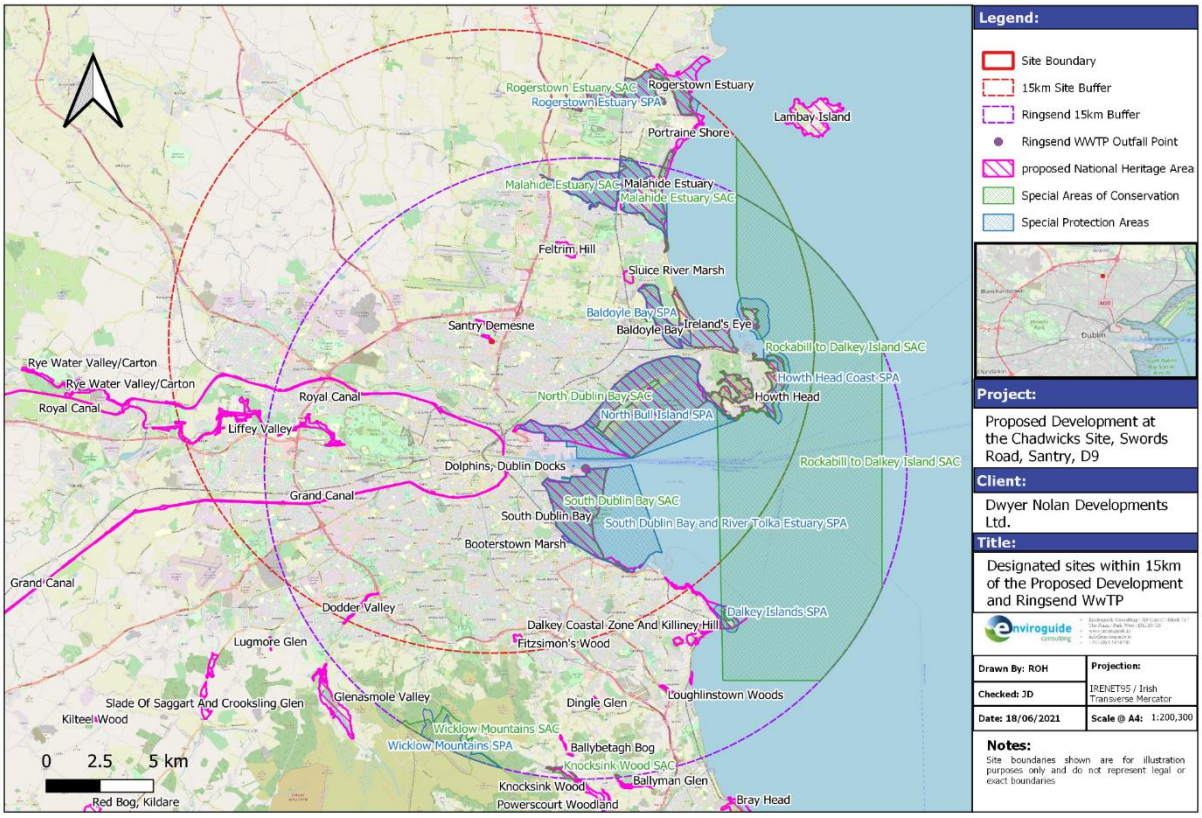

Figure 5.1: Designated Sites within 15km of the proposed development and Ringsend Wastewater Treatment Plant

5.4.4 Records of Habitats

Several distinct habitat types, as well as mosaics of different habitats (codes follow Fossitt, 2000) were recorded within the habitat survey area. These are described below and shown in Figure 5.5.

Buildings and Artificial Surfaces (BL3)

The majority of the site is comprised of buildings and artificial surfaces – BL3 which consist of the Chadwicks building and associated hardstanding areas. The building is currently operational, and some ornamental species of plants have been planted here, although these are small in number and the level of vegetation cover is negligible.

Figure 5.2: Buildings and artificial surfaces – BL3 habitat at the Site

Hedgerows – WL1

External boundaries of the proposed development contain areas of predominately native hedgerows. Species include Gorse *Ulex europaeus*, Bramble *Rubus fruticosus,* Goat willow *Salix caprea*, Hawthorn *Crataegus monogyna,* with an understorey including Herb Robert *Geranium robertianum*, Spurge *Euphorbia hyberna,* Common dandelion *Taraxacum officinale, and* nettle *Urtica dioica*. Some non-native potentially invasive species have become established here, namely Cotoneaster *Cotoneaster ssp.*, Butterfly bush *Buddleja davidii* and Sycamore saplings *Acer pseudoplatanus*.

Figure 5.3: Hedgerow - WL1 habitat along western fence line within the Site Boundary.

The digital database of the National Biodiversity Data Centre (NBDC) was consulted to assess known records of rare, protected and invasive species that occur in the surrounding landscape. The collation of this information, as well as examination of aerial photographs allowed areas of potential ecological importance to be highlighted prior to field survey work. A search was undertaken of records of Red Data Book and Protected species held by the National Biological Data Centre Database. Records of Rare or Protected Species from the 10km x 10km grid square occupied by the study area (N04) are listed in Appendix 6.2 [NBDC data].

Treelines – WL2

Treelines run along the eastern and western boundaries of the site. The treeline on the western boundary is dominated by Ash *Fraxinus excelsior*, Sycamore *Acer pseudoplatanus*, Hawthorn *Crataegus monogyna,* Elder *Sambucus nigra,* Beech *Fagus sylvatica*, *Leylandii spp*. and Ivy *Hedra helix*. The Treeline on the eastern boundary is dominated by Lime *Tilia spp* and Beech *Fagus sylvatica*.

Figure 5.4: Treeline habitat - WL2 along western Site Boundary

Mosaics of Recolonising Bare Ground (ED3) and Dry Meadows and Grassy Verges (GS2)

Mosaics of recolonising bare ground and dry meadows and grassy verges are found along the site's western boundary. These areas are dominated by a variety of herbaceous species. Species within this habitat included Dandelion Taraxacum officinale, Creeping Buttercup Ranunculus repens, Horsetails Equisetum hyemale, Common vetch Vicia sativa ssp. segetalis, Cow Parsley Anthriscus sylvestris, Scarlet Pimpernel Anagallis arvensis, Lords and Ladies Arum maculatum, Prickly Sowthistle Sonchus asper, Goosegrass Galium aparine, Primrose Primula vulgaris, Bush vetch Vicia sepium, Bramble Rubus fruticosus, Common ramping fumitory Fumaria muralis , Rapeseed Brassica napus, Colts-foot Tussilago farfara, Ragwort Jacobaea vulgaris and nettle Urtica dioica.

Figure 5.5. Mosaics of Recolonising bare ground - ED3 and Dry meadows and grass verges - GS2 along Site Boundary

Habitat Evaluation

Habitats have been evaluated below in Table 5.6 for their conservation importance, based on the NRA evaluation scheme (NRA, 2009b). Those selected as Key Ecological Receptors are those which are evaluated to be of at least local importance (higher value). The impact of the proposed development on these receptors are assessed in the Impact Assessment Section of this Chapter. The summary in Table 6 below indicates the evaluation rating assigned to each habitat and the rationale behind these evaluations.

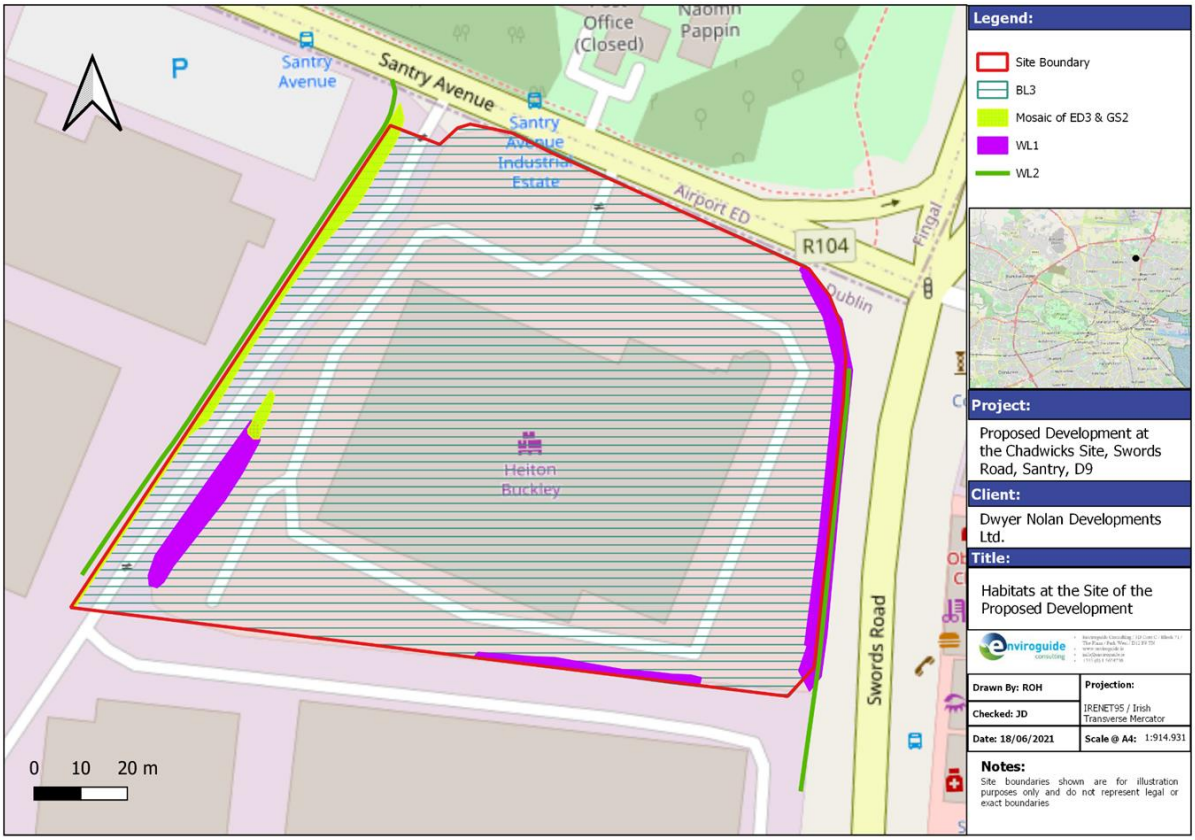

Figure 5.6: Mosaics of Recolonising bare ground - ED3 and Dry meadows and grass verges - GS2 along Site Boundary

Species	Evaluation	Rationale	Key Ecological Receptor (KER)
Hedgerows (WL1)	Local importance (lower value)	Due to the low biodiversity context of habitats within the site, these sections of hedgerow provide some semi-natural habitat for local fauna.	**Yes**
Treeline – WL2	Local importance (higher value)	Due to the low biodiversity context of habitats within the site, these sections of treeline provide some semi-natural habitat for local fauna.	**Yes**
Buildings and artificial surfaces (BL3)	Local importance (lower value)	Man-made habitat with little to no vegetation present. The site is completely covered with impermeable surfaces and artificial structures. Therefore, it has low ecological value.	**No**
Mosaic of Recolonising Bare Ground (ED3) and Dry Meadows and Grassy Verges (GS2)	Local importance (lower value)	Due to the low biodiversity context of the site, this habitat type may offer a temporary food source for birds.	**Yes**

Table 5.6: The evaluating rating assigned to each habitat and the rationale behind the evaluation

Species and Species Groups

The site of the proposed development is located within the Ordnance Survey Ireland National Grid 10km squares O13 and O14, 2km squares O13U and O14Q, and 1km squares O1639 and O1640. Species records dated within the last 20 years were studied for the presence of invasive, rare or protected flora and fauna. These records are presented in Table 5.7. In addition, data from various sources (e.g., Inland Fisheries Ireland) were used to determine the presence of species in the vicinity of the proposed development. The following sections outline the results of this assessment.

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
Invasive Flora	American Skunk – cabbage *Lysichiton americanus*	O13	29/03/2019	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive - EU Regulation No 1143/2014 - Regulation S.I. 477 (Ireland)	-
	Brazilian Giant-rhubarb *Gunnera manicata*	O13	29/03/2019	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive - Regulation S.I 477 (Ireland)	-
	Butterfly-bush *Buddleja davidii*	O14 O13 O13U	28/06/2019 31/08/2020 23/05/2015	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	-
	Canadian Fleabane *Conyza canadensis*	O14 O13	09/07/2018 26/10/2020	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	-
	Canadian Waterweed *Elodea canadensis*	O13	08/07/2020	Aras an Uachtarain Biodiversity Audit 2019-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	-
	Cherry Laurel *Prunus laurocerasus*	O14 O13	11/12/2017 14/07/2020	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species	-
	Common Cord-grass *Spartina anglica*	O14	15/07/2014	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	-
	Common Broomrape *Orobanche minor*	O13	24/06/2020	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	-
	Curly Waterweed *Lagarosiphon major*	O13	31/12/1999	National Invasive Species Database	- High Impact Invasive Species - EU Regulation No. 1143/2014 - Regulation S.I. 477 (Ireland)	-

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
	Evergreen Oak *Quercus ilex*	O13	01/06/2020	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
	Fallopia japonica x sachalinensis F.x bohemica	O13	17/06/2015	National Invasive Species Database	- High Impact Invasive - Regulation S.I. 477 (Ireland)	
	False-acacia Robinia pseudoacacia	O13	26/04/2012	Aras an Uachtarain Biodiversity Audit 2019-2020	- Medium Impact Invasive Species	
	Giant Hogweed *Heracleum mantegazzianum*	O14 O13	06/07/2018 21/06/2020	National Invasive Species Database	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	-
	Giant Knotweed *Fallopia sachalinensis*	O13	03/08/2017	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Giant Rhubarb *Gunnera tinctoria*	O13	28/06/2020	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Himalayan Honeysuckle *Leycesteria formosa*	O14 O13	11/12/2017 24/07/2020	National Invasive Species Database Aras an Uachtarain Biodiversity Audit 2019-2020	- Medium Impact Invasive Species	
	Indian Balsam *Impatiens glandulifera*	O13	06/08/1010	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Japanese Knotweed *Fallopia japonica*	O14 O13	25/02/2018 09/08/2020	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species	-

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
					- Regulation S.I. 477 (Ireland)	
	Japanese Rose *Rosa rugosa*	O13	19/05/2018	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
	Narrow-leaved Ragword *Senecio inaequidens*	O13	09/08/2020	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
	New Zealand pigmyweed *Crassula helmsii*	O13	31/07/2009	National Invasive Species Database	- High Impact Invasive Species - Regulation S.I. 477 - (Ireland)	
	Nuttall's Waterweed *Elodea nuttallii*	O13	22/07/2019	Online Atlas of Vascular Plants 2012-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Pampas-grass *Cortaderia selloana*	O13	15/01/2019	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
	Parrot's-feather *Myriophyllum aquaticum*	O13	31/07/2009	National Invasive Species Database	- High Impact Invasive Species - EU Regulation No. 1143/2014 - Regulation S.I. 477 (Ireland)	
	Rhododendron ponticum	O13	17/06/2004	Species Data from the National Vegetation Database	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Russian-vine *Fallopia baldschuanica*	O14	21/08/2018	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	-
	Sea-buckthorn *Hippophae rhamnoides*	O13	20/08/2019	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
					- Regulation S.I. 477 (Ireland)	
	Spanish Bluebell *Hyacinthoides hispanica*	O13	06/05/2018	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Sycamore *Acer pseudoplatanus*	O14 O1640 O13 O13U	31/07/2014 21/06/2005 14/07/2020 23/05/2015	Online Atlas of Vascular Plants 2012-2020 Aras an Uachtarain Biodiversity Audit 2019-2020	- Medium Impact Invasive Species	-
	Three-cornered Garlic *Allium triquetrum*	O14 O13	11/12/2017 22/04/2020	National Invasive Species Database Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species - Regulation S.I. 477 (Ireland)	-
	Traveller's joy *Clematis vitalba*	O13	10/07/2020	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
	Tree-of-haven *Ailanthus altissima*	O13	25/10/2009	Heritage Trees of Ireland	- Medium Impact Invasive Species	
	Turkey Oak *Quercus cerris*	O13	09/05/2019	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
	Wild Parsnip *Pastinaca sativa*	O13	03/08/2020	Online Atlas of Vascular Plants 2012-2020	- Medium Impact Invasive Species	
Bryophytes	Sausage Beard-moss *Didymodon tomaculosus*	O14	16/11/2003	Bryophytes of Ireland		Vulnerable
Terrestrial Mammals (Native)	Eurasian Badger *Meles meles*	O14 O13 O13U	30/05/2015 01/09/2020 04/04/2018	Atlas of Mammals in Ireland 2010-2015 Aras an Uachtarain Biodiversity Audit 2019-2020	- Wildlife (Amendment) Act 2000 - Berne Convention Appendix III	Least Concern

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
				Mammals of Ireland 2016-2025		
	Eurasian Pygmy Shrew *Sorex minutus*	O14 O13	06/06/2018 01/09/2020	Atlas of Mammals in Ireland 2016-2025 Aras an Uachtarain Biodiversity Audit 2019-2020	- Wildlife (Amendment) Act 2000 - Berne Convention Appendix III	Least Concern
	Eurasian Red Squirrel *Sciurus vulgaris*	O14 O13 O13U	10/05/2011 02/08/2017 02/08/2017	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016-2025	- Wildlife (Amendment) Act, 2000 - Berne Convention Appendix III	Least Concern
	European Otter *Lutra lutra*	O14 O13	02/05/2014 16/07/2018	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016-2025	- EU Habitats Directive – Annex II & IV - Wildlife (Amendment) Act 2000 - Bern Convention Appendix III	Least Concern
	Irish Hare *Lepus timidus subsp. hibernicus*	O14 O13	23/10/2018 17/09/2015	Mammals of Ireland 2016-2025 Atlas of Mammals in Ireland 2010-2015	- Wildlife (Amendment) Act 2000	Least Concern
	Irish Stoat *Mustela erminea subsp. hibernica*	O14 O13	05/06/2012 26/02/2016	Atlas of Mammals in Ireland 2010-2015 Mammals of Ireland 2016-2025	- Wildlife (Amendment) Act, 2000 - Bern Convention Appendix III	Least Concern
	Pine Marten *Martes martes*	O14	31/12/2012	Irish Squirrel Survey 2012; Atlas of Mammals in Ireland 2010-2015	- EU Habitats Directive – Annex V - Bern Convention Appendix III - Wildlife (Amendment) Act 2000	Least Concern

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
	Red Fox *Vulpes vulpes*	O14 O13 O13U	01/01/2018 01/09/2020 25/09/2017	Mammals of Ireland 2016-2025 Aras an Uachtarain Biodiversity Audit 2019-2020		Least Concern
	West European Hedgehog *Erinaceus europaeus*	O14 O13	22/09/2015 10/09/2015	Atlas of Mammals in Ireland 2010-2015; Road Kill Survey Atlas of Mammals in Ireland 2010-2015	- Wildlife (Amendment) Act 2000 - Bern Convention Appendix III	Least Concern
	Wood Mouse *Apodemus sylvaticus*	O14 O13	13/09/2011 31/08/2020	Atlas of Mammals in Ireland 2010-2015 Aras an Uachtarain Biodiversity Audit 2019-2020		Least Concern
Terrestrial Mammals (non-native)	American Mink *Mustela vison*	O13	27/02/2016	Mammals of Ireland 2016-2025	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Brown Rat *Rattus norvegicus*	O14 O13	15/05/2017 26/05/2020	Mammals of Ireland 2016-2025 Aras an Uachtarain Biodiversity Audit 2019-2020	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Eastern Grey Squirrel *Sciurus carolinensis*	O14 O14Q 01640 O13	27/05/2018 08/09/2015 15/04/2011 01/09/2020	Mammals of Ireland 2016-2025 Aras an Uachtarain Biodiversity Audit 2019-2020	- High Impact Invasive Species - EU Regulation No. 1143/2014 & Regulation S.I. 477 (Ireland)	

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
	European Rabbit *Oryctolagus cuniculus*	O14 O13	24/06/2018 15/06/2020	Mammals of Ireland 2016-2025 Aras an Uachtarain Biodiversity Audit 2019-2020	- Medium Impact Invasive Species	
	Fallow Deer *Dama dama*	O13	16/09/2018	Mammals of Ireland 2016-2025	- High Impact Invasive Species - Regulation S.I. 477 (Ireland)	
	Feral Ferret *Mustela furo*	O13	12/08/2018	Mammals of Ireland 2016-2025	- High Impact Invasive Species	
	Greater White-tooth Shrew *Crocidura russula*	O13	19/06/2017	Mammals of Ireland 2016-2025	- Medium Impact Invasive Species	
	House Mouse *Mus musculus*	O13	25/07/2018	Mammals of Ireland 2016-2025	- High Impact Invasive Species	
Bats	Brown Long-eared Bat *Plecotus auritus*	O14 O13	14/09/2002 25/05/2020	National Bat Database of Ireland Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Common Pipistrelle *Pipistrellus pipistrellus sensu stricto*	O13	25/05/2020	Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Daubenton's Bat *Myotis daubentonii*	O14 O13	12/08/2009 25/05/2020	National Bat Database of Ireland Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
	Lesser Noctule *Nyctalus leisleri*	O14 O14Q 01640 O13	09/08/2012 31/05/2011 01/08/2008 08/06/2020	National Bat Database of Ireland Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Myotis Bat species *Myotis*	O13	25/05/2020	Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Nathusius's Pipistrelle *Pipistrellus nathusii*	O13	25/05/2020	Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Natterer's Bat *Myotis nattereri*	O14 O13	31/08/2006 25/05/2020	National Bat Database of Ireland Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Pipistrelle *Pipistrellus pipistrellus sensu lato*	O14 O14Q O1640 O13	09/08/2012 31/05/2011 01/08/2008 03/08/2013	National Bat Database of Ireland	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
	Soprano Pipistrelle *Pipistrellus pygmaeus*	O14 O14Q O1640 O13	09/08/2012 31/05/2011 01/08/2008 25/05/2020	National Bat Database of Ireland Aras an Uachtarain Biodiversity Audit 2019-2020	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern

Species Group	Name	Grid square	Date of last record	Database	Legal Status	Conservation status
	Whiskered Bat *Myotis mystacinus*	O13	13/08/2007	National Bat Database of Ireland	- EU Habitats Directive Annex IV - Wildlife (Amendment) Acts 2000	Least Concern
Amphibian	Common Frog *Rana temporaria*	O14 O13 O14Q	28/09/2018 28/08/2020 23/02/2018	Amphibians and reptiles of Ireland	- EU Habitats Directive Annex V - Berne Convention Appendix III - Wildlife (Amendment) Acts 2000	Least Concern
	Smooth Newt *Lissotriton vulgaris*	O14 O13	28/09/2018 09/05/2020	Amphibians and reptiles of Ireland	- Wildlife (Amendment) Acts 2000	Least Concern
Fish	European Eel *Anguilla anguilla*	O14 O13	04/07/2008 09/06/2008	River Biologists' Database (EPA)	- Threatened Species: OSPAR Convention	Critically Endangered
Hymenoptera	*Andrena (Melandrena) nigroaenea*	O14	08/04/2020	Bees of Ireland		Vulnerable
Mollusca	Lake Orb Mussel *Musculium lacustre*	O14	01/07/2010	All Ireland Non-Marine Molluscan Database		Vulnerable
Insects	Marsh Fritillary *Euphydryas aurinia*	O13	27/05/2020	Butterflies of Ireland	- EU Habitats Directive Annex II	Vulnerable

Table 5.7: National Biodiversity Data Centre records of rare, invasive and protected species.

* With the exception of terrestrial mammals, species with "*near-threatened*", "*least concern*", "*data deficient*" and "*not assessed*" conservation status are not listed. The conservation status of non-native flora and fauna is not listed

Flora

Rare and Protected Flora

The proposed development site is located within the Ordinance Survey National Grid 10km Squares O13 and O14, the 2km Squares O13U and O14Q and the 1km Squares O1639 and O1640. Species records available from the National Biodiversity Data Centre (NBDC) online database for the 2 km grid square (O13U and O14Q) were studied for the presence of rare or protected flora species. A review of the above datasets yielded no records. Furthermore, according to the Flora Protection Order - Bryophytes Map Viewer provided by the DAHG, there are no records for bryophytes listed on the Flora Protection Order within the vicinity of the proposed development.

No rare or protected flora were identified within the site of the proposed development during surveys.

Invasive Flora Species

The NBDC have records for thirty-four species of flora considered to be invasive in the 10km grid squares O13 and O14, twenty of these are considered medium impact, whereas fourteen are considered high impact. Eighteen species within the grid squares are listed under Schedule III of Regulation S.I. 477. Only two species of flora considered to be invasive are listed for the 2km (O14Q and O13U), grid squares within which the site of the proposed development is located, Butterfly-bush *Buddleja davidii* and Sycamore *Acer pseudoplatanus.* Both species are medium impact invasive species.

No high impact invasive plant species were recorded at the site during the walk over surveys carried out on the 13th of May 2021. Three non-native, potentially invasive species were found along the western fence line within the site boundary, a single Butterfly-bush *Buddleja davidii*, a number of Sycamore *Acer pseudoplatanus* saplings and Cotoneaster *Cotoneaster spp*. None of these species are listed under regulation S.I. 477. [11]

Source: National Biodiversity Data Centre [https://maps.biodiversityireland.ie/Map] [Accessed 05-05-2021]

Mammals (excl. bats)

Ten native terrestrial mammals were recorded within the 10km grid squares, eight of which are afforded legal protection under the Wildlife (Amendment) Act, 2000, namely Eurasian Badger Meles meles, Eurasian Pygmy Shrew Sorex minutus, Eurasian Red Squirrel Sciurus vulgaris, European Otter Lutra lutra, Irish Hare Lepus timidus subsp. hibernicus, Irish Stoat Mustela erminea subsp. hibernica, Pine Marten Martes martes and West European Hedgehog Erinaceus europaeus. A number of these species are also protected under the Habitats Directive and were recorded within one or more of the relevant grid squares. Otter, Irish Hare and Irish Stoat were recorded in grid squares O14 and O13, Pine Marten was recorded in grid squares O14. The Eurasian Badger and Eurasian Red Squirrel were recorded in grid squares O14, O13 and O13U.

The habitats within the site of the proposed development are of little or no value for mammals. The site is comprised mainly of the hard-standing and man-made habitats associated with the current buildings located at the site.

[11] The NDBC have records of two medium impact invasive species within the 2km grid squares (O14Q and O13U) within which the Proposed Development is located. Three potentially invasive species were found by Enviroguide Consulting during the walk over survey on the 13th of May 2021.

According to the Dublin City Otter Survey, carried out as part of an Action of the Dublin City Biodiversity Action Plan 2015-2020 (Macklin et al., 2019), Otters do utilise the Santry river. The majority of Otter signs recorded along the river were located in the upper survey reaches south of the M50. The river reaches north of the M50 were not surveyed by Macklin et al. (2019).

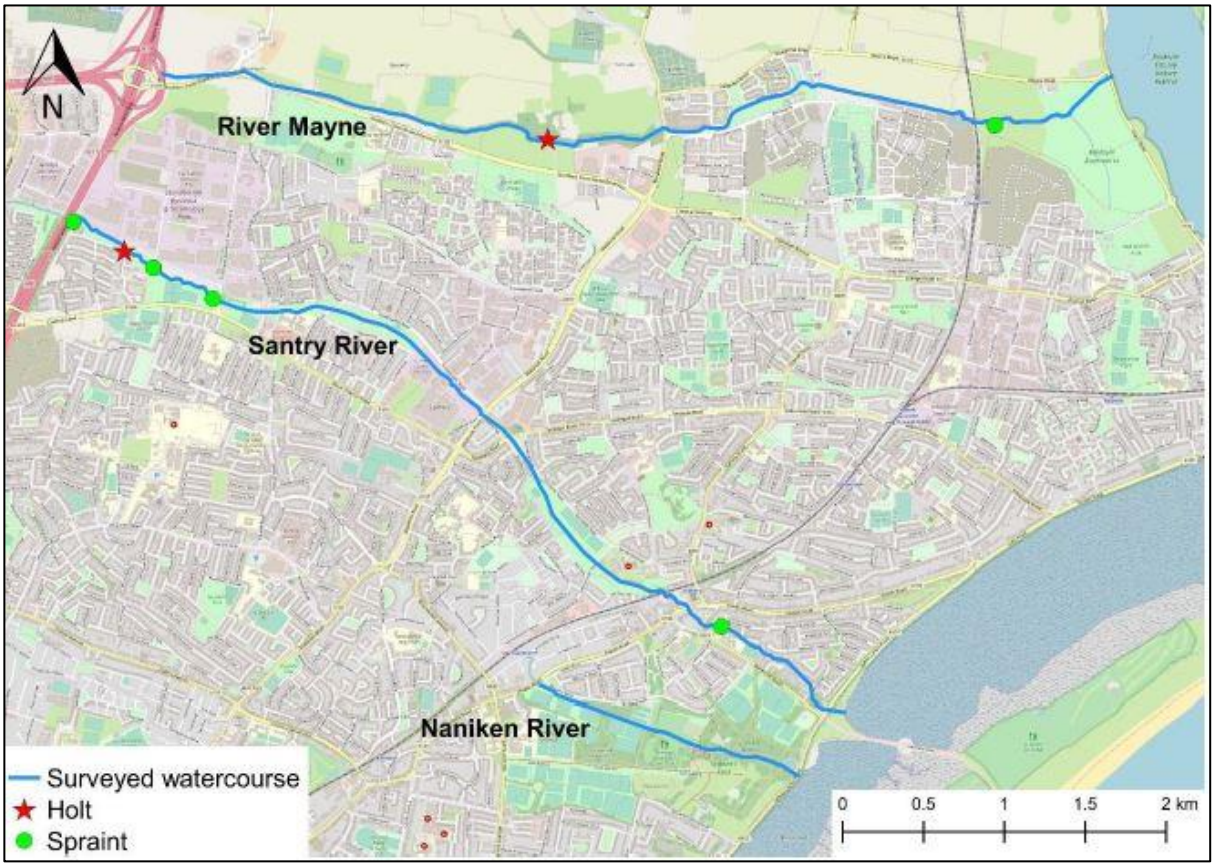

Figure 5.7: Otter sign distribution on the surveyed reaches of the Santry, Mayne and Naniken rivers as surveyed April 2018 – April 2019 by Triturus Environmental Lid. (Extracted from Macklin et al., 2019). No signs of Otter were recorded at the Site nor does it provide suitable habitat for this species.

No evidence of mammal activity was noted during the field survey carried out on the 13th of May 2021. No evidence of Badger activity such as sets or latrines were recorded at the site. There is potential habitat for hedgehog and pygmy shrew along the hedgerows bordering the west and east of the site. There are no water courses or areas of woodland within the project site, there is therefore no potential habitat for hare, pine marten, deer or stoat within the proposed development site, although some of these species may be present in the vicinity of the site in Santry Demesne Park north of the proposed development site.

Red fox may frequent the site as they are a relatively widespread species. Although not afforded the same level of protection as the other mammal species mentioned above; wilful harming of the animal should be avoided. Fox is also protected from a variety of hunting/extermination techniques as per the **Wildlife Acts 1976 to 2012**; and from acts of cruelty as per the **Animal Health and Welfare Act 2013**. Should a suspected Fox den be identified on-site, it is recommended that a professional ecologist be consulted regarding how best to proceed. This species is not assessed further in this report.

Brown Rat, Rabbit, Grey Squirrel and Mink are considered to be non-native invasive species and as such are not considered further in this report.

Bats

In view of their sensitive status across Europe, all species of bat have been listed on Annex IV of the EC 'Habitats Directive and some, such as the lesser horseshoe bat, are given further protection and listed on Annex II of this Directive. The obligations of the Habitats Directive have been transposed into Irish law and combined with the Wildlife Acts 1976 to 2018, ensure that individual bats and their breeding sites and resting places are fully protected. This has important implications for those who own or manage sites where bats occur.

All bat species are protected under the Wildlife Acts which make it an offence to wilfully interfere with or destroy the breeding or resting place of these species; however, the Acts permit limited exemptions for certain kinds of development.

Records for Bat species recorded in the 1km, 2km and 10km National Grid Squares were retrieved from the NBDC online database, along with records obtained from the NPWS. Ten species of bat have been recorded within the 10km, 2km and 1km grid squares which encompass the Site. Three species were recorded within the 1km grid square (O1640), Lesser Noctule Nyctalus leisleri, Pipistrelle Pipistrellus pipistrellus sensu lato and Soprano Pipistrelle Pipistrellus pygmaeus.

Bat Survey conclusion

The results of the bat survey carried out on the 28th of April 2021 found *'an absence of bat activity onsite during the survey despite the ambient weather conditions on the night and found the site itself to be of Lower Importance for bats for the following reasons:*

- *No bats were recorded during the bat survey carried out in ambient weather conditions during the appropriate time of year.*
- *The site is well illuminated due to the fact it is a live retail site (likely to deter bats).*
- *The site lacks mature trees and therefore commuting and foraging routes to other more suitable habitats.*
- *All buildings occupying the site lacked roosting suitability for bats.'*

According to the NBDC's bat suitability index (Lundy et al. 2011), which provides a visual map of the broad scale geographic patterns of occurrence and local roosting habitat requirements for Irish bat species; the area surrounding the Site of the proposed development carries an overall bat suitability score of 18.89 out of 100. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. It is a higher score just inside the northern boundary of the site 25.89 possibly due to the close proximity of Santry Park with wooded areas. The species with the highest individual suitability scores for the area encompassing the site are Common Pipistrelle Pipistrellus pipistrellus and Lesser Noctule Nyctalus leisleri with 40 and 33 respectively.

Birds

Limited bird species were recorded during the site visit on the 13th of May 2021. A total of ten species were identified within the vicinity of the site, predominantly associated with the boundary vegetation and the occasional flyover. All species recorded during the survey are shown in Table 5.8. One species, Herring Gull observed flying over the site and seen resting on an adjacent rooftop is on the Amber List of the Birds of Conservation Concern in Ireland. All other species observed are Green Listed.

Species	BoCCI[12] status	Notes	Breeding Status
Blackbird *Turdus merula*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Wren *Troglodytes troglodytes*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Robin *Erithacus rubecula*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Feral Pigeon *Coumba livia f. domestica*	Green	Flyover and on top of building on site	Possible Breeder
Woodpigeon *Columba palumbus*	Green	Flyover and on top of building on site	Possible Breeder
Dunnock *Prunella modularis*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Blue tit *Cyanistes caeruleus*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Magpie *Pica pica*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Jackdaw *Corvus monedula*	Green	Observed in Hedgerow (WL1) and Treeline (WL2)	Possible Breeder
Herring Gull *Larus argentatus*	Amber	A site fly over	Not utilizing the Site.

Table 5.8. Bird species recorded on the site during the surveys on 13th of May 2021.

Fish

Atlantic Salmon (Salmo salar)

There are three salmonid fish species native to Ireland, namely Atlantic Salmon Salmo salar, Brown Trout S. trutta and Arctic Char Salvelinus alpinus. In Ireland, Arctic Char are confined to lentic habitats. They

[12] Birds of Conservation Concern in Ireland 4: 2020-2026 Gilbert, G. Stanbury, A. and Lewis, L., 2021.

typically occur in upland lakes, corries, as well as lowland small and larger lakes with areas of deep water. Given the lack of suitable habitat for Arctic Char in the vicinity of the proposed development, they are not considered threatened by it and are therefore not considered further in this report. Conversely, Brown Trout are a relatively common species, occurring in almost every brook, stream, river and lake in Ireland (Kennedy and Fitzmaurice, 1971 cited in King et al., 2011). In addition, anadromous populations (sea trout) occur in many coastal river systems. Brown trout are protected by the Fisheries Acts 1959 to 2006.

Atlantic Salmon are generally widespread in Ireland where habitat quality is suitable and access to river systems from the sea is possible (no barriers to obstruct migration). Atlantic Salmon are listed under Annex II and V of the Habitats Directive and are protected by the Fisheries Acts 1959 to 2006. Furthermore, Atlantic Salmon are categorised as 'vulnerable' in the Irish Freshwater Fish Red List (King et al., 2011).

There are no NBDC records of this species in the 10km national grid squares O13 and O14 in which the site of the proposed development. No suitable habitat for this species is present at the site of the proposed development, however, they may occur downstream in the Santry River.

Lamprey (Lampetra sp. & Petromyzon marinus)

Ireland has three native lamprey species, Sea Lamprey Petromyzon marinus, River Lamprey Lampetra fluviatilis and Brook Lamprey L. planeri. The latter species is potamodromous whereas the two former species are anadromous. All three species are listed under Annex II of the Habitats Directive and are protected by the Fisheries Acts 1959 to 2006. Sea Lamprey are categorised as 'near threatened in the Irish Freshwater Fish Red List (King et al., 2011). Lamprey surveys in Ireland are focussed on juvenile lampreys, as L. fluviatilis and L. planeri are indistinguishable as juveniles, most available data relates to "Lampetra sp." and cannot be assigned to one species or the other.

It is highly unlikely that Sea Lamprey will be affected by the proposed development. The most important locations for Sea Lamprey in Ireland are the Lower Shannon, the River Suir in Clonmel, the River Nore in Kilkenny, the River Moy in Ballina and the River Corrib in Galway (Igoe et al., 2004). Sea Lamprey were recorded in the River Liffey at Island Bridge in 1906 (Igoe et al., 2004).

Although juvenile lamprey typically inhabit slow flowing, silty habitats within rivers (Kelly & King, 2001), adult lamprey require similar spawning habitats to salmonids (clean gravels) and may occur downstream within the Santry River. There are no records for any species of lamprey within the 10km grid squares associated with the site of the proposed development. No suitable habitat for these species was present at the site of the proposed development.

European eel (Anguilla anguilla)

European Eel are a red listed species and are currently considered to be the most threatened fish species in Ireland, following a red-listed publication (King et al. 2011). European Eel can inhabit a range of waterway types including lakes, small streams and rivers; migrating from where they live in freshwater habitats to breed out at sea, before returning as a young eel to their freshwater homes (King et al. 2011). Eels are protected by the Fisheries Acts 1959 to 2006, conservation of Eel fishing bye-law No. C.S. 303, 2009; EC Regulation (Council Regulation 1100/2007) for the recovery of the Eel stock and are listed under CITES Annex II (King et al., 2011). There are no NBDC records of European Eel within the 2km grid squares O14Q and O13U and no suitable habitat for this species is present on the site of the proposed development.

Amphibians

The Common Frog Rana temporaria and Smooth Newt Lissotriton vulgaris were recorded within the 10km grid squares associated with the site of the proposed development. There are records for Common Frog within the 2km grid square O140 also. The proposed development site does not contain any drainage ditches, attenuation ponds or slow flowing river habitats and therefore does not provide a suitable habitat for these species.

Invertebrates

White-clawed Crayfish (Austropotamobius pallipes)

In Ireland, the white-clawed crayfish most commonly occurs in small and medium-sized lakes, large rivers, streams and drains, wherever there is sufficient lime (Reynolds, 2007). The overall conservation status of the white-clawed crayfish in Ireland is inadequate, due to the reduction in its range and the continuing pressures that it faces (NPWS,2013).

There are no records for this species within the 10km grid squares O14 and O13 which encompasses the Site of the proposed development and no suitable habitat types are present within the site. It is noted that this species' range is somewhat restricted to the midlands of Ireland. As such this species is not assessed further.

Marsh Fritillary (Euphydryas aurinia)

Marsh Fritillary butterfly is listed under Annex II of the EU Habitats Directive and is the only insect protected by law in Ireland. There are records for this species within the 10km grid square O13.

Neither Marsh Fritillary, nor its associated food plant; Devil's bit scabious (Succisa pratensis), were recorded during site surveys. Butterfly forms of Marsh Fritillary are active in May-June and Devil's bit scabious flowering in July-September.

The site does not contain wet grassland, a habitat often inhabited by this species, and the intensive management of the farmland surrounding the site i.e., as intensive grassland, would make the presence of Devil's bit scabious unlikely. As such, it is deemed that the site does not provided suitable habitat for Marsh Fritillary.

Other species and species groups

There are no records of common lizard Zootoca vivipara within the 10km grid squares O14 and O13. In addition, this species is associated with coastal and heathland habitats, but also locally in rural gardens, stone walls and roadside verges (King et al., 2011). The habitat at the site of the proposed development is not considered suitable for this species and this species is not assessed further.

Designated sites and species evaluation

Fauna that have the potential to utilise the immediate area of the proposed development, or for which records exist in the wider area, have been evaluated below in Table 9 for their conservation importance. Designated sites considered to have the potential to be impacted by the proposed development via impact pathways e.g., hydrological links to the site, are also assessed in this table. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b). The rationale behind these evaluations is also provided. The term 'Key ecological receptor' is used when impacts upon a feature are considered likely.

Designated Sites/Species	Evaluation	Key Ecological Receptor (KER)	Rationale
Designated Sites			
SACs & SPAs	International Importance	No	Potential impacts on Natura 2000 sites are addressed in the AA Screening accompanying this application.
pNHAs	National Importance	**Yes**	Santry Demesne pNHA is located 20 meters north of the site. The Santry River flows through this pNHA and the woodland within it, which contains a legally protected plant species - Hairy St. John's wort *Hypericum hirsutum* which grows within the woodland and along the riverbanks. There is a potential indirect hydrological connection between the site, Santry Demesne pNHA and North Dublin Bay pNHA via surface water drainage systems. Although significant impacts are unlikely this KER will be assessed further.
Mammals			
Eurasian Badger *Meles meles*	National Importance	No	The badger is an adaptable species of lowland grassland and woodland habitats (Marnell et al., 2009). Although the woodland, scrub and hedgerows/treelines in Santry Demesne Park north of the site are considered suitable for badger, there was no evidence of badger utilizing the site of the proposed development.
West European Hedgehog *Erinaceus europaeus;*	National Importance	**Yes**	The hedgerow along the boundary of the proposed development site provides potential suitable habitat for West European Hedgehog and this species is likely to utilize the surrounding area.
Eurasian Pygmy Shrew *Sorex minutus*	National Importance	**Yes**	Pygmy shrews are found throughout Ireland in a variety of habitats ranging from areas bordering coniferous and deciduous woodland to any area with good ground cover such as grassland, heaths, hedgerows, peatlands and sand dunes. The hedgerow along the site boundary provides a potential habitat for this species.
Eurasian Red Squirrel *Sciurus vulgaris*	National Importance	No	The site of the proposed development is not located within the two areas of remaining red squirrel populations in Dublin. Furthermore, the habitats at the site are not suitable for this species.
European Otter *Lutra lutra*	International importance	**Yes**	No watercourse or habitat of value for otter are found within the proposed development site, however a potential hydrological link exists between the site and the Santry River via surface water drains.

Designated Sites/Species	Evaluation	Key Ecological Receptor (KER)	Rationale
Pine Marten *Martes martes*	National Importance	No	The favoured habitats of the Pine Marten are woodland and scrub, however, this species also occurs in mature gardens. The species dens in hollow trees, burrows, brash and buildings. The habitats at the site of the proposed development are considered unsuitable for this species due to the lack of woodland/forestry, although this species may be present north of the site is Santry Demesne Park.
Irish Hare *Lepus timidus* subsp. *hibernicus*	National Importance	No	The favoured habitat of the Irish hare is improved grassland (Marnell et al., 2009). The habitats at the site of the proposed development and within the surrounding area are considered unsuitable for this species due to the lack of grassland.
Irish Stoat *Mustela erminea* subsp. *hibernica*	National Importance	No	Stoat are found in various habitats from coastal grasslands to woodlands and uplands, however they tend to avoid open habitats (Marnell et al., 2009). The habitats at the site of the proposed development are considered unsuitable for this species due to the lack of vegetation cover, however this species may be present north of the site in Santry Demesne Park.
Red Fox *Vulpes vulpes*		No	Although this species is likely to occur at the site, it is not considered to be of conservation concern and therefore is not assessed further in this report.
Wood mouse *Apodemus sylvaticus*	National Importance	No	Wood mice can be found in wide range of habitats from sand dunes to their preferred forest habitat. However, this species is not considered to be of conservation concern and therefore is not assessed further in this report
Bat Assemblage	International Importance	No	The Bat Survey conducted on site concluded that the site itself is considered to be of Lower Importance for bats. No bats were recorded during the bat survey. The site lacks mature trees and therefore commuting and foraging routes, and the buildings on site lack roosting suitability for bats.
Birds			
Bird assemblage (**Red** listed)	National Importance	No	No species recorded on site.
Bird assemblage (**Amber** listed)	National Importance	No	One Amber listed species was recorded flying over the site (Herring Gull).
Bird assemblage (**Green** listed)	County Importance	**Yes**	Green listed species were recorded at the site which may breed there.
Amphibians			
Common Frog *Rana temporaria*	International Importance	No	There are no suitable breeding sites (ditches, attenuation pond) within the site of the proposed development.

Designated Sites/Species	Evaluation	Key Ecological Receptor (KER)	Rationale
Smooth Newt *Lissotriton vulgaris*	National Importance	No	There are no suitable breeding sites (ditches, attenuation pond) within the site of the proposed development.
Fish			
Brown Trout *Salmo trutta;* European Eel *Anguilla anguilla;* Brook and River Lamprey *Lampetra* spp.	International-National Importance	**Yes**	These species may occur in the Santry River which has a potential hydrological connection with the site in the form of surface water run-off. There is a slight potential impact to these species during the construction phase of the proposed development should they be present via construction surface water run-off entering drains that ultimately discharge to the Santry River.

Table 5.9: Evaluation of designated sites, habitats and fauna recorded within the surrounding area

5.5 Potential Impacts

Taking the baseline ecological data, the extent, the scale and the characteristics of the proposed development into account, the following potential impacts have been identified:

- Hedgerow removal;
- Impacts on Surface Water;
- Earthworks – causing the mobilisation of particles;
- Noise and vibration.

These potential impacts are discussed in the following paragraphs.

Hedgerow removal

The removal of hedgerows could result in the loss of habitat connectivity and potential breeding bird habitat. This would result in moderate local scale impacts to biodiversity, if unmitigated.

Impacts on Surface Water

The operational phase elements of the project will be consistent with the urban context of the site and therefore, there are no long terms sources for impacts to surface water. The construction phase elements of the project could interact with water quality and therefore a CEMP is required. Further details on the hydrological interactions are detailed in chapter 7.

Earthworks

The existing site is agricultural and amenity grassland and there are no habitats present on site that are of high ecological value. The earthworks proposed within the project description will not have effects beyond the site boundary. Furthermore, the CEMP contains measures to reduce potential impacts in this regard (see below).

Noise / Vibration

The construction phase and movement of heavy vehicles across the site could cause localised disturbance of breeding birds that may use the perimeter vegetation. Given the low levels of activity identified on site by birds impacts in this regard be very low. This would be expected to have a probable, short-term impact at a local level but there is likely to be an existing degree of habituation to regular traffic on the site so this impact may not be across the whole area. Bird species are particularly sensitive to disturbance effects due to increased noise and on-site activity. Full details of the noise pollution data can be found in chapter 9.

An assessment of the project detail outlined in Chapter 3 indicates the potential impacts to biodiversity are predominantly associated with construction phase works which are temporary. The site was found to have low ecological value following the CIEEM (2016) Ecological Impact Assessment Guidelines; informed by the results of both the desktop study and the field surveys. The operational phase elements of the project are thought to have negligible impacts given the low ecological value of the existing habitats. The potential operational phase activities are consistent with the existing land use of the receiving environment, the on-site land use is changing from agricultural to residential; residential impacts are low level and confined to the site boundary.

5.5.1 Potential Impacts on Designated Sites

The AA Screening Report sets out the likelihood and significance of any potential impacts on European designated sites. The report which accompanies the application concludes that there are no significant adverse effects foreseen to be likely to affect the ecological integrity of any European sites. These complete, precise and definitive findings, based on the best available scientific evidence, remove all reasonable scientific doubt that the proposed development will have any significant effect on the Natura 2000 sites detailed above. It is also noted that, no avoidance or preventative/mitigation measures have been taken into account in this Appropriate Assessment Screening Report and its conclusions.

5.5.2 Construction Phase

Impacts to Designated Sites

Natura 2000 sites

The proposed development does not overlap or adjoin any Natura 2000 site. Potential impacts on Natura 2000 sites are considered in the Appropriate Assessment accompanying this Planning Application. The conclusions of the Appropriate Assessment screening are included below:

In conclusion, upon the examination, analysis and evaluation of the relevant information and applying the precautionary principle, it is concluded by the authors of this report that, on the basis of objective information; the possibility ***may be excluded*** *that the* proposed development *will have a significant effect on any of the European sites listed below:*

- *North Dublin Bay SAC (000206)*
- *Baldoyle Bay SAC (000199)*
- *South Dublin Bay SAC (000210)*
- *Malahide Estuary SAC (000205)*
- *Howth Head SAC (000202)*
- *Rockabill to Dalkey Island SAC (003000)*
- *Ireland's Eye SAC (002193)*
- *Rogerstown Estuary SAC (000208)*
- *Wicklow Mountains SAC (002122)*
- *Knocksink Wood SAC (000725)*
- *Ballyman Glen SAC (000713)*
- *South Dublin Bay and River Tolka Estuary SPA (004024)*
- *North Bull Island SPA (004006)*
- *Baldoyle Bay SPA (004016)*
- *Malahide Estuary SPA (004025)*
- *Ireland's Eye SPA (004117)*
- *Rogerstown Estuary SPA (004015)*
- *Howth Head Coast SPA (004113)*
- *Dalkey Islands SPA (004172)*
- *Wicklow Mountains SPA (004040)*

These complete, precise and definitive findings, based on the best available scientific evidence, remove all reasonable scientific doubt that the proposed development *will have any significant effect on the Natura 2000 sites detailed above. It is also noted that, no avoidance or preventative/mitigation measures have been taken into account in this Appropriate Assessment Screening Report and its conclusions.*

Accordingly, a Stage 2 Appropriate Assessment is not required to be carried out in relation to the proposed

development.

Proposed Natural Heritage Areas

Similar to the analysis for the Natura 2000 sites provided above, the proposed development does not overlap or adjoin any national sites for nature conservation. There is a potential hydrological connection between Santry Demesne pNHA, North Dublin Bay pNHA and the site via the Santry River as storm drains from the proposed development flow into the Santry River.

Santry Demesne pNHA is located approximately 20m north of the proposed development. The Santry River flows through this pNHA, which contains a legally protected plant species – Hairy St. John's wort *Hypericum hirsutum* which grows within the woodland and along the riverbanks. In the absence of mitigation measures there is potential for surface water run-off containing silt and/or pollutants from the site to negatively impact Santry Demesne pNHA and the legally protected plant species there during the Construction Phase of the proposed development. The potential impact to Santry Demesne pNHA as a result of the Construction Phase of the proposed development is therefore considered to be *negative, short-term, moderate* in the absence of suitable mitigation.

The potential for surface water generated at the site of the proposed development to reach North Dublin Bay pNHA and cause significant effects is negligible due to, the downstream distance (over 6 river km) and consequent potential for dilution in the Santry River and Dublin Bay. Any potential surface water containing sediments, silts and/or pollutants would become diluted to non-discernible levels.

There is either a significant intervening distance, marine buffer or no hydrological or alternative pathway between the site of the proposed development and the remaining pNHAs in the zone of influence. Therefore, significant impacts on these sites are ruled out.

Impacts to Habitats and Flora

The habitats listed as KERs within the site of the proposed development include:

- Treelines (WL2)
- Hedgerows (WL1)
- Dry Meadows and Grassy verges (GS2) / Recolonising bare ground (ED3)

As noted in the Arborists report, it is intended to retain the existing tree lines along the western and eastern boundary. These trees will be retained and protected in accordance with BS 5837:2012, with the root protection area (EPA) clearly outlined. As such, no significant impacts will occur to this habitat type during the Operational Phase of the proposed development.

Some sections of hedgerows along the site boundary will likely be cleared as part of the proposed development works. This habitat has the potential to be utilised by small mammal species such as pygmy shrew and hedgehog for foraging/nesting. Therefore, it is considered that the loss/damage to this habitat would represent a *negative, permanent, slight* impact in the absence of suitable mitigation.

Some sections of mosaics of Dry meadows and Grassy Verges (GS2) / Recolonising bare ground (ED3) will be lost along the boundary of the site as a result of the Proposed Works. These semi-natural habitats act as 'biodiversity islands' for insect, pollinators, birds and small mammal species; and are relatively important in biodiversity poor areas. However, this type of habitat will re-establish quite quickly if allowed. Therefore, the loss of this habitat type represents a *negative, short-term, slight* impact.

Watercourses are highly sensitive to contamination with excess sediment, fuel and cementitious materials during the Construction Phase of developments. There is a potential hydrological connection between the site and a local waterbody as storm drains from the site will flow into the Santry River. In the absence of mitigation measures there is a potential *negative short-term, moderate* impact to the Santry River during the Construction Phase via surface water run-off containing silt and/or pollutants from the site to this waterbody.

Impacts on Fauna

Mammals excl. bats

The negative impacts to terrestrial mammals will be largely as a result of habitat loss and disturbance. No mammals were recorded within the proposed development Site during the survey on the 13th of May 2021 although Hedgehog and Pygmy Shrew may use some of the more vegetated margins of the Site.

The proposed development could have a *negative, permanent, significant* impact at a local level on the aforementioned mammal species, if they are present, in the absence of mitigation/compensatory measures, through the removal of hedgerows within the site of the proposed development.

Noise and dust generated during the Construction Phase has the potential to cause *negative, short-term, moderate* impacts in the form of disturbance to mammals at a local level. Increased lighting at the site also has the potential to cause *negative, temporary, slight* disturbances to mammals in the locality.

Small mammal species such as Pygmy Shrew, and in particular Hedgehog, have the potential to become entangled in construction materials such as netting and plastic sheeting, as well as other waste materials, causing entrapment and injury or death. This constitutes a *negative, short-term, significant* risk at a local level associated with the Construction Phase of the proposed development in the absence of suitable mitigation.

There is potential for negative impacts on Otter in the Santry river during the Construction Phase of the proposed development due to potential surface water containing silt, sediments or pollutants entering local surface water drains. This could potentially impact the prey population for otter utilising the waterbody. This constitutes a *negative, short-term moderate* impact in the absence of suitable mitigation.

Bats

The building within the proposed development site was examined for the suitability of bat roosting during the bat survey in April 2021. The building on site does not provide suitable habitat for roosting bats. The impact of the loss of this habitat is therefore considered to be negligible.

The impact of the proposed development on roosting, foraging and commuting bats is therefore considered to be *negligible*.

Birds

A total of ten bird species were recorded with the site of the proposed development during the site visit on 13th of May 2021. Nine of these species are green-listed species, with one amber-listed species (Herring Gull) seen flying over the site and on the rooftop of an adjacent building. The proposed development will have no impact on Herring Gull.

Local birds are likely to adapt to a certain degree of urban ambient noise due to the location of the site, the Construction Phase of the proposed development will likely result in elevated noise levels associated with the demolition and construction works. As a result, there is a potential risk of noise disturbance to birds in the vicinity of the Site, representing a *negative, short-term, slight* impact in the absence of suitable mitigation.

The bird species recorded on site were all associated with the treelines and hedgerow along the boundary of the Site. Should hedgerow vegetation be cleared from the site during the breeding bird season (March 1st to August 31st) there is the potential for nesting birds to be harmed and nests to be destroyed. This would be in contravention of the Wildlife Acts and Amendments (2000) which provides protection to breeding bird species and their nests and young.

Therefore, in the absence of any mitigation or precaution, this risk represents a potential *negative, permanent, significant* impact to breeding birds.

Fish

There is potential for negative impacts on fish in the Santry river during the Construction Phase of the proposed development due to potential surface water containing silt, sediments or pollutants entering local surface water drains. This constitutes a *negative, short-term moderate* impact in the absence of suitable mitigation.

5.5.3 Operational Phase

Impacts to Designated Sites

Natura 2000 sites

The proposed development does not overlap or adjoin any Natura 2000 site. Potential impacts on Natura 2000 sites are considered in the Appropriate Assessment accompanying this Planning Application.

Proposed Natural Heritage Areas

Negative impacts as a result of the Operational Phase of the proposed development to pNHAs are not anticipated due to the surface water management measures incorporated into the project design. Surface water run-off from the proposed development will be treated via on-site SuDS measures which will reduce the flow rate of surface water run-off and largely eliminate the risk of pollution of waterbodies arising from surface water run-off during the Operational Phase of the proposed development.

Impacts to Habitats and Flora

It is not envisaged that there will be any significant impacts to habitats at the site of the proposed development associated with the Operational Phase. Surface water from the proposed development will ultimately enter the Santry River via a network of storm sewers. There will be no significant impacts to the Santry river as a result of the Operational Phase of the proposed development due to the suite of SuDS measures on site which will reduce the flow rate of surface water run-off and largely eliminate the risk of pollution of waterbodies arising from the proposed development.

Impacts to Fauna

The overall habitat quality at the site will improve as a result of the proposed development due to the

proposed landscaping and planting design, this will have a Positive, permanent, significant impact on fauna utilising the area. It is proposed to use native species to create new hedgerows, treelines, meadows and gardens. This will potentially provide new foraging, nesting/roosting and commuting habitat at the site and have an overall Positive impact on local biodiversity.
Mammals excl. bats

There is potential for a negative, permanent, slight local impact through the increased lighting associated with the Operational Phase of the proposed development.

As negative impacts as a result of the Operational Phase of the proposed development on waterbodies are not anticipated (see section 5.6.2.2), negative impacts on Otter as a result of water quality issues in the Santry River are not expected.

Bats

The overall impact on bat species due to the operational phase of the proposed development is considered to be negligible, once the general recommendations and specific lighting mitigation measures are implemented from Section 4.0 of the Bat survey report.

Birds

No significant effects on bird species are anticipated to arise as a result of the operational phase of the proposed development.

Fish

As negative impacts as a result of the Operational Phase of the proposed development on waterbodies are not anticipated, negative impacts on fish as a result of water quality issues in the Santry River are not expected.

5.6 Mitigation Measures

5.6.1 Construction Phase

Waterbodies

A potential hydrological connection exists between the site of the proposed development, the Santry River and Dublin Bay via surface water discharge. However, the potential for surface water generated at the site of the proposed development to reach Dublin Bay and cause significant effects is negligible due to, the downstream distance (over 6 river km) and consequent potential for dilution in the Santry River and Dublin Bay. Any potential surface water containing sediments, silts and/or pollutants would become diluted to non-discernible levels.

The below general protection of water quality measures will act to reduce the likelihood of any potential impact on aquatic species and water quality within the waterbodies in the immediate vicinity of the proposed development, specifically the Santry River, during the Construction Phase of the proposed development.

General Protection of Water Quality

The following standard operational measures will protect surface waters during the Construction Phase

of the proposed development:

- No direct discharges will be made to waterbodies or drains where there is potential for cement or residues in discharges.
- The washing out of concrete trucks on site will not be permitted, all concrete truck washout must take place back in the ready-mix depot.
- The pH of any and all discharges made from and during the Construction Phase of the proposed development shall be in the range of 6-9 units and not alter the pH of any receiving waters by more than +/- 0.5 pH units.
- Run-off from the working site or any areas of exposed soil should be managed and controlled for the duration of the construction works until the permanently attenuated surface water drainage system of the proposed development is complete. A temporary positive drainage system shall be installed prior to the commencement of works.
- The level of suspended solids in any discharges to fisheries waters as a consequence of construction works shall not exceed 25mg/l, nor result in the deposition of silts on gravels or any element of the aquatic flora or fauna.
- A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.
- Any imported materials will, as much as possible, be placed on site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.
- All containment and treatment facilities will be regularly inspected and maintained.
- If cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from any water courses or drainage ditches.
- Refuelling of plant during the Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response. Emergency silt control & spillage response procedures contained within the CMP will ensure that appropriate information will be available on site outlining the spillage response procedures and a contingency plan to contain silt during an incident.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).
- Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste disposal contractor.
- The Site Management Team will maintain a record of all receipts for the removal of toilet or interceptor waste off site to ensure its disposal in a traceable manner.

All wastewater generated on-site during the Construction Phase will be stored and disposed of appropriately by discharge to foul sewer or by tankering off site. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby drains or watercourses.

5.6.2 Habitats and Flora

It is considered that there will be some loss of Hedgerows (WL1) and mosaics of Recolonising bare ground (ED3) and Dry meadows and grassy verges (GS2). To compensate for the loss of natural habitats at the site, tree and hedgerow planting consisting of native, pollinator friendly tree/shrub species will be carried out within and around the perimeter of the Site.

The planting of native flora will improve local biodiversity and increase insect abundance. This will provide additional foraging/roosting habitat for mammals and birds at the site and improve the biodiversity value of the site in comparison to its current state.

Tree planting and retention

The loss of the hedgerow vegetation from the site to facilitate the proposed development is to be mitigated against with the planting of new trees, shrubs and hedge planting within the completed landscaped development. Tree planting will consist of native tree species such as Oak, Alder, Downy Birch and hazel where possible. The current treeline along the western and eastern boundary will also be protected and retained (See Figure 5.9). It is concluded that the proposed development will thus have a positive impact on the habitat make-up at the site, and therefore no additional mitigation is necessary.

Figure 5.8: Schematic of the Proposed landscaping at the Site of the Proposed Development (Dermot Foley Landscape Architects).

General Measures for All Fauna

Reduction of noise impacts

Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction Phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing.

Noise generated during the Construction Phase of the proposed development could cause temporary disturbance to a number of faunal species in the vicinity of the site of the proposed development. To mitigate this disturbance, the following measures will be implemented:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoidance of unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Proper balancing of plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.
- Minimise drop heights for materials or ensure a resilient material underlies.
- Use of alternative reversing alarm systems on plant machinery.
- Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to nesting birds or any other fauna species in the vicinity of the site of the proposed development will be reduced to a minimum.

Reduction of dust related impacts

The following general dust control measures will be followed for the duration of the Construction Phase of the proposed development, and will ensure no significant dust related impacts occur to nearby sensitive receptors including local faunal species:

- In situations where the source of dust is within 25m of sensitive receptors screens (permeable or semi-permeable) will be erected.
- Haulage vehicles transporting gravel and other similar materials to site will be covered by a tarpaulin or similar.
- Access and exit of vehicles will be restricted to certain access/exit points.
- Vehicle speed restrictions of 20km/hr will be in place.
- Bowsers will be available during periods of dry weather throughout the construction period.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil thereby reducing the amount of dust.
- Stockpiles will be stored in sheltered areas of the site, covered, and watered regularly or as needed if exposed during dry weather.
- Gravel should be used at site exit points to remove caked-on dirt from tyre tracks.
- Equipment should be washed at the end of each workday.
- Hard surfaced roads will be wet swept to remove any deposited materials.

- Unsurfaced roads will be restricted to essential traffic only.
- If practical, wheel-washing facilities should be located at all exits from the construction sites.
- Dust production as a result of site activity will be minimised by regular cleaning of the site ac-cess roads using vacuum road sweepers and washers. Access roads should be cleaned at least 0.5km on either side of the approach roads to the access points.
- Public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.
- The frequency of cleaning will be determined by the site agent and is weather and activity de-pendent.
- The height of stockpiles will be kept to a minimum and slopes should be gentle to avoid wind-blown soil dust.
- The following will be dampened during dry weather:
  - Unpaved areas subject to traffic and wind
  - Stockpiles
  - Areas where there will be loading and unloading of dust-generating materials.
- Under no circumstances should wastewater from equipment, wheel or surface cleaning enter the surface water drainage network.

Hedgehog and Pygmy Shrew

As noted in the British Hedgehog Preservation Society's publication Hedgehogs and development, during the Construction Phase of the proposed development Hedgehogs have the potential to be significantly impacted through the loss of suitable hibernation and nest sites in the form of piles of dead wood, vegetation and leaves. This can be mitigated through the careful removal of any dead wood/leaves on site to another part of the site where they will not be affected. Woody debris from the proposed clearance of vegetative areas on site can also be left in this out-of-the way location as compensatory Hedgehog habitat during the Construction Phase.

Hedgehog and Pygmy Shrew have the potential to be impacted locally by the proposed development through the loss of a small quantity of suitable hedgerow habitat across the site during the Construction Phase. The potential habitat for hedgehog and pygmy shrew on site is small in scale and restricted by the current buildings and hard standing areas. The landscape design for the proposed development includes the planting of meadows, hedgerows, treelines, groundcover and herbaceous planting. This will create a significant increase in habitats with biodiversity potential within the site boundary and result in an overall improvement in terms of habitat potential for the aforementioned species.

As best-practice, all construction-related rubbish on site e.g., plastic sheeting, netting etc. should be kept in a designated area on site and kept off ground level so as to protect Hedgehogs from entrapment and death. The above measures will also act to mitigate potential negative impacts on other small mammal species potentially found on site e.g., Pygmy Shrew.

Bats

There was no bat activity onsite during the survey in April 2021 despite the ambient weather conditions on the night, no trees with bat potential were identified on site. Although this site is not considered of importance to Bats, due to the proximity of Santry Demesne park north of the site there is some small potential for bats to utilise the site. Hedgerows and treelines form a major component for the commuting routes for bats as well as important feeding sites. The treeline along the western and eastern boundary of the site will remain intact, the hedgerow along the site boundary will likely be removed due to the Proposed Works.

Birds

Any clearance of vegetation should be carried out outside the main breeding season, i.e., 1st March to 31st August, in compliance with the Wildlife Act 2000. Should any vegetation removal be required during this period, this vegetation should be checked for birds, and if any are noted during this evaluation prior to removal, a derogation licence is required from the NPWS. This would note the section of habitat that is a nest site, the precise location within the hedgerow/trees, the species of bird present; and also elaborate the means by which the birds would be protected prior to nest removal. If eggs have been laid, the nest should be protected until the young have fledged after which time the nest could be de-stroyed (under licence from the NPWS only). This would also require further compensatory measures including nesting sites for birds if practicable.

Fish

The mitigation measures outlined above will serve to protect fish present in the Santry River downstream of the proposed development.

Timing of vegetation clearance

The following table provides guidance for when vegetation clearance is possible. Information sources include The Bat Survey Report, the British Hedgehog Preservation Society's Hedgehogs and Development and The Wildlife (Amendment) Act, 2000.

<table>
<tr><th>Ecological Feature</th><th>January</th><th>February</th><th>March</th><th>April</th><th>May</th><th>June</th><th>July</th><th>August</th><th>September</th><th>October</th><th>November</th><th>December</th></tr>
<tr><td>Breeding Birds</td><td colspan="2">Vegetation Clearance Permissible</td><td colspan="5"><u>Nesting bird season</u>
No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of nesting birds by an ecologist</td><td colspan="4">Vegetation clearance permissible</td></tr>
<tr><td>Hibernating mammals (namely hedgehog, excluding bats)</td><td colspan="3"><u>Mammal hibernation season</u>
No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of hibernating mammals by an ecologist.</td><td colspan="6">Vegetation clearance permissible</td><td colspan="3"><u>Mammal hibernation season</u>
No clearance of vegetation or works to relevant structures permitted unless confirmed to be devoid of hibernating mammals by an ecologist.</td></tr>
<tr><td>Bats</td><td colspan="8">Tree felling to be avoided</td><td colspan="2">Preferred period for tree-felling</td><td colspan="2">Tree felling to be avoided</td></tr>
</table>

Table 5.0:1: Seasonal restrictions on vegetation removal and instream works. Red boxes indicate periods when clearance/works are not permissible.

The preferred period for vegetation clearance is within the months of September and October (Table 5.10 above). Vegetation should be removed in sections working in a consisted direction to prevent entrapment of protected fauna potentially present (e.g., Hedgehog). Vegetation clearance should take place under the supervision of an ecologist to avoid any potential impact on bats, breeding birds or mammals. Where this seasonal restriction cannot be observed, a check for active roosts and nests will be carried out immediately prior to any site clearance by an appropriately qualified ecologist / ornithologist and repeated as required to ensure compliance with legislative requirements.

Biosecurity

The following will be adhered to, to avoid the introduction of invasive species to the proposed development site.

- Any material required on the site will be sourced from a stock that has been screened for the presence of any invasive species by a suitably qualified ecologist and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival on site to prevent the spread of invasive species.

Non-native Species

Although not considered to be '*high impact'* invasive species or listed under regulation S.I. 477, the non-native species recorded at the Site, Butterfly-bush Buddleja davidii, Sycamore Acer pseudoplatanus saplings and Cotoneaster Cotoneaster spp. should be controlled/removed as per the appropriate best-practive guidelines and under the supervision of an appropriate qualified invasive species professional. Removal and disposal should be carried out in accordance with appropriate guidelines such as TII (formerly NRA) Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010), with consideration given to the prevention of spread of these plants.

Operational Phase

Habitats and Flora

Soft landscaping will be managed in such a way as to promote pollinators (e.g., pollinator friendly mowing regime, planting of native wildflower meadows and native tree species).

As noted in the arborists report, the trees along the site boundary will be retained and protected in accordance with BS 5837:2012.

Fauna

Bats

It was noted by the bat ecologist during the survey in April 2021 that the existing baseline lighting conditions at the site are well illuminated after dusk, as expected no bat activity was detected during the survey despite ambient weather conditions and the appropriate time of year. According to the public lighting layout drawing for the proposed development, most of the light spill is generated from the existing luminaires along Santry Avenue.

Although it is deemed unlikely that light spill from the proposed development will significantly impacts bats should they be present in the vicinity, due to the general well-lit nature of the surrounding environment (i.e., streetlights and security lights on buildings) and the carefully selected configuration of the proposed lighting for the residential area. The below selective bat-friendly lighting measures will minimise any night-time spill from the interiors of the Proposed buildings via windows/entrances and the levels of spill/glare from outdoor lighting in place on the building exterior and throughout the site (Figure 5.9).

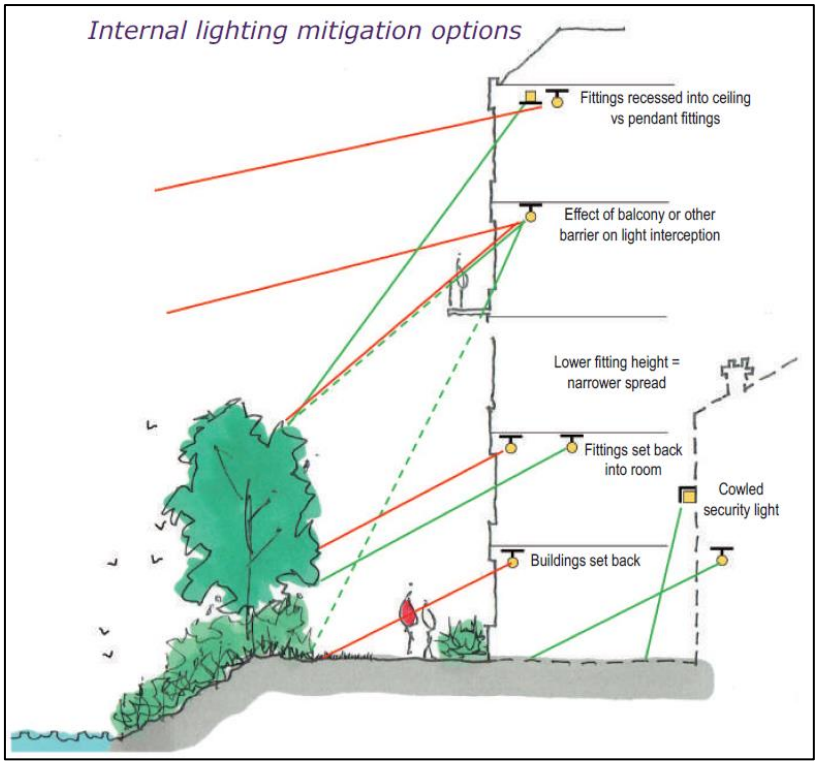

Figure 5.9: Internal Lighting Guidance Diagram adapted from ILP (2018)

In order to minimise disturbance to commuting/foraging bats if present in the vicinity of the site, lighting has been designed to minimise light spill onto habitat features such as treelines. This is achieved by ensuring that the design of lighting adheres to the guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers 'Bats and Lighting in the UK - Bats and Built Environment Series', (ILP, 2018) the Bat Conservation Trust 'Artificial Lighting and Wildlife Interim Guidance' and the Bat Conservation Trust 'Statement on the impact and design of artificial light on bats'.

Based on the above guidance documents, the lighting scheme will incorporate the following measures:

- Internal luminaries will be recessed where possible, if installed in proximity to windows to reduce glare and light spill from the Proposed Dwellings.
- The avoidance of direct lighting of existing trees scrub, woodland, or proposed areas of habitat creation / landscape planting.
- Unnecessary light spill will be controlled through a combination of directional lighting and hooded / shielded luminaires or strategic planting to provide screening vegetation.
- Where appropriate, luminaires on the site boundary will be fitted with light baffles to prevent light spill onto adjacent habitats.
- Lighting levels have been carefully selected to achieve the recommended illuminance levels for health and safety requirements whilst minimising light spill.
- Vegetated areas around the perimeter will not be directly lit. Lighting in these areas will not increase beyond existing lux levels or 1 lux, whichever is the lesser.
- Vertical light spill at light sources will be below 3m to avoid potential bat flight paths.
- No floodlighting will be used – this causes a large amount of light spillage into the sky. The spread of light will be kept below the horizontal. The upward light ratio (ULR) for the luminaries proposed is 0%.
- Hoods, louvres, shields or cowls will be fitted on the lights where necessary to reduce light spillage.

- All luminaries proposed have high performance optics designed to get the light onto the target area and minimise light spill.
- Lights will be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area.
- The source of light will be Light Emitting Diodes (LEDs) as this is a narrow beam that is highly directional and a highly energy efficient light source. There is no UV element to the light produced by the LEDs proposed.
- All proposed luminaires have LEDs which feature a peak wavelength of over 550nm, this avoids the component of light most disturbing to bats.
- Any external lighting will be fitted with a motion sensor where possible and have a timer of up to 60 seconds. This will ensure that lighting will be active only when required, and lights will not be left switched on overnight.
- All lighting will be facing downward on building facades.

The bat survey concluded that the building on the site (one block) were deemed Negligible for bat roost suitability. However, as a measure to increase Biodiversity on site, it is recommended to install a series of 5+ bat boxes on trees around the site during the operational phase to provide future roosting opportunities for bats. The type recommended is the 2F Schwegler Bat Box.

5.7 Cumulative Impacts

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

A review of other off-site developments and proposed developments was completed as part of this assessment. The following projects and plans were reviewed and considered for possible cumulative effects with the proposed development.

Existing planning permissions

Off Northwood Avenue, Santry, Dublin 9. (EIA Portal ID: 2019211, ABP Ref: ABP- 306075). Construction of 4 no. 8-storey apartment blocks over a shared basement, providing a total of 331 no. apartment units, a multi-function area, gym, childcare facility, 5 no. ground floor mixed-use units, ancillary car/cycle parking and substation. (Decision: 24/03/2020: Grant Perm. w Conditions).

Ref 2713/17. Santry Avenue and Swords Road, Santry, Dublin 9. (Adjacent to the Proposed Development). The proposed development (c.25,083 sq m total gfa above basement car park, and excluding plant, bin stores and bike stores), generally comprises: the partial demolition (c.7,781 sq m gfa) of an existing 8-bay warehouse (c.9,539 sq m gfa), and the construction of: 1 no. 5-storey mixed use building fronting Swords Road (Block A: c.5,932 sq m gfa in total), including 3 no. retail/commercial units (c.502 sq m) at ground level and 48 no. residential units in levels above; 1 no. 5-storey residential building (Block B: c.5,233 sq m gfa, 47 no. residential units); 1 no. 5-storey mixed use building (Block C:c.5,383 sq m gfa in total), including 2 no. office units (c.373 sq m gfa) and 1 no. crèche (c.331 sq m gfa) at ground floor, and 42 no. residential units from ground to 4th floor levels; the refurbishment of the partially retained and reclad double height warehouse (2-bays, 1,758 sq m gfa) with new 4-storey extension, to accommodate commercial office use (Block D: c.6,733 sq m gfa in total); and a new 4-storey commercial office building (Block E: c.1,802 sq m gfa in total); The proposed development accommodates 137 no.

residential units in total (25 no. 3-bed, 88 no. 2-bed and 24 no. 1-bed); And all ancillary and associated site development works, including: new vehicular and pedestrian access via Swords Road at the north east corner of the site, and environmental improvements along the Swords Road frontage; upgrading of existing vehicular and pedestrian access via Santry Avenue; new basement car park (c.3,988 sq m) accessed via ramp under Block A accommodating 122 no. car parking spaces (to include 6 no. disabled access), 100 no. bicycle parking spaces, plant, etc.; 151 no. surface car parking spaces (to include 7 no. disabled access); 100 no. surface bicycle spaces; bin storage at ground level in Blocks B and C; surface water attenuation tank; and, hard and soft landscaping, lighting and boundary treatment works; all on a site of c. 1.9Ha. Decision: Grant Permission (28/03/2018).

Ref 2737/19. Santry Avenue and Swords Road, Santry, Dublin 9. (Adjacent to the Proposed Development). Permission for development, consisting of modifications to a permitted mixed use development under Ref. 2713/17, located at Santry Avenue and Swords Road, Santry, Dublin 9. Permission is sought to increase the height of Blocks A, B and C from permitted 5 storeys to proposed 7 storeys and for a change in unit type and increase in number of apartments i.e. 70 no. apartments, which will result in a change from 137 no. permitted apartments to 207 no. 1, 2 & 3 bed apartments in the aforementioned buildings, including provision of balconies and roof terraces (i.e. 240sq.m. each) to Blocks A, B & C. The ground floor of Block C will accommodate a unit (i.e. 210sq.m.) for community use in compliance with condition no. 3 attached to planning permission Ref. 2713/17. The proposed development also seeks to provide additional office floor space to both Blocks D & E, providing an increase of 2,931sq.m. of office accommodation to the overall previously permitted development. Block D will increase in height from permitted 2 & 4 storeys to proposed 3 & 5 storeys, while Block E will increase in height from permitted 4 storeys to proposed 5 storeys. Permission is also sought for an extension to the permitted basement car park, (i.e. 1,273sq.m.), to accommodate 52 no. additional car parking spaces, additional bicycle parking and a new emergency escape route to the surface. The proposed development also provides for conversion of 3 no. surface car parking spaces to 3 no. "GoCar" spaces to the north of Block B, and all associated site development works, on a site area of 1.55ha. The effect of the proposed development will be a modification to an extant permission under Ref. 2713/17. Decision: Grant Permission (22/08/2019).

Ref 4211/15. Lands at the former Swiss Cottage Bar and Restaurant, Junction of Swords Road and Schoolhouse Lane, Santry, Dublin 9. Planning permission is sought for the demolition of the former Swiss Cottage Bar and Restaurant structure and the rear wall and part of derelict dwelling (Pinecroft) on Schoolhouse Lane, and the construction of a 3 storey mixed use structure comprising 1 no. retail/commercial unit and 1 no. takeaway unit at ground floor level, 1 no. two storey restaurant/cafe unit at ground and first floor level and 1 no. retail/commercial unit at ground and first floor level, office accommodation (277 sq.m) at first floor level and 1 no. licensed retail convenience/discount foodstore (1,165 sq.m net sales area) including off licence and ancillary services (plant room etc.) with terrace at second floor level. Permission is also sought for the relocation of the existing entrance off Swords Road to access the proposed surface level undercroft car park which provides for 80 no. car parking spaces with 9 no. on street parking spaces on Swords Road and Schoolhouse Lane, 20 no. bicycle spaces at surface level on Schoolhouse Lane, elevational signage, landscaping, esb substation, switch room etc., bin store, boundary treatments and all ancillary site and engineering works necessary to facilitate the development. Decision: Grant Permission (29/07/2016).

5.8 Residual Impacts

Residual impacts are defined as '*effects that are predicted to remain after all assessments and mitigation measures*'. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the proposed development were considered as part of this environmental assessment. Table 5.10 below provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

All mitigation measures detailed in this Chapter will be implemented in full and will remain effective throughout the lifetime of the facility. Therefore no significant negative residual impacts on the local ecology or on any designated nature conservation sites will result from the proposed development.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Compensation / Enhancement measures; Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Designated Sites								
pNHAs & Natura 2000 sites	National importance	Potential for surface water run-off containing silt and/or pollutants from the site to negatively impact Santry Demesne pNHA during the Construction Phase	Negative	n/a	Short-term	Slight	Protection of surface waters during the construction and operational phase of the proposed development.	**Negligible**
Habitats								
Hedgerows (WL1)	Local importance (Lower value)	Loss of some sections of this habitat as a result of the Proposed Works.	Negative	n/a	Permanent	Slight	Typical hedge planting for the proposed development will consist of Beech *Fagus sylvatica* and Common hawthorn *Crataegus monogyna*	**Positive; Long-term; Significant**

							through the site will offset the loss of small sections of this habitat type, enhancing the habitat provisions at the site.	
Treeline (WL2)	Local importance (Higher value)	No significant impacts predicted as it is proposed to keep the treeline along the western and eastern boundary of the site.	n/a	n/a	n/a	n/a	It is proposed to plant new sections of treelines along the western and eastern boundaries. The final landscape design includes gardens and open areas with native species planted throughout. This will enhance the habitat provisions on the site. Typical tree	**Positive; Long-term; Significant.**

							planting will include Alder *Alnus glutinosa*, Birch *Betula nigra*, Hazel *Corylus avellana* and semi mature Oak *Quercus robur.*	
Mosaics of Recolonising bare ground (ED3) / Dry meadows and Grassy verges (GS2)	Local importance (Lower value)	Loss of this habitat as a result of the Proposed Works	Negative	n/a	Short term	Slight	Sections of meadow planting, groundcover and herbaceous planting are proposed which will increase the biodiversity value of the site.	**Positive; Long-term; Significant**
Mammals								
Hedgehog and Pygmy Shrew	National Importance	Physical disturbance and or loss/ damage to some sections of potential hedgerow habitat. Noise and physical Disturbance as a result of	Negative	n/a	Permanent Short-term	Significant Slight	Setting aside of cleared vegetation in an undisturbed corner of the site as	**Negative; Short-term; Not significant.**

		the Construction Phase of the proposed development.					compensatory habitat for duration of proposed development. Construction noise management measures to be in place as part of the CMP. Clearing of vegetation (i.e. hedgerows), outside of hibernation period (Outside period November - March). Planting of native hedgerows, treelines, groundcover and herbaceous species. This will create a significant	**Negative; short-term; Imperceptible** **Positive; Long-term; Significant**

							increase in habitats with biodiversity potential within the site and provide suitable habitat for hedgehogs and pygmy shrews.	
Mammals (otter)	National Importance	Potential for surface water run-off containing silt and/or pollutants from the site to negatively impact Otter downstream	Negative	n/a	Short-term	Moderate	Protection of surface waters during the construction and operational phases	**Negligible**
Brown trout, European Eel, Brook and River lamprey	International and National Importance	Pollution of the Santry river during the Construction Phase of the proposed development	Negative	n/a	Short-term	Moderate	Protection of surface waters during the construction and operational phases	**Negligible**
Bat assemblage	International Importance	Loss of some minor sections of potential foraging/commuting habitat. Noise Disturbance as a	Negative	n/a	Permanent	Not significant Slight	Retention of existing treelines along western and eastern site boundary	**Negative; Permanent; Negligible .** **Negative;**

		result of the Construction Phase of the proposed development.			Short-term		Planting of native treelines and hedgerows in accordance with the Proposed Landscape design. Range of best practise construction and operational noise control measures to be put in place for the duration of the Construction Phase and Operational Phase respectively. A series of 5+ bat boxes will be erected on trees around the site during the operational phase to provide future	**Short-term; Not significant.** **Positive; Long-term; Significant**

							roosting opportunities for bats. Bat sensitive lighting measures implemented during the Construction Phase and incorporation of measures described in **Error! R eference source not found.** during the Operational Phase.	
Birds								
Bird assemblage (Green-listed)	County Importance	Physical disturbance and or loss of some sections of potential nesting/foraging habitat during	Negati ve	n/a	Perman ent	Moderate	Retention of all existing treelines along the western and	**Negative; Short-term; Not significant.**

Bird assemblage (Amber-listed)	National Importance	Construction Phase. Noise Disturbance as a result of the Construction Phase of the proposed development. Habitat enhancement at the site as a result of the planting of native treelines and hedgerows (increased roosting/nesting/foraging habitat).	Negative Positive		Short-term Long-term	Slight Significant	eastern boundary. Clearance of vegetation to be carried out outside of the breeding bird season (Outside period March – August) Range of best practise construction and operational noise control measures to be put in place for the duration of the Construction Phase and Operational Phase respectively. No mitigation required.	**Negative; Short-term; Not significant.** **Positive; Long-term; Significant**
Bird assemblage (Red-listed)	National Importance							

Table 5.10: Summary of potential impacts on KER(s), mitigation measures/mitigating factors and residual impacts.

5.9 Monitoring

The impacts are foreseen to be low due to the characteristics of the project, and the ecological value of the receiving environment is also low.

5.10 *"Worst Case"* Scenario

With regard to the *'worst-case'* scenario, it is considered relevant only to potential for hydrological or water quality impacts such as nutrient release, siltation and/or contaminated run-off from the development works footprint. Potential hydrological or water quality impacts apply to the Santry River and Dublin Bay. It the event that the proposed development was to proceed, and the proposed mitigation measures in relation to water management markedly fail then it is possible that there could be impacts to water quality in the Santry River and Dublin Bay, and subsequently the species that reside within these waterbodies.

5.11 Difficulties Encountered

No difficulties were encountered while developing this report.

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6.0. Land, Soil & Geology

6.1 Introduction

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on the soils and the geological environment, as well as identifying proposed mitigation measures required to minimise any impacts. This chapter of the EIAR was prepared by Laura McLoughlin, Senior Civil Engineer, B.Eng, C.Eng. and Daniel Hodnett, Graduate Civil Engineer, B.Eng. of DBFL Consulting Engineers.

The proposed strategic housing development sits on a site measuring c. 1.5 hectares located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19), and to the west by the Santry Avenue Industrial Estate. The proposed development provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 4 no. blocks. The proposed development also provides for 5 no. commercial/retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

The brownfield site is currently occupied by Chadwick's Building Suppliers.

A more detailed description of the proposed development can be found in Chapter 3 of this EIAR.

6.2 Assessment Methodology

Assessment of the likely impact of the proposed development on soils and the geological environment includes the following activities:

- Review of information available on the Geological Survey of Ireland (GSI) online mapping service
- Review of information available on the Environmental Protection Agency (EPA) online mapping service.

6.3 Receiving Environment

6.3.1 Soils

Review of information available on the GSI's online mapping service ("Quaternary Sediments") indicates that the site is underlain by a sediment type described as "TLs – Till derived from Limestones". Refer to Figure 6.1 below.

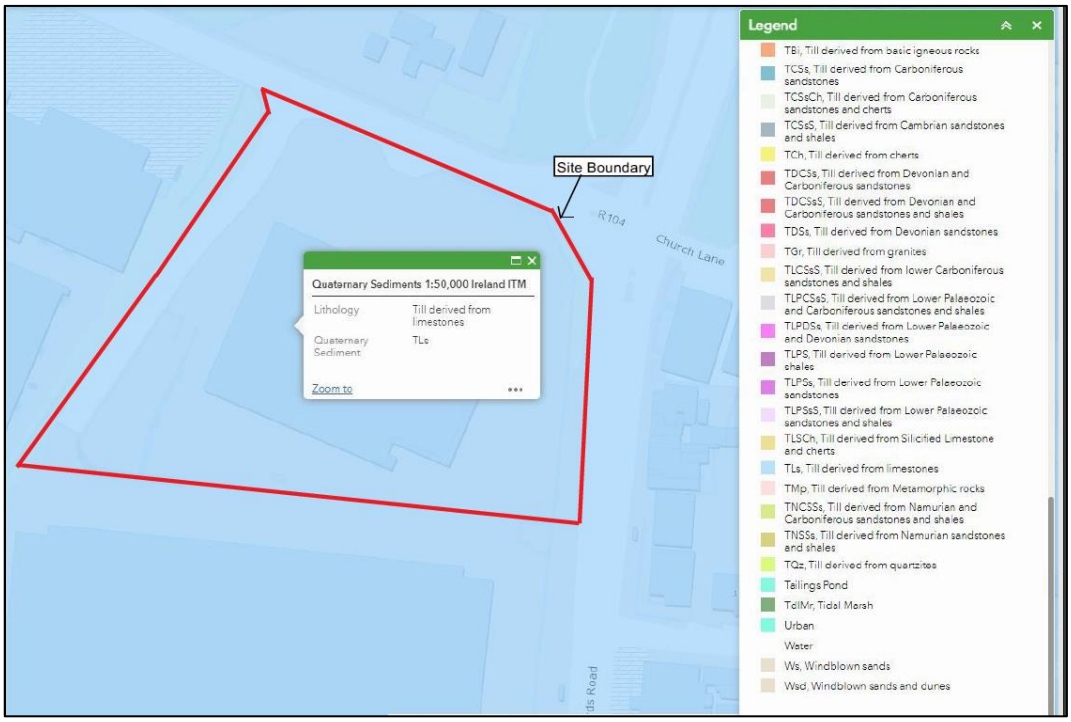

Figure 6.1 Extract rom Quaternary Sediments Map (source GSI Online Mapping Service)

6.3.2 Geology & Hydrogeology

A review of GSI's online mapping service ("Bedrock Geology") describes geology in the vicinity of the site as "Dark Limestone and Shale". Refer to Figure 6.2 below.

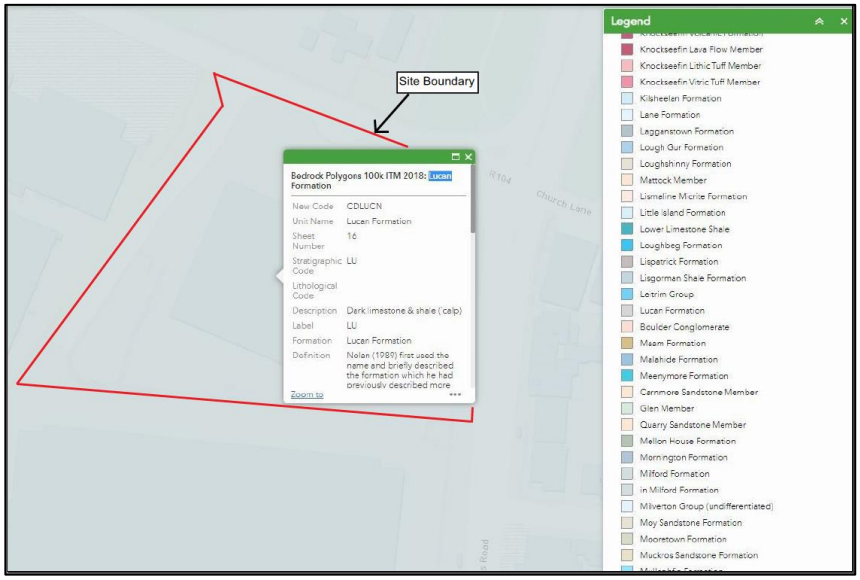

Figure 6.2 Extract from Bedrock Map (source GSI Online Mapping Service)

GSI have classified the site's groundwater vulnerability as *"Low"*.

GSI also classified underlying bedrock aquifers as "*locally important*".

Refer to Chapter 7 (Water) of this EIAR for further commentary regarding Hydrogeology. In addition refer to AWN Hydrogeological Impact Assessment under a separate heading for further information.

6.3.3 Radon

A review of the EPA's online mapping service ("*Radon Map*") shows that 3.79% of the homes in this 10km grid square are estimated to be above the reference level of 200 becquerel per cubic metre (Bq/m3). Refer to figure 6.3 below.

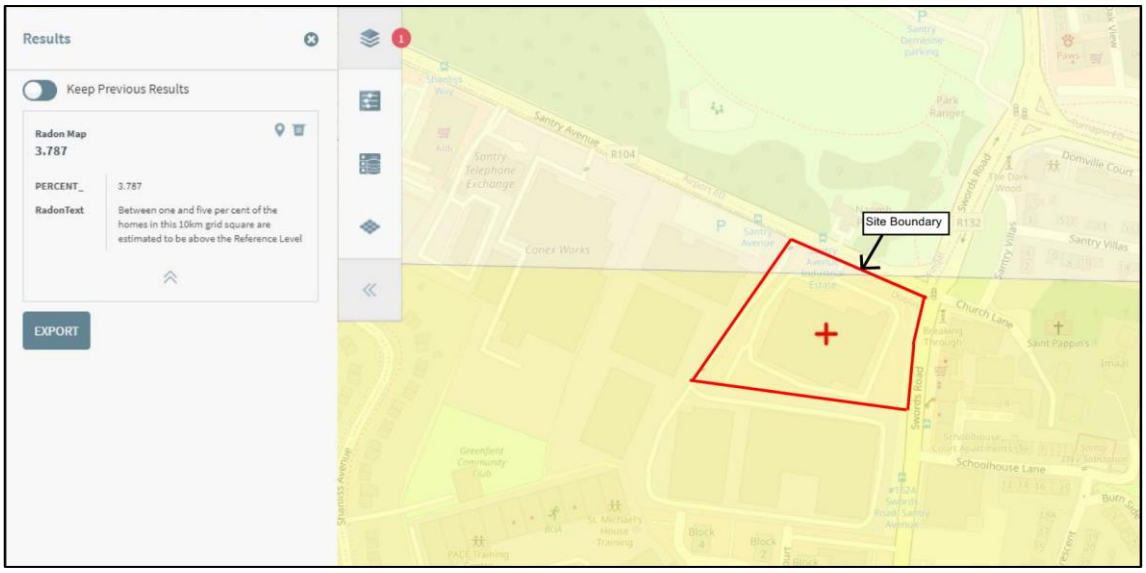

Figure 6.3 Extract from EPA Mapping Service (Radon Mapping)

6.3.3 Soil Contamination

There are no known areas of soil contamination on the site of the proposed development. According to the EPA online mapping (https://gis.epa.ie/EPAMaps), there are no licenced waste facilities on or within the immediate environs of the site of the proposed development.

There are no historic mines at or in the immediate vicinity of the site of the proposed development that could potentially have contaminated tailings.

6.4 Characteristics of the Proposed Development

The proposed development, described in detail in chapter 3 consists of 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 4 no. blocks. The proposed development also provides for 5 no. commercial/retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

The development will consist of the following:

Demolition of the existing building on site i.e. the existing Chadwicks Builders Merchants (c. 4,196.8m^2).

Construction of 350 no. 1, 2, & 3 bed apartments, retail / commercial and community uses in 4 no. buildings that are subdivided into Blocks A-G as follows:

- Block A is a 7 to 14 storey block consisting of 59 no. apartments comprised of 26 no. 1 bed & 33 no. 2 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 132.4m^2 & 173m^2 respectively). Adjoining same is Block B, which is a 7 storey block consisting of 38 no. apartments comprised of 6 no. 1 bed, 20 no. 2 bed, & 12 no. 3 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 162.3m^2 & 130.4m^2 respectively). Refuse storage areas are also provided for at ground floor level.

- Block C is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. Refuse storage areas are provided for at ground floor level. Adjoining same is Block D which is a 7 to 10 storey block consisting of 51 no. apartments comprised of 25 no. 1 bed, 19 no. 2 bed, & 7 no. 3 bed dwellings, with 1 no. commercial unit / café located on the ground floor (c. 163.3m^2). A refuse storage area is also provided for at ground floor level.

- Block E is a 7 to 10 storey block consisting of 58 no. apartments comprised of 10 no. 1 bed & 48 no. 2 bed dwellings, with 1 no. community use unit located on the ground floor (c. 188.1m^2). A refuse storage area, substation, & switchroom are also provided for at ground floor level. Adjoining same is Block F which is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

- Block G is a 7 storey block consisting of 34 no. apartments comprised of 20 no. 1 bed & 14 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

Construction of a 1 storey residential amenity unit (c. 187.9m^2) located between Blocks A & D.

Construction of basement level car parking (c.5,470.8m^2) accommodating 173 no. car parking spaces & 719 no. bicycle parking spaces. Internal access to the basement level is provided from the cores of Blocks A, B, C, D, E, & F. External vehicular access to the basement level is from the south, between Blocks B & C. 36 no. car parking spaces & 58 no. bicycle parking spaces are also provided for within the site at surface level.

Public open space of c. 1,915m^2 is provided for between Blocks C, D, E, & F. Communal open space of c. 3,122m^2 provided for between (i) Blocks E, F, & G, (ii) Blocks A, B, C, & D, and (iii) in the form of roof gardens located on Blocks A, C, & F and the proposed residential amenity use unit. The development includes for hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels.

Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).

The development includes for all associated site development works above and below ground, bin & bicycle storage, plant (M&E), sub-stations, public lighting, servicing, signage, surface water attenuation facilities etc.

The proposed development will typically require alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage, foul water drainage and to mitigate flood risk.

Excavation of subsoil layers will be required in order to allow road construction, foundation excavation, drainage and utility installation and provision of underground attenuation of surface water. Underlying subsoil layers are also expected to be suitable for reuse as non-structural fill (e.g. build-up of open spaces).

Importation of fill will be required beneath apartment blocks and roadways (structural fill). Importation of fill may also be required in some areas, to raise the ground levels to assure a gravity drainage solution. Further information regarding importation of fill is included in Section 6.5.1.3 of this Chapter.

6.5 Identification of Likely Significant Impacts

6.5.1 Construction Phase

6.5.1.1 Demolition of Existing Structures

During demolition of existing structures hazardous material on site is to be identified and removed following the correct procedures.

6.5.1.2 Excavation of Subsoil Layers

Excavation of existing subsoil layers will be required in order to allow for basement excavation, drainage and utility installation and provision of underground attenuation of surface water.

Underlying subsoil layers are expected to be generally suitable for reuse as non-structural fill.

6.5.1.3 Imported Fill

In the context of materials imported to site, these will be natural stones sourced from locally available quarries in accordance with the appropriate statutory guidelines, greenfield/inert soil imported under a Waste Permit issued by the local authority; or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of article 27(1) of the European Communities (Waste Directive) Regulations, 2011.

Imported materials will be granular in nature and used in the construction of road pavement foundations, drainage and utility bedding and surrounds. Imported fill may be required to raise the development to the required level for drainage.

Materials will be brought to site and placed in their final position in the shortest possible time. Any imported material will be kept separate from the indigenous arisings from the site. All excavation to accommodate imported material will be precisely co-ordinated to ensure no surplus material is brought to site beyond the engineering requirement.

6.5.1.4 Construction Traffic

Due to the site being brownfield, earthworks plant (e.g. dump trucks) and vehicles delivering construction materials to site (e.g. road aggregates, concrete deliveries etc.) have potential to cause rutting and deterioration of the soil layers, resulting in erosion and generation of sediment laden runoff. This issue can be particularly noticeable at site access points (resulting in deposition of mud and soil on the surrounding road network). Dust generation can also occur during extended dry weather periods as a result of construction traffic.

Mitigation Measures will be discussed in the following sections.

6.5.1.5 Accidental Spills and Leaks

During the construction phase there is a risk of accidental pollution from the sources noted below. Accidental spills and leaks may result in contamination of the soils underlying the site.

- Storage of oils and fuels on site
- Oils and fuels leaking from construction machinery
- Spillage during refuelling and maintenance of construction machinery
- Use of cement and concrete during construction works

Groundwater vulnerability is mapped as *'low'* by the GSI at the proposed site. This vulnerability will likely be temporarily increased due to the removal of soils, subsoils and made ground cover during construction. Therefore, accidental spillages may have potential to impact on the *'locally important'* aquifer.

Mitigation Measures will be discussed in the following sections.

6.5.1.6 Geological Environment

Any excavations associated with development of the site are expected to be moderate. The drainage infrastructure will require excavations of approximately 2.0m on average with 3.0m in the deepest sections. A Basements is proposed for under blocks Blocks A, B, C, D, E & F and expected to be in the region of approximately 3m. It is possible that underlying geology may be disturbed in areas of deep excavation, this will be verified by site investigation works following the receipt of planning permission.

Please refer to AWN report: *"Hydrogeological Impact Assessment"* under a separate heading for further details.

6.5.2 Operational Phase

Once the construction stage is complete and the development is in-situ and operational, the geology beneath the proposed site will remain unchanged. Subsoil will either be covered by surface hardstanding, building footprint or landscaped areas.

There will be no direct discharges to soil or groundwater during the operational phase of the proposed development. Foul effluent and surface water will be discharged to the Irish Water

sewer and Dublin City Council surface water drainage network following the required treatment measures.

There will be no significant storage or use of hazardous materials during the operational phase that could adversely impact subsoil, groundwater or surface water in the vicinity of the site. Accidental losses of oil, petrol or diesel on roadways or in car parks could cause contamination if these elements entered the underlying soil and groundwater. However, the presence of surface hardstanding throughout these areas would render this unlikely. In addition, all surface water will be routed through a suitably sized petrol interceptor before entering the public surface water network.

In the absence of mitigation measures, should accidental losses of oil, diesel, or petrol to ground occur, they would be considered direct, negative impacts of temporary duration, given that they would be confined to one-off releases. This would be considered a medium impact to a medium sensitivity environment, and the significance of the impact would be moderate.

6.6 Potential Cumulative Impacts

Due to the lack of significant residual impacts from the development that would affect the wider geological environment, there will be no significant cumulative impacts to land, soil and geology resulting from this project, and other local existing developments, projects and plans. All impacts on soils and geology relating to the proposed project will be localised and within the development footprint.

6.6.1 Residual Impacts

With appropriate mitigation measures implemented during the construction phase, the potential impact on land, soils and geology during construction is considered to have a short term, imperceptible significance.

There are no likely significant impacts on the land, soil or geological environment associated with the proposed operational development of the site. As such, the impact is considered to have a long term, imperceptible significance with a neutral impact on quality.

6.6.2 Risks to Human Health

The following risk to human health from soils and the geological environment can occur during construction:

- Dust generation occurring during extended dry weather periods as a result of construction traffic.

With the implementation of mitigation measures, the likelihood of such events occurring would be local and not significant.

6.6.3 Unplanned Events

The following accidents & disasters involving soils during construction could potentially give rise to a serious incident putting people at risk:

- Collapse of trench during excavation works.

- Accidental spills and leaks may result in contamination of the soils underlying the site.

With the implementation of mitigation measures, the likelihood of such events occurring would be local and not significant.

On completion of the construction phase, there will be no further unplanned events anticipated on soils and the geological environment.

6.7 Do Nothing Impact

Should the development not proceed the site would remain in its current state with the only likely impact on the underlying soil and/or aquifer being due to potential contamination from accidental spills and leaks from the operation of Chadwick's building suppliers.

6.8 Remedial and Mitigation Measures

6.8.1 Construction Phase

6.8.1.1 Demolition of Existing Structures

During demolition of existing structures any hazardous material identified on site will be removed by specialist contractors.

6.8.1.2 Excavation of Subsoil Layers

Excavation of existing subsoil layers has been minimised as far as reasonably practicable. Cut type earthworks operations will not be required to achieve designed site levels, however some cut type earthworks will be required to construct the basements and attenuation system. Cut material is considered likely to be suitable to be reused as non-structural fill elsewhere on site.

Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

Stockpiles of excavated subsoil material will be protected for the duration of the works.

Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection).

6.8.1.3 Imported Fill

As noted in section 6.5.1.3 above, importation of fill to site will be required.

The source of aggregate, fill material and topsoil imported to site will be carefully selected and vetted in order to ensure that it is of a reputable origin and that it is "clean" (i.e. will not contaminate the environment). Project contract and procurement procedures will be developed to ensure that aggregate, fill material and topsoil are acquired from reputable sources with suitable environmental management systems as well as regulatory and legal compliance.

No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area.

Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling.

6.8.1.4 Construction Traffic

A construction traffic management plan will be developed and implemented in order to minimise the disturbance caused by large vehicles. This management plan shall include and detail:

- Predetermined haul routes for earthworks plant and vehicles delivering construction materials to site.
- Vehicle wheel wash facilities in the vicinity of any site entrances and road sweeping to maintain the road network in the immediate vicinity of the site.
- Dust suppression measures (e.g. dampening down)

6.8.1.5 Accidental Spills and Leaks

Due to the presence of a locally important aquifer beneath the site, it will be necessary to employ mitigation measures at the construction site in order to prevent spillages to ground of fuels, and to prevent consequent soil or groundwater quality impacts. These measures are outlined in the Construction & Environmental Management Plan (CEMP) and are listed here as follows:

- Over Ground Oil / Diesel Storage – Only approved storage system for oil / diesel within the site will be permitted.
- The bunded area will accommodate the relevant oil / diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment /removal from site;
- All hazardous substances on-site shall be controlled within enclosed storage compounds that shall be fenced-off and locked when not in use to prevent theft and vandalism;
- Fixed plant shall be self-bunded; mobile plant must be in good working order, kept clean, fitted with drip trays where appropriate and subject to regular inspection; water runoff from designated refuelling areas shall be channelled to an oil-water separator, or an alternative treatment system, prior to discharge; and,
- Spill kits and oil absorbent material shall be carried with mobile plant and located at vulnerable locations around the site to reduce risk of spillages entering the sub-surface or groundwater environment; booms shall be held on-site for works near drains or dewatering points.

6.8.1.6 Geological Environment

No mitigation measures are proposed in relation to the geological environment.

6.8.1.7 Reinstatement

- All temporary construction compounds are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.
- All construction waste and/or scrapped building materials are to be removed from site on completion of the construction phase.
- Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.
- All sediment control measures (e.g. sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

6.8.2 Operational Phase

The operational phase of the development is unlikely to have any significant adverse impacts on the local geological/hydrogeological environment due to the environmental considerations incorporated into the design. These measures will seek to avoid or minimise potential effects, in the main, through the implementation of best practice construction methods and adherence to all relevant legislation.

6.9 Predicted Impact of the Proposed Development

6.9.1 Construction Phase

Implementation of the measures outlined in Section 6.8.1 will ensure that the potential impacts of the proposed development on soils and the geological environment do not occur during the construction phase and that any residual impacts will be short term/imperceptible.

6.9.2 Operational Phase

There are no predicted impacts arising from the operational phase. Accordingly, the predicted impact will be long-term-imperceptible-neutral.

6.10 Monitoring

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to the CEMP.

- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination).

- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)

No ongoing monitoring is proposed on completion of the construction phase.

6.11 Reinstatement

All temporary construction compounds and site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

All construction waste and/or scrapped building materials are to be removed from site on completion of the construction phase.

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.

All sediment control measures (e.g. sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

During decommissioning of the proposed development, there is a risk of localised accidental pollution incidences from the following sources:

- Spillage or leakage of temporary oils and fuels stored on site;
- Spillage or leakage of oils and fuels from machinery or site vehicles; and
- Spillage of oil or fuel from refuelling machinery on site.

Accidental spillages may result in localised contamination of soils and groundwater underlying the proposed development site, should contaminants migrate through the subsoils and impact underlying groundwater i.e. unmitigated. Groundwater vulnerability at the proposed development site is classified as low. Therefore, this is considered the *'Worst Case'* scenario.

6.12 Interactions

Land, soils and geology can interact with several other environmental aspects during both the construction and operational phases of the development. These interactions are discussed below.

Transportation

Interactions with Traffic and Transport arise during the construction phase when soil and subsoils and demolition waste are being transported to & from the site and raw materials for construction are being imported to the site. A construction traffic management plan will be implemented in order to minimise the disturbance caused by traffic.

Water

Interactions with Water and Hydrology arise during the construction phase and the operational phase. Surface water from the site will be discharged to existing surface water sewers during the operational phase. However, surface water run-off may have the potential to infiltrate into

underlying soils. During the construction phase a site-specific CEMP will manage site water and will mitigate the risk of surface contaminants infiltrating into the underlying geology and hydrogeology. Surface water drainage from the operational site will be designed in accordance with Greater Dublin Strategic Drainage Study (GDSDS) and SuDs methods will be used to manage drainage. Surface water discharge rates will be controlled by a Hydrobrake type vortex flow control device in conjunction with an attenuation system.

Resource & Waste Management

Interactions with Waste Management arise during the construction phase when soil, subsoils and demolition waste are being transported from the site. These waste materials will require appropriate transport and disposal. A Waste Classification Report for soils and subsoils shall be prepared in order to define appropriate waste disposal outlets.

Noise & Vibration

Development of the site will result in a level of noise and vibration related effects on the surrounding environment during the construction phase. The interaction between Soils, Land & Geology and Noise and Vibration is considered to be moderate and temporary in nature. A construction traffic management plan will be implemented in order to minimise the disturbance caused by traffic.

Air Quality

There is a potential for soil excavation activity to impact on air quality in terms of dust generated. Dust generation can also occur during extended dry weather periods as a result of construction traffic. However, the implementation of suitable mitigation measures as outlined in the CEMP for the site will ensure a neutral impact.

Biodiversity / Species & Habitat

There is little existing topsoil and vegetation to be removal from the site. As the site is a brownfield site in an industrial area there will be minimal effect on biodiversity in the area. The increased green area proposed as part of the new development will increase space for wildlife habitat.

6.13 Difficulties Encountered in Compiling

No difficulties were encountered while compiling this chapter.

6.14 References

Greater Dublin Strategic Drainage Study (2005) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council

The Greater Dublin Region Code of Practice for Drainage Works (2012) – Fingal County Council, Dublin City Council, Dún Laoghaire-Rathdown County Council, South Dublin County Council, Wicklow County Council, Kildare County Council, Meath County Council

Code of Practice for Water Infrastructure (2020) – Irish Water

Code of Practice for Wastewater Infrastructure (2020) – Irish Water

Environmental Protection Agency (EPA) Online Mapping Service

Geological Survey of Ireland (GSI) online mapping service

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

Guidelines on the information to be contained in environmental impact assessment reports. Environmental Protection Agency (Draft 2017).

7.0. Water

7.1 Introduction

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on the surrounding hydrogeological environments (including flood risk, surface water drainage, foul drainage and water supply), as well as identifying proposed mitigation measures to minimize any impacts. This chapter of the EIAR was prepared by Laura McLoughlin, Senior Civil Engineer, B.Eng, C.Eng. and Daniel Hodnett, Graduate Civil Engineer, B.Eng. of DBFL Consulting Engineers.

A detailed Hydrological Impact Assessment can be found under a separate heading, produced by AWN Consulting.

The proposed strategic housing development sits on a site measuring c. 1.5 hectares located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19), and to the west by the Santry Avenue Industrial Estate. The proposed development provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 4 no. blocks. The proposed development also provides for 5 no. commercial/retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

The brownfield site is currently occupied by Chadwick's Building Suppliers.

Figure 7.1 – Site Location – Swords Road, Santry, Dublin 9.

A more detailed description of the proposed development can be found in Chapter 3 of this EIAR.

7.2 Methodology

7.2.1 Source of Information

Assessment of the likely impact of the proposed development on the surrounding hydrogeological environments and flood risk included the following activities:

- Review of existing topographic survey information.
- Review of utility records obtained from Irish Water (IW).
- Review of information available on the Environmental Protection Agency (EPA) online mapping service.
- Review of Office of Public Works (OPW) National Flood Hazard Mapping and Catchment Flood Risk Assessment and Management Studies (CFRAM Studies).
- Review of information available on the Geological Survey Ireland (GSI) online mapping service.
- Dublin City Council Development Plan (2016 - 2022)
- Consultation with Irish Water
- Submission of a Pre-Connection Enquiry Application to Irish Water
- Obtaining a Statement of Design Acceptance from Irish Water

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage and water usage calculations were carried out in accordance with the following guidelines:

- Greater Dublin Strategic Drainage Study (GDSDS)
- Method outlined in Irish Water's Pre-Connection Enquiry Application (water demand and foul drainage discharge)

7.3 Receiving Environment (Baseline Situation)

7.3.1 Hydrology

The primary hydrological feature in the vicinity of the site is the Santry River (approx. 700m south of the site). Excavations of the basement of the neighbouring development to depts of 4m encountered no ground water.

The site slopes from south-west to north-east towards Santry Avenue at a gradient of approximately 1 in 150.

Figure 7.2 – Extract from EPA Online Mapping Service

7.3.2 Hydrogeology & Geology

The Geological Survey Ireland (GSI) Online Data Services classifies the aquifer at the subject site as *"Locally Important Aquifer – Bedrock which is Generally Moderately Productive in Local Zones"*. There is also a gravel aquifer overlaying the bedrock, which is classified as "*Locally important gravel aquifer*"

GSI classifies the site's groundwater vulnerability as low across the site.

Refer to Chapter 6 (Land, Soil & Geology) of this EIAR for further commentary regarding underlying geology.

Figure 7.3 - Extract from GSI Online Mapping Service (Groundwater Vulnerability)

7.3.3 Surface Water Quality

The site is a brownfield site and surface water currently discharges to the public network. There is no surface water quality data available for the proposed development site.

7.3.4 Flood Risk

DBFL Consulting Engineers have undertaken a flood hazard assessment by reviewing information from the Office of Public Works (OPW) National Flood Hazard Mapping (www.floodinfo.ie), the Eastern CFRAM Study. This assessment has been carried out in accordance with the procedure for a *"Stage 1 Flood Risk Identification"* as outlined in the OPW's Guidelines for Planning Authorities – The Planning System and Flood Risk Management (November 2009).

A review of the data available on the subject site showed no sign of fluvial flood risk. Following the flood risk assessment stages it was determined that the site is within Flood Zone C as defined by the Guidelines, and therefore the residential development proposed is appropriate for the Site's flood zone category. The site is considered to have a low probability of flooding based on our review of OPW's Flood Hazard Mapping, the Eastern CFRAM Study.

In addition, the proposed drainage is designed to provide protection against a possible pluvial flooding event up to the 100 year return period plus an allowance for climate change. Should extreme pluvial flooding occur that is in excess of the development's drainage capacity, overland flood routes have been designed to direct flood water away from the buildings in order to protect the development and residential units with lower floor levels.

Refer to DBFL's Site Specific Flood Risk Assessment (Report: 200060-DBFL-XX-XX-RP-C-0002) under a separate heading for further details.

OPW Flood Hazard Mapping

A flood event was recorded on the 24/04/1958 approximately 300m to the south of the site on Swords Road. A Report produced by D.C.C. titled "*Wad River catchment Study - Full Catchment Report Rev E "* concludes the flooding was pluvial, originating from the mostly culverted River Wad. The proposed site is within the catchment of the River Wad. It is noted that a number of defence assets have since been put in place downstream of the site. We believe these works to be the 1967 diversion via a culvert along Ballymun Road to the River Tolka.

Eastern CFRAM Study

As part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study.

The maps are produced based on a series of nodes, which detail the modelled water level at that point. The closest modelled node to the site is located approximately 700m north of the site (Node: 09SANT00678). See figure 7.4 for ECFRAMS mapping.

The location of this node is shown on CFRAM Drawing E09SAY_EXFCD_F1_03

- Node: 01GOL01220u, 10% AEP + 47.91m
- Node: 01GOL01220u, 1% AEP + 48.02m

- Node: 01GOL01220u, 0.1% AEP + 48.09m
- Lowest Existing Ground Level + 55.00m (approx.)

It can be seen that the existing ground level within the site is approximately 7m above the modelled flood water levels.

The CFRAM study provided further assessment of areas identified in the Preliminary Flood Risk Assessment, undertaken in 2011, for further investigation and confirmed that the subject site is in Flood Zone C and is not affected by fluvial flooding.

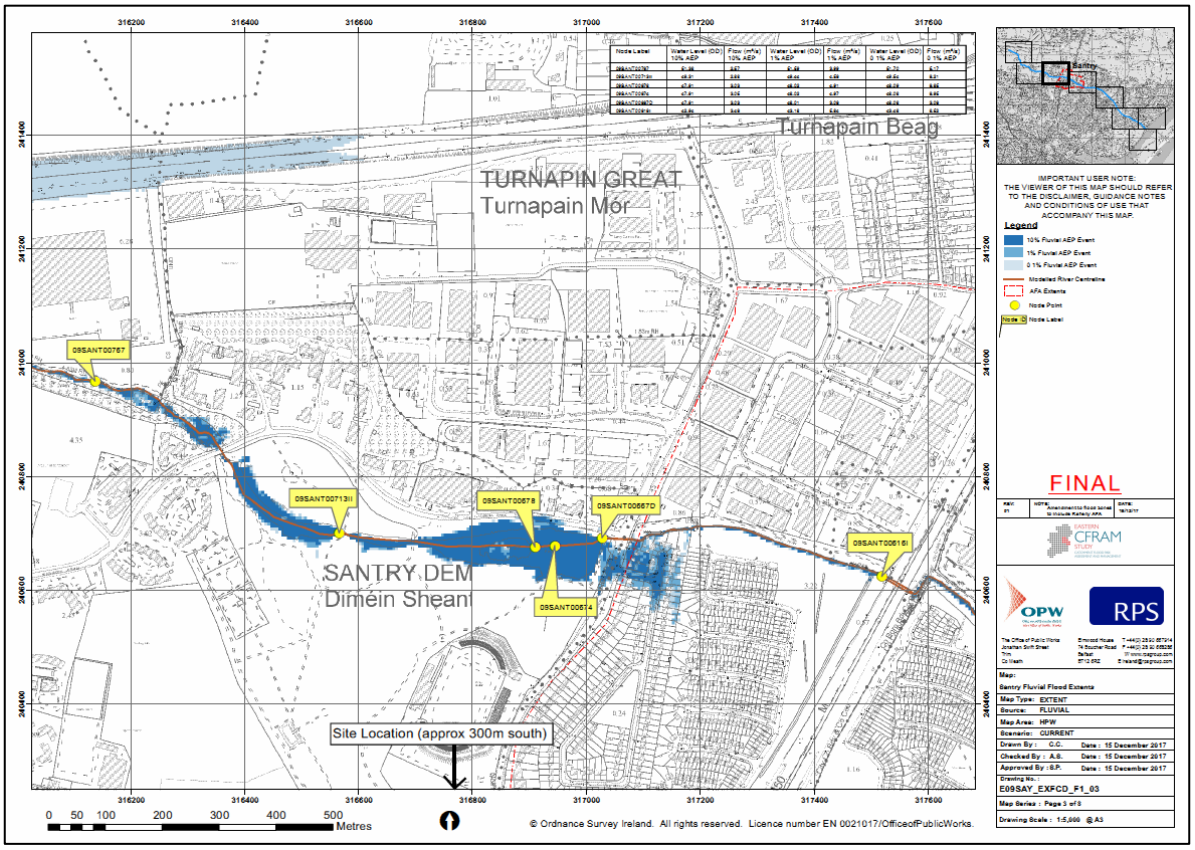

Figure 7.4 - Extract from ECFRAMS Mapping

Dublin City Council Development Plan (2016 - 2022) Strategic Flood Risk Assessment

The site is outside the extents of Dublin City Council Development Plan (2016 - 2022) Strategic Flood Risk Assessment.

Please refer to DBFL Site Specification Flood Risk Assessment report 200060-DBFL-XX-XX-RP-C-0002 for further details regarding flood risk for this development.

7.3.5 Surface Water Drainage

The existing surface water infrastructure within the site boundary is currently unknown. Irish Water records show no public surface water infrastructure within the site boundary (See appendix 7-A for Irish Water mapping).

A manhole has been constructed on the new 225mm diameter outfall sewer of previously approved proposed mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development to discharge the permitted flow from the proposed development.

7.3.6 Foul Drainage

There is an existing 300mm diameter public foul sewer located on the Swords Road (R104) to the east of the site. A manhole has been constructed on the new 225mm diameter outfall sewer of previously approved proposed mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development to take permitted flow from the proposed development.

The existing foul water infrastructure within the site boundary is currently unknown. Irish Water records show no public foul infrastructure within the site boundary. (See appendix 7-A for Irish Water mapping)

A Pre-Connection Enquiry was submitted to Irish Water CDS20003546 and subsequent confirmation of feasibility letter states that connection is feasible subject to upgrades. The Applicant will communicate with Irish Water to agree the required works following receipt of Planning Approval.

The foul water drainage design has been submitted to Irish Water and a Statement of Design Acceptance received confirming the design is in compliance with Irish Water Code of Practice and Standard Details.

7.3.7 Water Supply

There is currently no public water supply infrastructure noted on Irish Water records within the subject site. There is an existing 300mm diameter cast iron public watermain located on the Swords Road adjacent to the proposed site entrance. (See appendix 7-A for Irish Water mapping)

The existing water infrastructure within the site boundary is currently unknown.

A Pre-Connection Enquiry was submitted to Irish Water CDS20003546 and subsequent confirmation of feasibility letter states that connection is feasible subject to upgrades. The Applicant will communicate with Irish Water to agree the required works following receipt of Planning Approval.

The watermain design has been submitted to Irish Water and a Statement of Design Acceptance received confirming the design is in compliance with Irish Water Code of Practice and Standard Details.

7.4 Characteristics of the Proposed Development

7.4.1 Hydrology & Geology

The primary hydrological feature in the vicinity of the site is the Santry River (approx. 700m south of the site).

No groundwater was encountered during excavations of the basement in neighbouring development (depts up to 4m). However, soakaway test conducted in the neighbouring site in

May 2019 showed the soil has poor infiltration characterises. Therefore all suds features within the site are proposed to be tanked.

On the assumption of infiltration not being feasible, surface water flows from the proposed development are to be attenuated to greenfield runoff rates in conjunction with implementation of SUDS strategies such as permeable paving, green roofs, catchpit manholes, pluvial cube attenuation system and installation of a Class 1 By-Pass Fuel/Oil Separator prior to discharging to the public surface water network. Refer to DBFL's Engineering Services Report (200060-DBFL-XX-XX-RP-C-0001) for full details of the proposed drainage & SUDS methodologies employed in the proposed surface water design.

Based on the available information it is not currently envisaged that the proposed development works will have any direct impact on the existing underlying hydrogeology & geology.

A detailed Hydrological Impact Assessment can be found under a separate heading, produced by AWN Consulting.

7.4.2 Flood Risk

The Site-Specific Flood Risk Assessment for proposed development was undertaken in accordance with the requirements of "*The Planning System and Flood Risk Management, Guidelines for Planning Authorities*" and its Technical Appendices.

Following the Flood Risk Assessment, it was determined that the site is located in Flood Zone C as defined by the Guidelines. It concluded that the;

- Proposed residential development is appropriate for the site's flood zone category.
- The sequential approach outlined in the Guidelines has been adhered to and that the 'Avoid' principal has been achieved.

The proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event. Overland flow paths have been identified for pluvial flooding exceeding the capacity of the surface water drainage network. Refer to DBFL's Site Specific Flood Risk Assessment (200060-DBFL-XX-XX-RP-C-0002) for full details.

7.4.3 Surface Water Drainage

The surface water drainage from this development is proposed to discharge, following attenuation, hydrobrake flow control device and petrol interceptor, via a new 225mm diameter surface water sewer to a manhole constructed as part of the previously approved mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development.

The petrol interceptor, placed under the aforementioned planning reference, has been designed to accommodate the combined permitted discharge rate from both of this development and the development located to the south (Planning Ref: 2713/17 & 2737/19).

Surface water runoff from the site's road network and parking bays will be directed to a proposed surface water pipe network via the porous aggregates beneath permeably paved road surfacing (providing an additional element of attenuation/treatment). Road gullies will be installed at low points on the permeable paving road surface in addition.

Extensive green roofs will be provided at roof level and intensive green roofs provided on podium slab. Surface water runoff from the roofs of blocks A, B,C,D, E and F will be collected by slung drainage and directed to the attenuation system. Surface water runoff from block G will be directed into the proposed surface water pipe network and then travel to the attenuation structure.

Surface water will pass through silt trap (catchpit) manholes prior to entering the attenuation system. The discharge rate from the proposed surface water drainage network will be controlled by a vortex flow control device (Hydrobrake or equivalent) and run-off contained in the associated underground attenuation tanks (Pluvial Cube or equivalent). Surface water discharge exiting the flow control device will pass through a by-pass fuel/oil separator sized to accommodate the combined permitted discharge rate from both this development and the development located to the south (Planning Ref: 2713/17& 2737/19).

Surface water calculations are based on permissible site discharge rate of 5.0 l/s in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). This results in a total attenuation volume required of approx. 416m³.

The surface water drainage network, attenuation storage and site levels are designed to accommodate a 100-year storm event (provision for 20% climate change included). Floor levels of the residential units are set above the 100-year flood levels by a minimum of 0.4m. For storm events in excess of a 100 year event the development has been designed to provide overland flood routes towards green areas and away from structures.

The Proposed surface water drainage network has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the Department of the Environment's Recommendations for Site Development Works for Housing Areas, the Department of the Environment's Building Regulations "*Technical Guidance Document Part H Drainage and Waste Water Disposal*" and BS EN 752: 2008 Drain and Sewer Systems Outside Buildings.

See Engineering Services Report (200060-DBFL-XX-XX-RP-C-0001) for full details of the proposed surface water drainage design.

7.4.4 Foul Drainage

The foul sewerage from this development is proposed to discharge via a new 225mm diameter sewer to a manhole constructed as part of the previously approved mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development. This will negate the requirement for any construction outside of the site boundary and minimise any disruption to the public.

The proposed foul drainage network will comprise of a series of main sewers 150mm/225mm diameter in size. Foul sewage from apartment blocks A, B, C, D, E and F will be drained on separate systems via 150mm diameter pipes slung from the underside of basement roof slabs and adjacent to the basement walls. Service pipes from individual apartments will project through ground floor slabs and connect into the slung drainage system which in turn will connect by gravity to the proposed external drainage system.

Any surface water from the basement car park generated by incidental run-off only will drain through an underground system of collector pipes, gullies and ACO drains which in turn will drain through a petrol interceptor prior to discharging into a pumping station located beneath the basement slab. This run-off will then be pumped to ground level and enter the gravity foul drainage system for the site.

The foul drainage network for the proposed development has been designed in accordance with the following guidance:

- Irish Water Code of Practice for Wastewater Infrastructure & Standard Details for Wastewater Infrastructure;
- Department of the Environment's Recommendations for Site Development Works for Housing Areas;
- Department of the Environment's Building Regulations *"Technical Guidance Document Part H Drainage and Waste Water Disposal";*
- BS EN 752: 2008 Drain and Sewer Systems Outside Buildings;
- IS EN 12056: Part 2 (2000) Gravity Drainage Systems Inside Buildings

A peak flow rate of 17.8 l/s has been calculated using the EN752 method, which equates to a daily foul discharge volume of 955m³.

A BOD (Biochemical Oxygen Demand) loading (based on 60g per person per day) of 56.70kg has been calculated for the proposed development as outlined in the EPA Waste Water Treatment Manual.

See Engineering Services Report (200060-DBFL-XX-XX-RP-C-0001) for full details of the proposed foul water drainage design.

7.4.5 Water Supply

It is proposed to form a connection to the existing 300mm diameter cast iron public watermain located on the Swords Road adjacent to the proposed site entrance to the south east of the site.

All connections, valves, hydrants, meters etc. have been designed and are to be installed in accordance with Irish Water's Code of Practice / Standard Details and the Department of the Environment's Building Regulations *"Technical Guidance Document Part B Fire Safety".*

An average daily domestic demand of approx. 144.6m³ has been calculated as outlined in Irish Water's Pre-Connection Enquiry Application Form.

Commercial properties will be individually metered.

See Engineering Services Report (200060-DBFL-XX-XX-RP-C-0001) for full details of the proposed water design.

7.5 Potential Impacts of the Proposed Development

7.5.1 Construction Phase

Potential impacts that may arise during the construction phase are noted below:

- Surface water runoff during the construction phase may contain increased silt levels (e.g. runoff across areas stripped of hardstanding) or become polluted by construction activities.
- Discharge of rainwater pumped from excavations may also contain increased silt levels (potential impact on existing hydrology e.g. discharge to existing open drain).

- Accidental spills and leaks associated with storage of oils and fuels, leaks from construction machinery and spillage during refuelling and maintenance contaminating the surrounding surface water and hydrogeological environments.
- Concrete runoff, particularly discharge of wash water from concrete trucks (potential impact on existing hydrology e.g. infiltration to ground).
- Discharge of vehicle wheel wash water (potential impact on existing hydrology e.g. discharge to existing surface water drainage infrastructure).
- Improper discharge of foul drainage from contractor's compound (impact on existing hydrology e.g. cross-contamination of existing surface water drainage.).
- Cross contamination of potable water supply to construction compound.

7.5.2 Operational Phase

Potential operational phase impacts are noted below:

- Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas).
- Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate).
- Increased discharge to foul drainage network (Daily Foul Discharge Volume = approx. 955m³)
- Increased potable water consumption (Average Daily Domestic Demand = approx. 144.6m³)

Implementation of the mitigation measures described under section 7.8.2 will prevent and minimize the potential impacts of this interaction.

7.6 Potential Cumulative impacts

7.6.1 Surface (Storm) Water Infrastructure

The cumulative impacts of the proposed development are such that the requirement to attenuate the subject site to pre-development run-off rates will ensure that during extreme storm events the surface water from the development is limited to the greenfield run off rate in accordance with the GDSDS and Dublin City Council requirements. The use of sustainable urban drainage features will aid in improving overall storm water quality prior to ultimate discharge.

Please refer to DBFL report 200060-DBFL-XX-XX-RP-C-0001 for further details.

7.6.2 Potable Water Infrastructure

The potential impacts for the local public potable water are that the proposed development will reduce the capacity in the public watermain. A Pre-Connection Enquiry was submitted to Irish Water CDS20003546 and subsequent confirmation of feasibility letter states that connection is feasible subject to upgrades.

Please refer to DBFL report 200060-DBFL-XX-XX-RP-C-0001 for further details.

7.7 *'Do Nothing'* Scenario

There are no predicted impacts should the proposed development not proceed.

7.8 Mitigation Measures

7.8.1 Construction Phase

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment.

- A site-specific Construction Management Plan will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practice as outlined in the Construction Management Plan.
- Rainwater pumped from excavations is to be directed to on-site settlement ponds.
- Surface water runoff from areas stripped of hardstanding and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping the site and excavations, with an objective of minimizing soil erosion.
- In order to mitigate against spillages contaminating the surrounding surface water and hydrogeological environments, all oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (where not possible to carry out such activities off site).
- Concrete batching will take place off site and wash out of concrete trucks will take place off site (at authorized concrete batching plant in full compliance with relevant planning and environmental consents).
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.
- Any groundwater pumped from excavations is to be directed to on-site settlement ponds.
- It is proposed to implement a programme for monitoring water quality at the outfall as part of the construction of this development, in agreement with the Planning Authority.
- The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established.
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

7.8.2 Operational Phase

The design of proposed site levels (roads, plaza, finished floor levels etc.) has been carried out in such a way as to replicate existing surface contours, break lines etc. as closely as reasonably practicable and avoid concentrating additional surface water flow in any particular location. However, some localised areas have been raised in order to enable gravity foul drainage and provide sufficient depth of cover. In these areas the levels have been designed to provide overland flow paths have been designed to ensure that during exceedance events, runoff is directed away from buildings to soft landscaped areas.

Following the Site Specific Flood Risk Assessment, it has been determined that the entire site / zoned developable area is located in Flood Zone C as defined by the Guidelines (i.e. proposed development is considered to have the required level of flood protection up to and including the 1% AEP flood event.)

Surface water runoff from the site will be attenuated to the greenfield runoff rate as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled by a Hydrobrake type vortex flow control device in conjunction with attenuation storage.

The following methodologies are being implemented as part of a SuDS surface water treatment train approach:

- Permeable paving along carriageways and parking areas.
- Greenroofs, both intensive and extensive.
- Catchpit manholes.
- Installation of hydrobrake limiting surface water discharge from the site to combined greenfield runoff rates.
- Surface water discharge to pass via a Class 1 bypass fuel / oil separator (sized in accordance with permitted discharge from the site).

A contract will be entered into with a suitably qualified contractor for maintenance of the attenuation system, Hydrobrake and by-pass fuel / oil separator noted above.

No specific mitigation measures are proposed in relation to foul drainage however, all new foul drainage lines will be designed, installed and tested in accordance with Irish Water Code of Practice.

No specific mitigation measures are proposed in relation to water supply. However, all new watermain will be designed, installed and tested in accordance with the Irish Water Code of Practice.

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk - attenuation storage design allows for a 20% increase in rainfall intensities, as recommended by the GDSDS.
- Pluvial flood risk - drainage system design allows for a 20% increase in flows, as recommended by the GDSDS.

7.9 Predicted Impact of the Proposed Development

This section describes the predicted impact of the proposed development following the implementation of the remedial and mitigation measures, as set out above.

7.9.1 Construction Phase

Implementation of the measures outlined above will ensure that the potential impacts of the proposed development on water and the hydrogeological environment do not occur during the construction phase and that any residual impacts will be negligible.

7.9.2 Operational Phase

Surface water drainage design has been carried out in accordance with the GDSDS, and SuDS methodologies implemented as part of a treatment train approach. Foul drainage and watermain has been designed and will be constructed in accordance with Irish Water Code of Practice. As a result, the predicted residual impacts on the water and hydrogeological environment arising from the operational phase will be negligible.

7.10 Monitoring

Proposed monitoring during the construction and operational phase in relation to the water and hydrogeological environment are as follows:

- Adherence to Construction Management Plan.
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and vehicle wheel wash facilities.
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content).
- During the operational phase an inspection and maintenance contract is to be implemented in relation to the proposed Class 1 fuel / oil separators, hydrobrakes, SuDS and attenuation facilities.

7.11 Reinstatement

The external connections into the potable water will be carried out by Irish Waters regional contactor and reinstated to Dublin City Council requirements.

7.12 Interactions

DBFL Consulting Engineers lodged a Pre-Connection Enquiry and a Request for Design Acceptance to Irish Water, (copies of their response are appended to the Engineering Services Report 200060-DBFL-XX-XX-RP-C-0001).

7.13 Difficulties Encountered in Compiling

No difficulties were encountered while compiling this chapter.

7.14 References

The baseline environment and the assessment of the development in this chapter was described based on the information collected from the sources mentioned in Section 0.

Appendix 7A: Irish Water Records

8.0. Air Quality and Climate

8.1 Introduction

AWN Consulting Ltd. has been commissioned to carry out an assessment of the likely air quality and climate impacts associated with the proposed mixed-use development on lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. A full description of the development is available in Chapter 3 of this EIAR.

This chapter was completed by Niamh Nolan, an environmental consultant in the air quality section of AWN Consulting Ltd. She holds a BSocSci (Hons) in Social Policy and Geography from University College Dublin. She is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Science. She has experience in mapping software primarily in QGIS and she specialises in the area of air quality, climate and sustainability.

8.2 Methodology

8.2.1 Criteria for Rating Impacts

8.2.1.1 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 8.1 and Appendix 8.1).

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 NO2, PM10 and PM2.5, which are applicable in relation to this project (see Table 8.1). 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 Appendix 8.1).

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

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

Table 8.1: Air Quality Standards Regulations

8.2.1.2 Dust Deposition Guidelines

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (PM10) and less than 2.5 microns (PM2.5) and the EU ambient air quality standards outlined in Table 8.1 have set ambient air quality limit values for PM10 and PM2.5.

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

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m2*day) averaged over a one year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the Bergerhoff limit of 350 mg/(m2*day) to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction of the proposed development.

8.2.1.3 Climate Agreements

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013 (the Regulation). The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the Act). The purpose of the Act was to enable Ireland *'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050'* (3.(1) of No. 46 of 2015). This is referred to in the Act as the *'national transition objective'.* The Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The Climate Action Plan (CAP) (Government of Ireland, 2019), published in June 2019, outlines

the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The CAP also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The CAP has set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

Following on from Ireland declaring a climate and biodiversity emergency in May 2019 and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019 followed by the publication of the Climate Action and Low Carbon Development (Amendment) Bill 2021 (hereafter referred to as the 2021 Climate Bill) in March 2021 (Government of Ireland, 2021). The 2021 Climate Bill was prepared for the purposes of giving statutory effect to the core objectives stated within the CAP.

The purpose of the 2021 Climate Bill, if enacted, is to provide for the approval of plans *'for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050'.* The 2021 Climate Bill will also *'provide for carbon budgets and a decarbonisation target range for certain sectors of the economy'*. The 2021 Climate Bill defines the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'.

The 2021 Climate Bill removes any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority.

The Fingal County Council Climate Change Action Plan 2019 - 2024 sets out specific objectives in relation the climate. These include:

- A 40% reduction in the Council's greenhouse gas emissions by 2030;
- To make Dublin a climate resilient region, by reducing the impacts of future climate change-related events;
- To actively engage and inform citizens on climate change.

The actions in the plan are a starting point and will be regularly monitored and updated by a dedicated Climate Action Team, working with an Interdepartmental Steering Group representative of all four Dublin Council Departments.

8.2.2 Construction Phase

Air Quality

The current assessment focuses on identifying the existing baseline levels of PM_{10} and $PM_{2.5}$ in the region of the proposed development by an assessment of EPA monitoring data. Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the proposed development.

Construction phase traffic also has the potential to impact air quality and climate. The UK Design Manual for Roads and Bridges (DMRB) guidance (UK Highways Agency, 2019a), states that road links meeting one or more of the following criteria can be defined as being *'affected'* by a proposed development and should be included in the local air quality assessment. Transport Infrastructure Ireland (TII) recommend the use of the UK DMRB guidance (UK Highways Agency, 2007) in its document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, 2011*. This approach is considered best practice in the absence of specific Irish guidance.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band;
- A change in carriageway alignment by 5m or greater.

The construction stage traffic does not meet the above scoping criteria and therefore, has been scoped out from any further assessment as there is no potential for significant impacts to air quality.

Climate

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the proposed development.

8.2.3 Operational Phase

Air Quality 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 Highways Agency (2019a) and UK Department of Environment Food and Rural Affairs (DEFRA) (2016; 2018). TII reference the use of the UK Highways Agency and DEFRA guidance and methodology in their document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011). This approach is considered best practice in the absence of Irish guidance and can be applied to any development that causes a change in traffic.

In 2019 the UK Highways Agency DMRB air quality guidance was revised with *LA 105 Air Quality* replacing a number of key pieces of guidance (HA 207/07, IAN 170/12, IAN 174/13, IAN 175/13, part of IAN 185/15). This revised document outlines a number of changes for air quality assessments in relation to road schemes but can be applied to any development that causes a change in traffic. Previously the DMRB air quality spreadsheet was used for the majority of assessments in Ireland with detailed modelling only required if this screening tool indicated compliance issues with the EU air quality standards. Guidance from Transport Infrastructure Ireland (TII, 2011) recommends the use of the UK Highways Agency DMRB spreadsheet tool for assessing the air quality impacts from road schemes. However, the DMRB spreadsheet tool was last revised in 2007 and accounts for modelled years up to 2025. Vehicle emission standards up to Euro V are included but since 2017, Euro 6d standards are applicable for the new fleet. In addition, the model does not account for electric or hybrid vehicle use. Therefore, this a somewhat outdated assessment tool. The LA 105 guidance document states that the DMRB spreadsheet tool may still be used for simple air quality assessments where there is unlikely to be a breach of the air quality standards. Due to its use of a "*dirtier*" fleet, vehicle emissions would be considered

to be higher than more modern models and therefore any results will be conservative in nature and will provide a worst-case assessment.

The 2019 UK Highways Agency DMRB air quality revised guidance *LA 105 Air Quality* states that modelling should be conducted for NO_2 for the base, opening and design years for both the do minimum (do nothing) and do something scenarios. Modelling of PM_{10} is only required for the base year to demonstrate that the air quality limit values in relation to PM_{10} are not breached. Where the air quality modelling indicates exceedances of the PM_{10} air quality limits in the base year then PM_{10} should be included in the air quality model in the do minimum and do something scenarios. Modelling of $PM_{2.5}$ is not required as there are currently no issues with compliance with regard to this pollutant. The modelling of PM_{10} can be used to show that the project does not impact on the $PM_{2.5}$ limit value as if compliance with the PM_{10} limit is achieved then compliance with the $PM_{2.5}$ limit will also be achieved. Historically modelling of carbon monoxide (CO) and benzene was required however, this is no longer needed as concentrations of these pollutants have been monitored to be significantly below their air quality limit values in recent years, even in urban centres (EPA, 2020a).

The key pollutant reviewed in this assessment is NO_2. Modelling of operational NO_2 concentrations has been conducted for the do nothing and do something scenarios for the base year (2020) opening year (2022), and design year (2037). 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 Highways Agency guidance *LA 150* (2019) scoping criteria was used to determine the road links required for inclusion in the modelling assessment. Sensitive receptors within 200m of impacted road links are included within the modelling assessment. Pollutant concentrations are calculated at these sensitive receptor locations to determine the impact of the proposed development in terms of air quality. The guidance states a proportionate number of representative receptors which are located in areas which will experience the highest concentrations or greatest improvements as a result of the proposed development are to be included in the modelling (UK Highways Agency, 2019a). The TII guidance (2011) defines sensitive receptor locations as: residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. A total of 3 no. sensitive receptors within 200m of impacted road links were included within the modelling assessment (see Figure 8.1), these are all high sensitivity residential properties.

The following model inputs are required to complete the assessment using the DMRB spreadsheet tool: road layouts, receptor locations, annual average daily traffic movements (AADT), percentage heavy goods vehicles (%HGV), annual average traffic speeds and background concentrations. Using this 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 ambient concentrations are then compared with the relevant ambient air quality standards to assess the compliance of the proposed development with these ambient air quality standards.

The TII document *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011) details a methodology for determining air quality impact significance criteria for road schemes which can be applied to any project that causes a change in traffic. The degree of impact is determined based on 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 Appendix 8.2 Table A8.2.1 and Table A8.2.2. The significance criteria are based on NO_2 and PM_{10} as these pollutants are most likely to exceed the annual mean limit values (40 µg/m^3).

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 HGV's 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 NOx 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 NOx to NO_2 calculator (2020) which was originally published in 2009 and is currently on version 8.1. This calculator (which can be downloaded in the form of an excel spreadsheet) accounts for the predicted availability of O_3 and proportion of NOx 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.

Update to NO_2 Projections using DMRB

In 2011 the UK DEFRA published research (Highways England, 2013) 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_2 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 published an Interim advice note (IAN 170/12) in order to correct the DMRB results for future years. This methodology has been used in the current assessment to predict future concentrations of NO_2 as a result of the proposed development.

Traffic Data Used in Modelling Assessment

Traffic flow information was obtained from DBFL Consulting for the purposes of this assessment. Data for the Do Nothing and Do Something scenarios for the base year 2020, opening year 2022 and design year 2037 were provided. The traffic data in AADT is detailed in Table 8.2 along with the % HGV. Only road links that met the DMRB scoping criteria outlined in Section 8.2.2 and that were within 200m of receptors were included in the modelling assessment. Background concentrations have been included as per Section 8.3.3 of this chapter based on available EPA

background monitoring data (EPA, 2020a).

This traffic data has also been used in the operational stage climate impact assessment.

Road Name	Base Year	Do-Nothing		Do-Something		Speed (kph)
	2020	2022	2037	2022	2037	
	AADT (%HGV)	AADT (%HGV)	AADT (%HGV)	AADT (%HGV)	AADT (%HGV)	
Link E	21,235 (9%)	19,894 (10%)	25,934 (9%)	22,676 (9%)	26,045 (9%)	50
Link F	212 (26%)	425 (13%)	489 (13%)	476 (4%)	541 (12%)	30
Link H	19,328 (9%)	20,548 (9%)	23,852 (9%)	20,706 (9%)	28,365 (7%)	50

Table 8.2: Traffic Data Used in Modelling Assessment

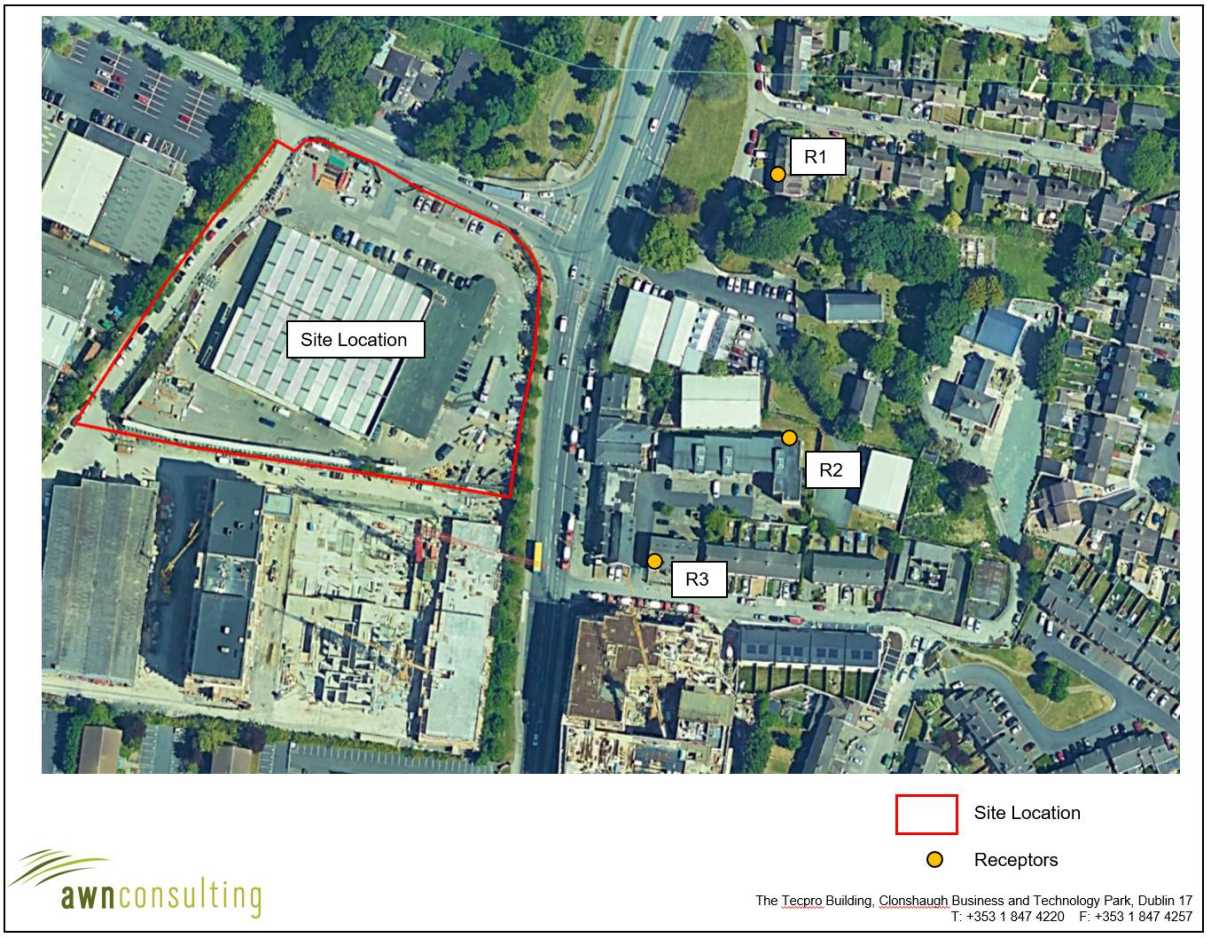

Figure 8.1: Location of Sensitive Receptors used in Air Quality Modelling Assessment

Air Quality Impact on Ecological Sites

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 (TII, 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. Only sites that are sensitive to nitrogen deposition should be included in the assessment. In addition, the UK Highways Agency (2019) states that a

detailed assessment does not need to be conducted for areas that have been designated for geological features or watercourses.

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

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

- A designated area of conservation is located within 200 m of the proposed development.
- A significant change in AADT flows (>5%) will occur.

The Proposed Natural Heritage Area (pNHA) of the Santry Demesne (site code 000178) is located to the direct north of the proposed development within 200m. An assessment of the impact with regards to nitrogen deposition was conducted for the pNHA. Dispersion modelling and prediction was carried out at typical traffic speeds at this location. Ambient NOx concentrations were predicted for the opening year of 2022 along a transect of up to 200m within the pNHA in line with the UK Highways Agency (2019a) and TII (2011) guidance. The road contribution to dry deposition along the transect was also calculated using the methodology outlined in Appendix 9 of the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011).

Climate Assessment

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013. Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 8.3.3). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments LA 114 Climate (UK Highways Agency, 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meets one or more of the below criteria, then further assessment is required.

- a change of more than 10% in AADT;
- a change of more than 10% to the number of heavy duty vehicles; and
- a change in daily average speed of more than 20 km/hr.

There are three road links that will experience an increase of 10% or more in the AADT. These

road links have been included in the detailed climate assessment (see Table 8.2).
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 D in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of carbon dioxide (CO2). 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 project that causes a change in traffic. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds (see Table 8.2).

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. The Building Lifecycle Report prepared in relation to this assessment has been reviewed and used to inform the operational phase climate assessment. This report outlines a number of measures in relation to energy usage from the proposed development primarily in relation to heat and electricity. A number of measures have been incorporated into the overall design of the development to reduce the impact to climate where possible.

Air Quality Impact on Ecological Sites

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 (TII, 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. Only sites that are sensitive to nitrogen deposition should be included in the assessment. In addition, the UK Highways Agency (2019) states that a detailed assessment does not need to be conducted for areas that have been designated for geological features or watercourses.

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

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

- A designated area of conservation is located within 200 m of the proposed development.
- A significant change in AADT flows (>5%) will occur.

The Proposed Natural Heritage Area (pNHA) of the Santry Demesne (site code 000178) is located to the direct north of the proposed development within 200m. An assessment of the impact with regards to nitrogen deposition was conducted for the pNHA. Dispersion modelling and prediction was carried out at typical traffic speeds at this location. Ambient NOx concentrations were predicted for the opening year of 2022 along a transect of up to 200m within the pNHA in line with the UK Highways Agency (2019a) and TII (2011) guidance. The road contribution to dry deposition along the transect was also calculated using the methodology outlined in Appendix 9 of the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (2011).

Climate Assessment

Ireland has annual GHG targets which are set at an EU level and need to be complied with in order to reduce the impact of climate change. Impacts to climate as a result of GHG emissions are assessed against the targets set out by the EU under *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013*. Which has set a target of a 30% reduction in non-ETS sector emissions by 2030 relative to 2005 levels.

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established by reference to EPA data on annual GHG emissions (see Section 8.3.3). Thereafter the impact of the proposed development on climate is determined. Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency, 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meets one or more of the below criteria, then further assessment is required.

- a change of more than 10% in AADT;
- a change of more than 10% to the number of heavy duty vehicles; and
- a change in daily average speed of more than 20 km/hr.

There are three road links that will experience an increase of 10% or more in the AADT. These road links have been included in the detailed climate assessment (see Table 8.2).

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 D in the UK Design Manual for Roads and Bridges (UK Highways Agency, 2007). The assessment focused on determining the resulting change in emissions of carbon dioxide (CO_2). 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 project that causes a change in traffic. The inputs to the air dispersion model consist of information on road link lengths, AADT movements and annual average traffic speeds (see Table 8.2).

The EU guidance (2013) also states indirect GHG emissions as a result of a development must be considered, this includes emissions associated with energy usage. The Building Lifecycle Report prepared in relation to this assessment has been reviewed and used to inform the operational phase climate assessment. This report outlines a number of measures in relation to energy usage from the proposed development primarily in relation to heat and electricity. A number of measures have been incorporated into the overall design of the development to reduce the impact to climate where possible.

8.3 Baseline Environment

8.3.1 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 PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

The nearest representative weather station collating detailed weather records is Dublin Airport, which is located approximately 3 km north of the site. Dublin Airport met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 8.2). For data collated during five representative years (2016 – 2020), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds (Met Éireann, 2021).

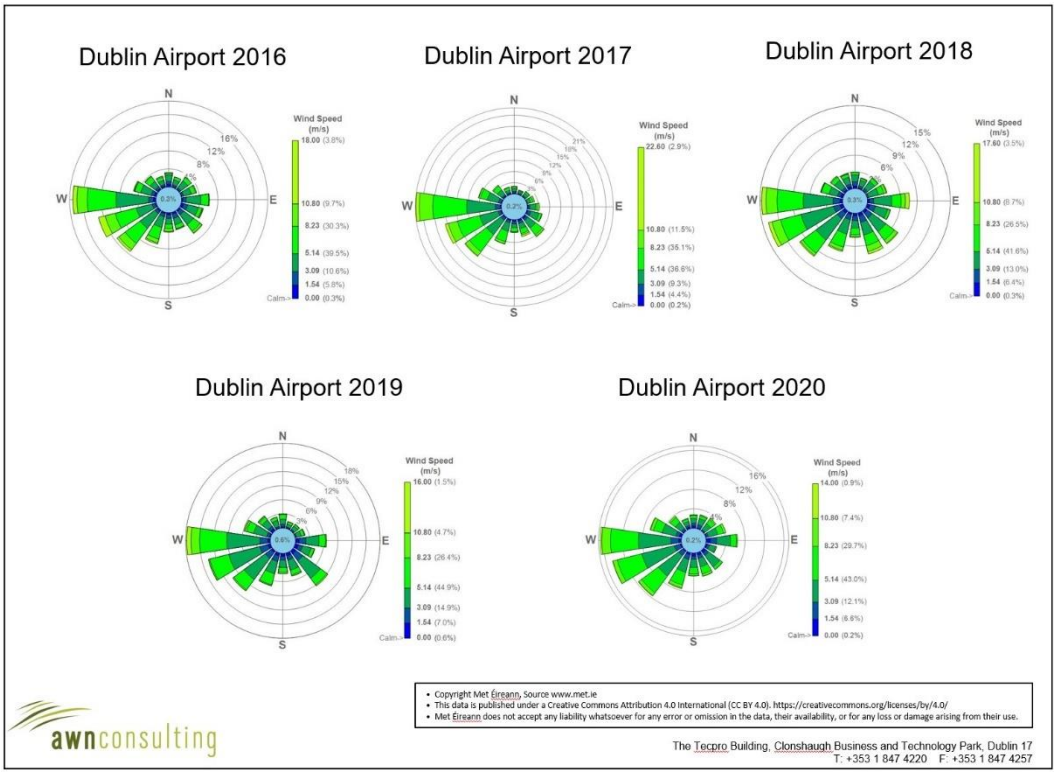

Figure 8.2: Dublin Airport Windroses 2016 – 2020

8.3.2 Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality in Ireland is "*Air Quality In Ireland 2019*" (EPA, 2020a). 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, 2020b).

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, 2020b). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development is within Zone A (EPA, 2020a). 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, 2020a) at suburban Zone A locations in Ballyfermot, Dun Laoghaire, Swords and Rathmines show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 15 – 22 µg/m^3 in 2019 (see Table 8.3). Sufficient data is available for all stations to observe the long-term trend since 2015 (EPA, 2020a) (see Table 8.3), with results ranging from 13 – 22 µg/m^3 and few exceedances of the one-hour limit value. The station in Swords is approximately 6 km north of the proposed development site and monitored background concentrations would be representative of the site location. Concentrations of NO_2 at the Swords site over the period 2015 – 2019 ranged from 13 - 16 µg/m^3. Based on the above information, an estimate of the background NO_2 concentration in the region of the proposed development is 16 µg/m^3.

Station	Averaging Period Notes 1, 2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean NO_2 (µg/m^3)	18	20	17	20	22
	Max 1-hr NO_2 (µg/m^3)	106	102	116	138	183
Dún Laoghaire	Annual Mean NO_2 (µg/m^3)	16	19	17	19	15
	Max 1-hr NO_2 (µg/m^3)	103	142	153	135	104
Swords	Annual Mean NO_2 (µg/m^3)	13	16	14	16	15
	Max 1-hr NO_2 (µg/m^3)	170	206	107	112	108
Ballyfermot	Annual Mean NO_2 (µg/m^3)	16	17	17	17	20
	Max 1-hr NO_2 (µg/m^3)	142	127	148	217	124

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).

Table 8.3: Trends in Zone A Air Quality – Nitrogen Dioxide (NO_2)

Continuous PM_{10} monitoring carried out at the Zone A locations of Rathmines, Phoenix Park and Dún Laoghaire showed 2015 – 2019 annual mean concentrations ranging from 9 – 15 µg/m^3 (Table 8.4), with at most 9 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m^3 (35 exceedances are permitted per year). The most representative location is Phoenix Park which had an average annual mean concentration of 10.8 µg/m^3 over the five year period. Based on the EPA data (Table 8.4) a conservative estimate of the current background PM_{10} concentration in the region of the proposed development is 13 µg/m^3.

Station	Averaging Period Notes 1, 2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean PM_{10} (µg/m^3)	15	15	13	15	15
	24-hr Mean > 50 µg/m^3 (days)	5	3	5	2	9
Phoenix Park	Annual Mean PM_{10} (µg/m^3)	12	11	9	11	11
	24-hr Mean > 50 µg/m^3 (days)	2	0	1	0	2
Dún Laoghaire	Annual Mean PM_{10} (µg/m^3)	13	13	12	13	12
	24-hr Mean > 50 µg/m^3 (days)	3	0	2	0	2

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).

Table 8.4: Trends in Zone A Air Quality – PM_{10}

Continuous $PM_{2.5}$ monitoring carried out at the Zone A location of Rathmines showed $PM_{2.5}/PM_{10}$ ratios ranging from 0.60 – 0.68 over the period 2015 – 2019. 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 9.1 µg/m^3.

Background concentrations for Opening Year 2022 and Design Year 2037 have been calculated. These have used current estimated 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* (2011) and the UK Department for Environment, Food and Rural Affairs LAQM.TG(16) (2018).

8.3.3 Climate Baseline

Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details provisional emissions up to 2019 (EPA, 2020b). The data published in 2020 states that Ireland will exceed its 2019 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by an estimated 6.98 Mt. For 2019, total national greenhouse gas emissions are estimated to be 59.90 million tonnes carbon dioxide equivalent (Mt CO_2eq) with 45.71 MtCO_2eq of emissions associated with the ESD sectors for which compliance with the EU targets must be met. Agriculture is the largest contributor in 2019 at 35.3% of the total, with the transport sector accounting for 20.3% of emissions of CO_2.

GHG emissions for 2019 are estimated to be 4.5% lower than those recorded in 2018. Emission reductions have been recorded in 6 of the last 10 years. However, compliance with the annual EU targets has not been met for four years in a row. Emissions from 2016 – 2019 exceeded the annual EU targets by 0.29 MtCO_2eq, 2.94 MtCO_2eq, 5.57 MtCO_2eq and 6.98 MtCO_2eq respectively. Agriculture is consistently the largest contributor to emissions with emissions from the transport and energy sectors being the second and third largest contributors respectively in recent years.

The EPA 2019 GHG Emissions Projections Report for 2019 – 2040 (EPA, 2020c) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and Climate Action Plan (CAP) published in 2019. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and a change from diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to

grow steadily due to an increase in animal numbers. However, over the period 2013 – 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 13.4 Mt CO_2eq under the "With Existing Measures" scenario and 12.6 Mt CO_2eq under the "With Additional Measures" scenario (EPA, 2020c).

8.3.4 Sensitivity of the Receiving Environment

In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) prior to assessing the impact of dust from a proposed development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

In terms of receptor sensitivity to dust soiling, there are approximately 38 high sensitivity residential properties within 100m of the main works area of the proposed development site. Based on the IAQM criteria outlined in Table 8.5, the worst case sensitivity of the area to dust soiling is considered to be **low**.

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	**Low**	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 8.5: Sensitivity of the Area to Dust Soiling Effects on People and Property

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the proposed development is 13 µg/m^3 and there are approximately 38 high sensitivity receptors located within 100m of the proposed development site. Based on the IAQM criteria outlined in Table 8.6, the worst case sensitivity of the area to human health is considered to be **low**.

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<200
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	**Low**	Low
		1-10	Low	Low	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

8.4 Potential Impact of the Proposed Development

8.4.1 Construction Phase

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. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. The proposed development can be considered moderate in scale and therefore, there is the potential for significant dust soiling impacts within 50m of the site (Table 8.7). The closest high sensitivity receptors (residential properties) to the site are approximately 40 m to the north of the site. As per Section 8.3.4 the surrounding area is of low sensitivity to dust soiling and dust related human health impacts. In the absence of mitigation there is the potential for short-term, negative, imperceptible impacts to nearby sensitive receptors as a result of construction dust emissions.

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

Table 8.7 Assessment Criteria for the Impact of Dust from Construction, with Standard Mitigation in Place (TII, 2011)

There is also the potential for traffic emissions to impact air quality in the short-term over the construction phase. Particularly due to the increase in HGVs accessing the site. The construction stage traffic has been reviewed and a detailed air quality assessment has been scoped out as none of the road links impacted by the proposed development satisfy the DMRB assessment criteria in Section 8.2.2. It can therefore be determined that the construction stage traffic will have an imperceptible, neutral, localised and short-term impact on air quality.

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. The Institute of Air Quality Management document "*Guidance on the Assessment of Dust from Demolition and Construction"* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is considered to be imperceptible, neutral and short term.

Human Health

Dust emissions from the construction phase of the proposed development have the potential to impact human health through the release of PM_{10} and $PM_{2.5}$ emissions. As per Table 8.7 significant PM_{10} emissions can occur within 15m of the site for a development of this scale. However, the surrounding area is of low sensitivity to dust related human health impacts as per Section 8.3.4. Therefore, in the absence of mitigation there is the potential for imperceptible, negative, short-term impacts to human health as a result of the proposed development.

8.4.2 Operational Phase

Air Quality

The impact of the proposed development has been assessed by modelling emissions from the traffic generated as a result of the development. The impact of NO_2 emissions for the opening and design years was predicted at the nearest sensitive receptors to the development. This assessment allows the significance of the development, with respect to both relative and absolute impacts, to be determined. The assessment was carried out at 3 no. high sensitivity residential receptors (R1 - R3) (see Figure 8.1).

Transport Infrastructure Ireland's document *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes* (2011) detail a methodology for determining air quality impact significance criteria for road schemes and this can be applied to any development that causes a change in traffic. The degree of impact is determined based on both the absolute and relative impact of the proposed development. Results are compared against the 'Do-Nothing' scenario, which assumes that the proposed development is not in place in future years, in order to determine the degree of impact.

The results of the assessment of the impact of the proposed development on NO_2 in the opening year 2022 are shown in Table 8.8 and for design year 2037 are shown in Table 8.9. The annual average concentration is in compliance with the limit value at the worst-case receptors in 2022 and 2037. Concentrations of NO_2 are at most 48% of the annual limit value in 2022 and at most 45% in 2037 for the do-something scenario. There are some increases in traffic volumes between 2022 and 2037, therefore any reductions in concentrations are due to decreased background values. In addition, 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 in any modelled year (Table 8.10).

The impact of the proposed development on annual mean NO_2 concentrations can be assessed relative to "Do Nothing (DN)" levels. Relative to baseline levels, there are predicted to be some negligible increases in NO_2 concentrations at receptors R1 and R3. NO_2 concentrations are predicted to be imperceptible at all receptors. Concentrations will increase by at most 0.03% of the annual limit value at worst-case receptors. Receptor R2 will experience a negligible decrease in concentrations by at most 0.4% in 2037, primarily due to a decrease in the number of HGV on the nearby road link. Using the assessment criteria outlined in Appendix 8.2, Table A8.2.1 and Table A8.2.2 the impact of the proposed development in terms of NO_2 is considered negligible. Therefore, the overall impact of NO_2 concentrations as a result of the proposed development is long-term, negative and imperceptible.

Concentrations of PM_{10} were modelled for the baseline year of 2020. The modelling showed that concentrations were in compliance with the annual limit value of 40 µg/m^3 at all receptors assessed, therefore, further modelling for the opening and design years was not required as per the UK Highways Agency guidance (2019a). Concentrations reached at most 0.55 µg/m^3 excluding background concentrations. When a background concentration of 13 µg/m^3 is included the overall impact is 34% of the annual limit value at the worst case receptors (R1 and R3).

The impact of the proposed development on ambient air quality in the operational stage is considered long-term, localised, negative and imperceptible.

Receptor	Impact Opening Year 2022				
	DN	DS	DS-DN	Magnitude	Description
R1	18.5	18.5	0.01	Imperceptible	Negligible Increase
R2	15.9	15.8	-0.03	Imperceptible	Negligible Decrease
R3	19.2	19.2	0.01	Imperceptible	Negligible Increase

Note 1 Based on UK Highways Agency IAN technique for predicting future NO_2 concentrations

Table 8.8 Predicted Annual Mean NO_2 Concentrations – Opening Year 2022 (µg/m³)

Receptor	Impact Design Year 2037				
	DN	DS	DS-DN	Magnitude	Description
R1	17.6	17.6	0.01	Imperceptible	Negligible Increase
R2	14.9	14.9	0.01	Imperceptible	Negligible Increase
R3	18.3	18.1	-0.16	Imperceptible	Negligible Decrease

Note 1 Based on UK Highways Agency IAN technique for predicting future NO_2 concentrations

Table 8.9 Predicted Annual Mean NO_2 Concentrations – Design Year 2037 (µg/m³)

Receptor	Opening Year 2022		Design Year 2037	
	DN	DS	DN	DS
R1	64.6	64.6	61.5	61.6
R2	55.5	55.4	52.2	52.3
R3	67.1	67.1	64	63.4

Table 8.10 Predicted 99.8th percentile of Daily Maximum 1-hour NO_2 Concentrations (µg/m³)

Air Quality Impact on Sensitive Ecosystems

The Santry Demesne Proposed Natural Heritage Area (pNHA) (site code 000178) is located to the direct north of the proposed development. The proposed development will lead to an increase in traffic volumes along the Swords road which has the potential to impact sensitive ecology within the pNHA due to NOx emissions from traffic.

Modelling has been conducted at the worst-case location in closest proximity to the road links impacted by the proposed development. The NO_X emissions resulting from traffic associated with the proposed development have been calculated and are detailed in Table 8.11. Ambient NO_X concentrations have been predicted for the opening year of 2022 as per the UK Highways Agency (2019a) and TII (2011) guidance. Concentrations are predicted along a transect of up to 200m within the pNHA.

The predicted annual average NO_X concentration within the pNHA is within the limit value of 30 µg/m³ for the existing "*Do Nothing*" scenario and the "*Do Something*" scenario. Concentrations are at most 84% of the annual limit value, including a background concentration of 23 µg/m³, for the protection of ecosystems for the existing scenario without the proposed development in place. The proposed development is predicted to increase NO_X concentrations by at most 0.01 µg/m³.

Appendix 9 of the TII guidelines (2011) state that where the scheme is expected to cause an increase of more than 2 µg/m^3 and the predicted concentrations (including background) are close to, or exceed the standard, then the sensitivity of the habitat to NO_X should be assessed by the project ecologist. NO_X concentrations are not predicted to be in exceedance of the limit value either with or without the proposed development in place, the proposed development will only increase NO_X concentrations by a maximum of 0.01 µg/m^3 at the worst-case location, therefore, effects are not predicted to be significant.

The contribution to the NO_2 dry deposition rate along the 200m transect within the pNHA is also detailed in Table 8.11. The change in the maximum NO_2 dry deposition rate is 0.001 Kg(N)/ha/yr. This is well below the critical load for general forest and inland surface water sites of 10 - 20 Kg(N)/ha/yr (TII, 2011).

Overall, the air quality effect on the Santry Demesne pNHA is considered negative, long-term and imperceptible.

Distance to Road (m)	NO_X Concentration (µg/m^3) Note 1			NO_2 Dry Deposition Rate Impact
	Do Nothing	Do Something	Change in NO_X Concentration	Kg N ha^{-1} yr^{-1}
81.4	25.27	25.27	0.01	0
91.4	24.77	24.78	0.01	0
101.4	24.38	24.39	0.00	0
111.4	24.08	24.08	0.00	0
121.4	23.84	23.85	0.00	0
131.4	23.67	23.67	0.00	0
141.4	23.54	23.54	0.00	0
151.4	23.46	23.46	0.00	0
161.4	23.42	23.42	0.00	0
171.4	23.39	23.40	0.00	0
181.4	23.33	23.33	0.00	0
191.4	23.26	23.26	0.00	0.001
201.4	23.20	23.20	0.00	0

Note 1 Based on a background NO_X concentration of 23 µg/m^3 in 2022

Table 8.11: Assessment of NO_X Concentrations and NO_2 Dry Deposition Impact on the Santry Demense pNHA

Climate

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. A detailed flood risk assessment has been undertaken as part of this planning application and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the impact will be imperceptible.

There is the potential for a number of greenhouse gas emissions to atmosphere during the operational phase of the development. The predicted concentrations of CO_2 for the future years of 2022 and 2037 are detailed in Table 8.12. These are significantly less than the 2022 and 2030 target set out under EU legislation. It is predicted that in 2022 the proposed development will increase CO_2 emissions by 0.00006% of the EU 2022 target. In 2037 CO_2 emissions will increase by 0.00003% of the 2030 target. Therefore, the climate impact of the proposed development is considered negative, long-term and imperceptible.

Year	Scenario	CO_2 (tonnes/annum)
2022	Do Nothing	267
	Do Something	289
2037	Do Nothing	332
	Do Something	342
Increment in 2022		22.2 Tonnes
Increment in 2037		10.4 Tonnes
Emission Ceiling (kilo Tonnes) 2022		**42,357** Note 1
Emission Ceiling (kilo Tonnes) 2030		**33,381** Note 1
Impact in 2022 (%)		0.00006 %
Impact in 2037 (%)		0.00003 %

Note 1 Target under *Commission Implementing Decision (EU) 2020/2126 of 16 December 2020 on setting out the annual emission allocations of the Member States for the period from 2021 to 2030 pursuant to Regulation (EU) 2018/842 of the European Parliament and of the Council*

Table 8.12 Climate Impact Assessment

In addition, the proposed development has been designed to reduce the impact to climate where possible, the following measures have been incorporated into the design of the development: The use of photovoltaics as a means of providing a renewable source of energy for the building is being considered along with the provision of electric vehicle (EV) charging points. The proposed development aims to be a "*Near Zero – Energy Building"* meaning it will have a very high energy performance and it will achieve at minimum a Building Energy Rating (BER) of A3. Overall these measures will aid in reducing the impact to climate during the operational phase of the proposed development.

Human Health

Traffic related air emissions have the potential to impact air quality which can affect human health. However, air dispersion modelling of traffic emissions has shown that levels of all pollutants are below the ambient air quality standards set for the protection of human health. It can be determined that the impact to human health during the operational stage is long-term, negative and imperceptible.

8.4.3 Potential Cumulative Impacts

Construction Phase

According to the IAQM guidance (2014) should the construction phase of the proposed development coincide with the construction phase of any other developments within 350m then there is the potential for cumulative construction dust related impacts to nearby sensitive receptors. However, provided the mitigation measures outlined in Section 8.5 and Appendix 8.3 are implemented throughout the construction phase of the proposed development significant cumulative dust impacts are not predicted.

Due to the short-term duration of the construction phase and the low potential for significant CO_2 and N_2O emissions cumulative impacts to climate are considered imperceptible.

There are no significant cumulative impacts to air quality or climate predicted for the construction phase.

Operational Phase

The traffic data used to assess the operational stage impacts to air quality and climate included the cumulative traffic associated with the proposed development as well as other existing and permitted developments in the local area where such information was available. Therefore, the cumulative impact is included within the operational stage impact for the proposed development. The impact is predicted to be long-term, negative and imperceptible with regards to air quality and climate.

8.5 Mitigation Measures

8.5.1 Construction Phase

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 Appendix 8.3. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

In summary the measures which will be implemented will include:

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned as necessary. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

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

Climate

Construction stage 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 development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term nature 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.

8.5.2 Operational Phase

No mitigation is proposed for the operation phase of the proposed development as it is predicted to have an imperceptible impact on air quality and climate.

8.6 Residual Impacts of the Proposed Development

8.6.1 Construction Phase

Air Quality

In order to minimise dust emissions during construction, a series of mitigation measures have been prepared in the form of a dust minimisation plan which will be incorporated into the construction environmental management plan (CEMP) for the site. Provided the dust minimisation measures outlined in the plan (see Appendix 8.3 and Section 8.5.1) are adhered to, the air quality impacts during the construction phase will be short-term, negative, localised and imperceptible.

Climate

According to the IAQM guidance (2014) site traffic, plant and machinery are unlikely to have a significant impact on climate during the construction phase. Therefore, the predicted impact is short-term, neutral and imperceptible.

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, localised and imperceptible with respect to human health.

8.6.2 Operational Phase

Air Quality

Air dispersion modelling of operational traffic emissions associated with the proposed development was carried out using the UK DMRB model. The modelling assessment determined that the change in emissions of NO_2 at nearby sensitive receptors as a result of the proposed development will be imperceptible. Therefore, the operational phase impact to air quality is long-term, localised, negative and imperceptible.

Climate

Modelling of operational phase CO_2 emissions as a result of the traffic associated with the proposed development was carried out to determine the impact to climate. It was found that emissions of CO_2 will increase by an imperceptible amount as a result of the proposed development and are significantly below the EU 2022 and 2030 GHG targets. The operational phase impact to climate is long-term, negative and imperceptible. In addition, the proposed development has been designed to reduce the impact to climate where possible during operation.

Human Health

As the air dispersion modelling has shown that emissions of air pollutants are significantly below the ambient air quality standards which are based on the protection of human health, impacts to human health are long-term, negative and imperceptible.

8.6.3 Worst-Case Impact

Conservative background concentrations were used in order to ensure a robust assessment. Thus, the predicted results of the construction and operational stage assessment are worst-case and will not cause a significant impact on either air quality or climate.

8.7 Monitoring

8.7.1 Construction Phase

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

8.7.2 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.

8.8 Reinstatement

Not applicable to air quality and climate.

8.9 Interactions

Air quality does not have a significant number of interactions with other topics. The most significant interactions are between population and human health and air quality. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and imperceptible with respect to human health.

Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on the surrounding road network and the proposed scheme. In this assessment, the impact of the interactions between traffic and air quality are considered to be imperceptible.

There is the potential for interactions between air quality and biodiversity as the Santry Demesne Proposed Natural Heritage Area (pNHA) (site code 000178) is to the direct north of the proposed development. Dust emissions from construction works have the potential to impact vegetation in the pNHA. Once the mitigation measures outlined within Section 8.5 and Appendix 8.3 are implemented dust related impacts are predicted to be short-term and imperceptible. Traffic emissions also have the potential to impact vegetation as a result of NOx emissions. Air dispersion modelling of traffic emissions was conducted, and it was found that the traffic associated with the proposed development will lead to an imperceptible increase in NOx concentrations within the pNHA. Therefore the impact is long-term, negative and imperceptible.

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils. No other significant interactions with air quality and climate have been identified.

8.10 References

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Appendix 8.1: Ambient Air Quality Standards

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2 and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 µg/m^3, as an annual average (to be attained everywhere by 2010) and a limit value of 25 µg/m^3, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 µg/m^3 to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 µg/m^3). Where the AEI is currently greater than 22 µg/m^3 all appropriate measures should be employed to reduce this level to 18 µg/m^3 by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 µg/m^3 was set to be complied with by 2015 again based on the AEI.

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. The Alert Threshold is defined in Council Directive 96/62/EC as *"a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC".* These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway
- 5 km from the nearest major industrial installation
- 20 km from a major urban conurbation

As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

Appendix 8.2: Transport Infrastructure Ireland Significance Criteria

Magnitude of Change	Annual Mean NO_2 / PM_{10}	No. days with PM_{10} concentration > 50 µg/m^3	Annual Mean $PM_{2.5}$
Large	Increase / decrease ≥4 µg/m^3	Increase / decrease >4 days	Increase / decrease ≥2.5 µg/m^3
Medium	Increase / decrease 2 - <4 µg/m^3	Increase / decrease 3 or 4 days	Increase / decrease 1.25 - <2.5 µg/m^3
Small	Increase / decrease 0.4 - <2 µg/m^3	Increase / decrease 1 or 2 days	Increase / decrease 0.25 - <1.25 µg/m^3
Imperceptible	Increase / decrease <0.4 µg/m^3	Increase / decrease <1 day	Increase / decrease <0.25 µg/m^3

Table A8.2.1 Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration [Note 1]		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥40 µg/m^3 of NO_2 or PM_{10}) (≥25 µg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36 - <40 µg/m^3 of NO_2 or PM_{10}) (22.5 - <25 µg/m^3 of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30 - <36 µg/m^3 of NO_2 or PM_{10}) (18.75 - <22.5 µg/m^3 of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 µg/m^3 of NO_2 or PM_{10}) (<18.75 µg/m^3 of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥40 µg/m^3 of NO_2 or PM_{10}) (≥25 µg/m^3 of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value With Scheme (36 - <40 µg/m^3 of NO_2 or PM_{10}) (22.5 - <25 µg/m^3 of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value With Scheme (30 - <36 µg/m^3 of NO_2 or PM_{10}) (18.75 - <22.5 µg/m^3 of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value With Scheme (<30 µg/m^3 of NO_2 or PM_{10}) (<18.75 µg/m^3 of $PM_{2.5}$)	Negligible	Negligible	Slight Beneficial

[Note 1] Well Below Standard = <75% of limit value.

Table A8.2.2 Air Quality Impact Significance Criteria For Annual Mean NO_2 and PM_{10} and $PM_{2.5}$ Concentrations at a Receptor

Appendix 8.3: Dust Management Plan

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). The following measures will be incorporated into the Construction Management Plan (CMP) prepared for the site.

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies. At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 8.1 for the windrose for Dublin Airport Meteorological Station). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 20 kph haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and thus suppress dust.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Site roads (particularly unpaved) can be a significant source of fugitive dust from construction sites if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust 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 minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

9.0. Noise

9.1 Introduction

This section of the EIAR has been prepared by AWN Consulting Ltd (AWN) to assess the potential noise and vibration impact of the proposed development in the context of current relevant standards and guidance.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development during both the short-term construction phase and the long-term operational phase on its surrounding environment. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment. An assessment of noise from existing sources inward on the development has also been completed.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

This assessment has been prepared by Donal Heavey who holds a BEng in Video and Sound Technology, Diploma in Acoustics and Noise Control and is an Associate Member of the Institute of Acoustics. He is an Acoustic Consultant at AWN who has 3 years' experience as an environmental consultant specialising in Acoustics and Environmental Impact Assessment.

9.2 Assessment Methodology

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out in the following sections. In addition to specific noise and vibration guidance documents, the following Environmental Protection Agency (EPA) guidelines were considered and consulted in the preparation of this Chapter:

- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017); and
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);

The study has been undertaken using the following methodology:

- An environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment;
- 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;
- Predictive calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development 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 to reduce, where necessary, the identified potential outward impacts relating to noise and vibration from the proposed development; and
- An inward noise impact assessment from the existing noise sources on the proposed development.

9.2.1 Construction Phase – Noise Impacts

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. Dublin City Council (DCC) typically controls construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

9.2.1.1 DCC – Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition

Dublin City Council's *"Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition"* (hereinafter referred to as DCC GPG) outlines a risk assessment methodology directly applicable to the specific construction activities on the proposed site.

The proposed development has been classed as a high risk category site based on the DCC GPG risk assessment factors as detailed below: -

- Duration of the works;
- Distance to NSLs;
- Ambient noise levels;
- Site operating hours;
- Location of works;
- Duration of demolition; and
- Intrusive noise activities, including vibration generating activities.

As the proposed development is in the high risk category, the monitoring section (S.6) of the DCC GPG document identifies that: -

> *"The ABC Method detailed in Paragraph E.3.2 of BS 5228-1:2009 shall be used to determine acceptable noise levels for day, evening and night time work."*

Please note that construction works in relation to this development are proposed during normal working hours only as set out below: -

- Monday to Friday: 07:00 to 19:30hrs
- Saturdays: 08:00 to 14:00hrs
- Sundays and Bank Holidays: No construction works.

9.2.1.2 British Standard BS 5228 – 1: 2009+A1:2014

DCC GPG refers to British Standard *BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise* (hereinafter referred to as BS 5228-1:2009+A1:2014) as appropriate criteria relating to permissible construction noise threshold levels for a development of this scale may be found in BS 5228-1:2009+A1:2014.

Potential noise impacts during the construction stage of a project are often assessed in accordance with BS 5228-1:2009+A1:2014. Various mechanisms are presented as examples of determining if an impact is occurring, these are discussed in the following paragraphs.

ABC Method

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, depending on context.

BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 9.1 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors.

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
Evenings and weekends D	55	60	65
Night-time (23:00 to 07:00hrs)	45	50	55

Table 9.1: Example Threshold of Significant Effect at Dwellings

A. Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D. 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5 dB. If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur. It should be noted that this assessment method is only valid for residential properties and if applied to commercial premises without consideration of other factors may result in an excessively onerous thresholds being set.

The closest neighbouring noise sensitive properties to the proposed development are within a new residential development, some 25m to the south of the site, currently under construction, which will present future noise sensitive receivers. Other residential receptors include a dwelling approximately 35m to the north of the proposed development site and dwellings located above retail properties approximately 35m to the east of the proposed development site.

Fixed Limits

Several commercial units are located 20-30m to the west of the subject site.

When considering non-residential receptors, reference is made to BS 5228-1:2009+A1:2014, which gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. For example, paragraph E.2 states: -

> *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."*

Paragraph E.2 goes on to state: -

> *"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: -*
>
> > *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
> >
> > *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

Proposed Threshold Noise Levels

Taking into account the proposed documents outlined above and making reference to the baseline noise environment monitored around the development site (see Section 9.3), BS 5228-1:2009+A1:2014 has been used to inform the assessment approach for construction noise in line with the DCC GPG.

The following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development: -

- For residential NSLs it is considered appropriate to adopt 65 - 75 dB(A) CNT depending on location. Given the baseline monitoring carried out, it would indicate that Category A and C values are appropriate using the ABC method.
- For commercial NSLs it is considered appropriate to adopt the 75 dB(A) CNT, given the urban environment in which the closest commercial properties reside, in line with BS 5228-1:2009+A1:2014 and DCC GPG.

Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 9.2 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of *DMRB: Noise and Vibration* and adapted to include the relevant significance effects from the *EPA Guidelines* (EPA 2017).

Guidelines for Noise Impact Assessment Significance (DMRB)	CNT per Period	EPA EIAR Significance Effects	Determination
Negligible	Below or equal to baseline noise level	Not Significant	Depending on CNT, duration & baseline noise level
Minor	Above baseline noise level and below or equal to CNT	Slight to Moderate	
Moderate	Above CNT and below or equal to CNT +5 dB	Moderate to Significant	
Major	Above CNT +5 to +15 dB	Significant, to Very Significant	
	Above CNT +15 dB	Very Significant to Profound	

Table 9.2: Construction Noise Significance Ratings

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

9.2.1.3 Construction Phase – Noise Impacts

In order to assist with the interpretation of construction traffic noise, Table 9.3 includes guidance as to the likely magnitude of impact associated with changes in traffic noise levels along an existing road. This is taken from Table 3.17 of the *DMRB Noise and Vibration* (UKHA 2020).

Magnitude of Impact	Increase in Traffic Noise Level (dB)
Negligible	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

Table 9.3: Likely Effect Associated with Change in Traffic Noise Level – Construction Phase

In accordance with the *DMRB Noise and Vibration*, construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights;
- A total number of days exceeding 40 in any six consecutive months.

9.2.2 Construction Phase – Vibration

Vibration standards address two aspects: those dealing with cosmetic or structural damage to buildings and those with human comfort. For the purpose of this scheme, the range of relevant criteria used for surface construction works for both building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s.

9.2.2.1 Building Damage

With respect to vibration, *British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration* recommends 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. It is therefore common, on a cautious basis to use this lower value. Taking the above into consideration the vibration criteria in Table 9.4 are recommended.

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:		
Less than 15Hz	**15 to 40Hz**	**40Hz and above**
12 mm/s	20 mm/s	50 mm/s

Table 9.4: Recommended Vibration Criteria During Construction Phase

Expected vibration levels from the construction works will be discussed further in Section 9.5.

9.2.2.2 Human Perception

People are sensitive to vibration stimuli at levels orders of magnitude below those which have the potential to cause any cosmetic damage to buildings. There are no current standards which provide guidance on typical ranges of human response to vibration in terms of PPV for continuous or intermittent vibration sources.

BS5228-2:2009+A1:2014, provides a useful guide relating to the assessment of human response to vibration in terms of the PPV. Whilst the guide values are used to compare typical human response to construction works, they tend to relate closely to general levels of vibration perception from other general sources.

Table 9.5 below summarises the range of vibration values and the associated potential effects on humans.

Vibration Level, PPV	Effect
0.140mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3mm/s	Vibration might be just perceptible in residential environments.
1mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.

Table 9.5: Guidance on Effects of Human Response to PPV Magnitudes

Vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin and or the duration of vibration is known. For example, ground breaking can typically be tolerated at vibration levels up to 2.5 mm/s if adequate public relations are in place and timeframes are known. These values refer to the day-time periods only.

During surface construction works (demolition and ground breaking etc.) the vibration limits set within Table 9.5 would be perceptible to building occupants and have the potential to cause subjective effects. The level of effect is, however, greatly reduced when the origin and time frame of the works are known and limit values relating to structural integrity are adequately communicated. In this regard, the use of clear communication and information circulars relating to planned works, their duration and vibration monitoring can significantly reduce vibration effects to the neighbouring properties.

Interpretation of the Human Response to Vibration

In order to assist with interpretation of vibration thresholds, Table 9.6 presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS5228-2:2009+A1:2014.

Criteria	Impact Magnitude	Significance Rating
≥10 mm/s PPV	Very High	Very Significant
≥1 mm/s PPV	High	Moderate to Significant
≥0.3 mm/s PPV	Medium	Slight to Moderate
≥0.14 mm/s PPV	Low	Not significant to Slight
Less than 0.14 mm/s PPV	Very Low	Imperceptible to Not significant

Table 9.6: Human Response Vibration Significance Ratings

9.2.3 Operational Phase – Noise

9.2.3.1 Mechanical Plant

The most appropriate standard used to assess the impact of a new continuous source (i.e. plant items) to a residential environment is BS 4142 *Methods for rating and assessing industrial and commercial sound* (2014). This standard describes a method for assessing the impact of a specific noise source at a specific location with respect to the increase in "background" noise level that the specific noise source generates. The standard provides the following definitions that are pertinent to this application:

- "*Specific sound level,* $L_{Aeq,\ Tr}$" is equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, *T*. This level has been determined with reference to manufacturers information for specific plant items.

- "*Rating level*" $L_{Ar,Tr}$ is the specific noise level plus adjustments for the character features of the sound (if any), and;

- *"Background noise level"* is the A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T.* This level is expressed using the L_{A90} parameter. These levels were measured as part of the baseline survey.

The assessment procedure in BS4142: 2014 is outlined as follows:

1. determine the specific noise level;
2. determine the rating level as appropriate;
3. determine the background noise level, and;
4. subtract the background noise level from the specific noise level in order to calculate the assessment level.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. A difference of +10 dB or more is likely to be an indication of a significant adverse impact. A difference of around +5 dB is likely to be an indication of an adverse impact, dependent on the context. Where the rated plant noise level is equivalent to the background noise level, noise impacts are typically considered to be neutral.

9.2.3.2 Additional Vehicular Traffic on Surrounding Roads

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the development will make use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development. In order to assist with the interpretation of the noise associated with additional vehicular traffic on public roads, Table 9.7 is taken from DMRB Design Manual for Roads and Bridges (DMRB), Highways England Company Limited, Transport Scotland, The Welsh Government and The Department for Regional Development Northern Ireland, (2020).

Change in sound Level (dB)	Subjective Reaction	Magnitude of Impact	EPA Glossary of Effects[1]
10+	Over a doubling of loudness	Major	Significant
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
3 – 4.9	Perceptible	Minor	Slight
0.1 – 2.9	Imperceptible	Negligible	Imperceptible
0	None	No Change	Neutral

Table 9.7: Significance in Change of Noise Level

The guidance outlined in Table 9.7 will be used to assess the predicted increases in traffic levels on public roads associated with the proposed development and comment on the likely long-term impacts during the operational phase.

13 EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017)

9.2.3.3 Vibration

The development is residential in nature, therefore it is not anticipated that there will be any impact associated with vibration during the operational phase.

9.2.3.4 Inward Noise – ProPG Planning & Noise

The Professional Practice Guidance on Planning & Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a government document, since its adoption it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk-based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 - Comprises a high-level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- Stage 2 – Involves a full detailed appraisal of the proposed development covering four *"key elements"* that include:
    - Element 1 - Good Acoustic Design Process;
    - Element 2 - Noise Level Guidelines;
    - Element 3 - External Amenity Area Noise Assessment
    - Element 4 - Other Relevant Issues

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. Figure 9.1 presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

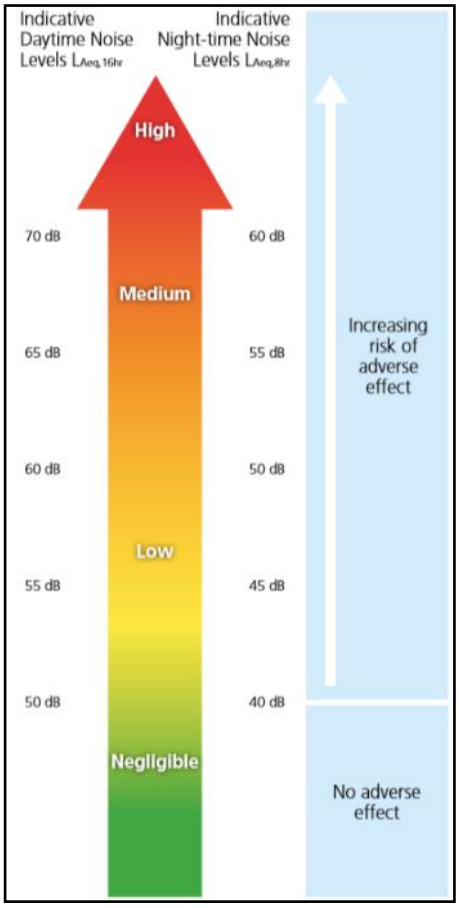

Figure 9.1: ProPG Stage 1 - Initial Noise Risk Assessment

It should be noted that a site should not be considered a negligible risk if more than 10 L_{AFmax} events exceed 60 dB during the night period and the site should be considered a high risk if the L_{AFmax} events exceed 80 dB more than 20 times a night.

Element 2 of the ProPG document sets out recommended internal noise targets derived from BS 8233 (2014). The recommended indoor ambient noise levels are set out in Table 9.8 and are based on annual average data, that is to say they omit occasional events where higher intermittent noisy events may occur.

Activity	Location	Day (07:00 to 23:00hrs) dB $L_{Aeq,16hr}$	Night (23:00 to 07:00hrs) dB $L_{Aeq,8hr}$
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 $L_{Aeq,8hr}$ 45 dB $L_{Amax,T}$*

Table 9.8: ProPG Internal Noise Levels

*Note The document comments that the internal $L_{AFmax,T}$ noise level may be exceeded no more than 10 times per night without a significant impact occurring.

In addition to these absolute internal noise levels ProPG provides guidance on flexibility of these internal noise level targets. For instance, in cases where the development is considered necessary or desirable, and noise levels exceed the external noise guidelines, then a relaxation of the internal L_{Aeq} values by up to 5 dB can still provide reasonable internal conditions.

ProPG provides the following advice with regards to external noise levels for amenity areas in the development:

> *"The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."*

9.2.3.5 Inward Noise – Aircraft Noise

The proposed development site is located within Airport Noise Zone D. While the site is situated within Dublin City Council (DCC) bounds, it is appropriate to reference the Fingal County Council (FCC) guidance documents.

Fingal Development Plan Policy on Aircraft Noise

The members of Fingal County Council resolved to adopt Variation No. 1 of the Fingal Development Plan 2017-2023 at a Council meeting on 9 December 2019. Variation No. 1 outlines revised Noise Zones and policy objectives in relation to aircraft noise from Dublin Airport.

Four noise zones (Zone A to D) are now indicated representing potential site exposure to aircraft exposure. The council will actively resist residential development within Zone A, and resist in Zone B and C pending independent acoustic advice and mitigation measures. Certain specific residential developments located in Zone D may be required to demonstrate that aircraft noise intrusion has been considered in the design.

Table 1 below outlines the objectives to be adhered to by applicants for developments in Zone D.

Zone	Indication of Potential Noise Exposure during Airport Operations	Objective
D	≥ 50 dB and < 54 dB $L_{Aeq,\ 16hr}$ and ≥ 40 dB and < 48 dB L_{night}	**To identify noise sensitive developments which could potentially be affected by aircraft noise and to identify any larger residential developments in the vicinity of the flight paths serving the Airport in order to promote appropriate land use and to identify encroachment.** *All noise sensitive development within this zone is likely to be acceptable from a noise perspective. An associated application would not normally be refused on noise grounds, however where the development is residential-led and comprises non residential noise sensitive uses, or comprises 50 residential units or more, it may be necessary for*

Zone	Indication of Potential Noise Exposure during Airport Operations	Objective
		the applicant to demonstrate that a good acoustic design has been followed. *Applicants are **advised** to seek expert advice.*

Table 9.9: Aircraft Noise Zones Objectives

In line with the above objectives, aircraft noise is therefore considered as part of this assessment. Figure 9.2 illustrates the development location in the context of the future airport noise zones.

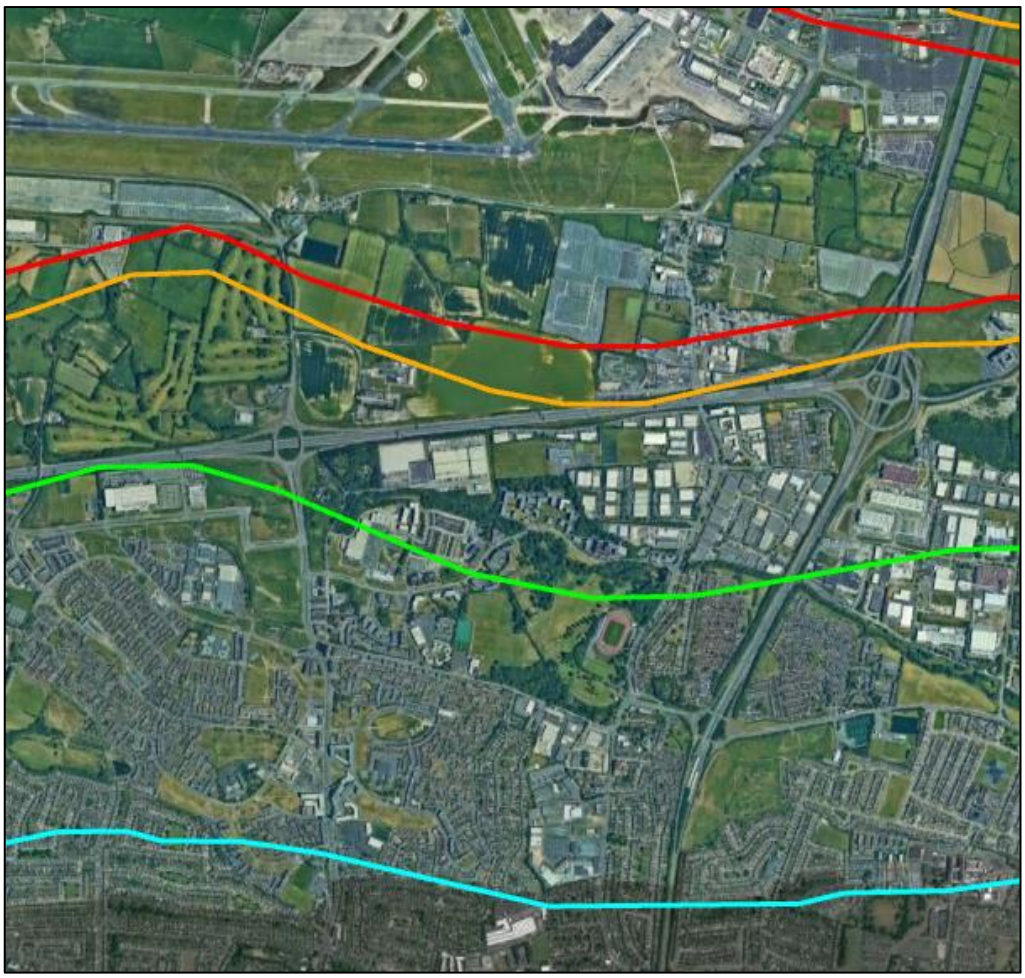

Figure 9.2: Development Location in the Context of Aircraft Noise

9.3 Receiving Environment

The subject site is located within the Dublin 9 area, bound to the north by Santry Avenue, to the east by Swords Road, to the west by existing commercial buildings within the Santry Avenue Industrial Estate and to south by a residential development that is nearing completion. The surrounding environment in the vicinity of the development site is mixed in nature with retail units and warehousing making up the majority of the surrounding building uses.

9.3.1 Baseline Noise Environment

Baseline noise monitoring has been undertaken across the development site to determine the range of noise levels at varying locations across the site.

9.3.1.1 Environmental Noise Survey

An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise.* Specific details are set out below.

Choice of Measurement Locations

The measurement locations are described below and shown in Figure 9.2.

N1 located to the east of the site in Santry Villas residential estate.
N2 located to the south of the site at a small commercial park.
N3 located to the west of the site within Santry Avenue Industrial Estate.
N4 unattended noise monitor located inside the north-eastern site boundary adjacent to the Santry Avenue Junction.

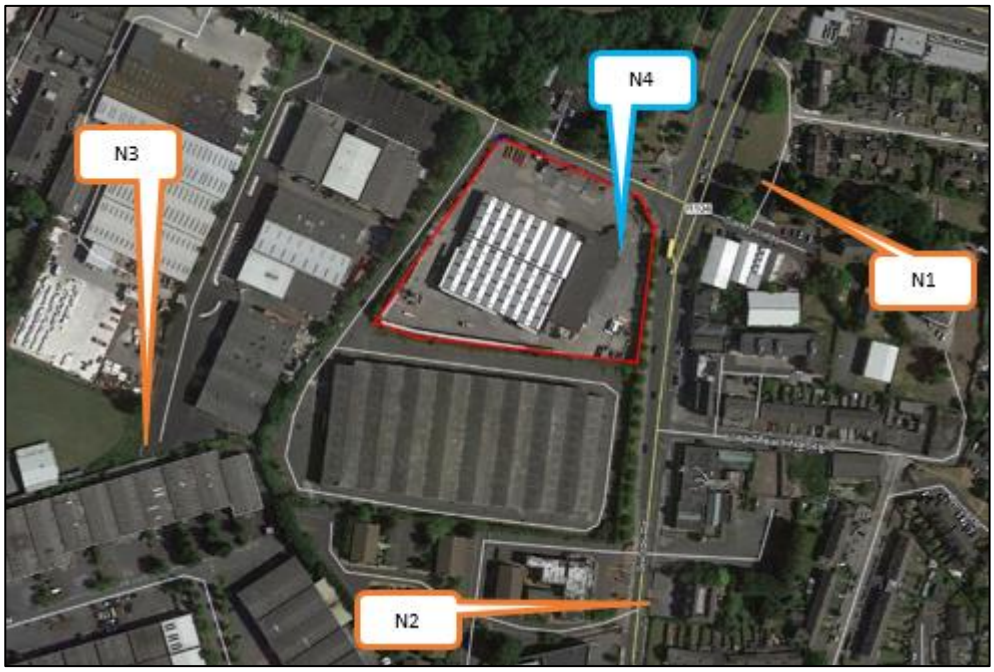

Figure 9.3: Noise Monitoring Locations (Image Source: Google Maps)

Survey Periods

The noise survey was carried out over the following periods:

Aspect	Survey Position	Survey Period
Noise	N1	11:55hrs to 13:49hrs on 30 July 2020
	N2	
	N3	
	N4 (unattended)	11:22hrs on 30 July to 09:36hrs on 6 August 2020

Table 9.10: Survey Periods

Instrumentation

The noise measurements were carried out using the equipment listed below. The instrument was calibrated before and after the survey with no significant drift noted.

Measurement	Manufacturer	Equipment Model	Serial Number	Calibration date
Sound Level Meter	Rion	NL-52	1644 26	5 May 2020
Sound Level Meter	Rion	NL-52	1076 328	15 August 2018
Calibrator	Brüel & Kjær	Type 4231	3010 369	14 January 2020

Table 9.11: Noise Monitoring Equipment Details

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.

Survey Results and Discussion

The results of the noise survey at the four monitoring locations are summarised below.

Location N1

At this location, the primary noise sources were observed to be vehicles passing on the Swords Road, occasional local traffic within the residential estate, distant construction noise and aircraft noise. Traffic noise from junctions with Santry Avenue and the R104 also contributed to measured noise levels. Ambient noise levels were in the range of 56 to 58 dB L_{Aeq}. Background noise levels were in the range of 52 to 54 dB L_{A90}.

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
30 July 2020	11:55	58	70	54
	12:54	58	72	53
	13:54	56	68	52

Table 9.12: Measured Noise Levels at N1

Location N2

At this location the primary noise sources were observed to be traffic noise on the Swords Road, movements within the carpark of the commercial park. Construction noise from adjacent sites and passing pedestrian activity also contributed to measured levels to vary degrees. Ambient noise levels were of the order of 69 dB L_{Aeq}. The elevated max level of 95 dB was caused by a passing pedestrian talking loudly in close proximity to the microphone. Background noise levels were in the range of 59 to 60 dB L_{A90}.

Date	Time	Measured Noise Levels (dB re. $2x10^{-5}$Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
30 July 2020	12:16	69	85	60
	13:14	69	88	59
	14:13	69	95	60

Table 9.13: Measured Noise Levels at N2

Location N3

At this location the primary noise sources were observed to be from distant vehicle movements along Santry Avenue and the Swords Road, as well as distant construction. Aircraft, birdsong and birdcall were also noted to be contributing to measured noise levels. Ambient noise levels were in the range of 51 to 57 dB L_{Aeq}. Background noise levels were in the range of 46 to 47 dB L_{A90}.

Date	Time	Measured Noise Levels (dB re. 2x10^{-5}Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
30 July 2020	11:33	57	78	46
	12:35	57	83	47
	13:34	51	69	46

Table 9.14: Measured Noise Levels at N3

Location N4

The unattended measurements collected over the survey period are summarised below.

Date	Period	Measured Noise Levels (dB re. 2x10^{-5} Pa)		
		L_{Aeq}	L_{Amax}	L_{A90}
30 July	Day	63	100	56
	Night	57	90	48
31 July	Day	63	93	56
	Night	55	75	45
1 August	Day	61	91	54
	Night	55	80	44
2 August	Day	60	86	53
	Night	55	77	45
3 August	Day	60	96	52
	Night	57	84	44
4 August	Day	62	87	57
	Night	55	76	45
5 August	Day	63	95	56
	Night	56	80	45
Average	Day	62	93	55
	Night	56	80	45

Table 9.15: Measured Noise Levels at N4

On installation and collection at this location the primary noise sources were observed to be traffic noise on Swords Road and Santry Avenue. Activities relating to the day-to-day operation of a commercial trade business currently in operation on the site also contributed to daytime measured noise. Daytime ambient noise levels ranged from 60 to 63 dB L_{Aeq} with an average of 62 dB L_{Aeq}. Daytime background noise levels ranged from 52 to 57 dB L_{A90} with an average of 55 dB L_{A90}.

Night-time ambient noise levels ranged from 55 to 57 dB L_{Aeq} with an average of 56 dB L_{Aeq}. Night-time background noise levels ranged from 44 to 48 dB L_{A90} with an average of 45 dB L_{A90}. Night-time maximum noise levels were in the range of 75 to 90 dB L_{Aeq} with an average of 80 dB.

In addition, the L_{AFmax} values were measured over 15-minute intervals over the duration of the unattended monitoring survey. Figure 9.3 presents the number of measured L_{AFmax} events for each decibel level during the night period measured at Location N4. On review of the maximum noise levels the value of 74 dB L_{AFmax} is not regularly exceeded on a given night (less than 10 events).

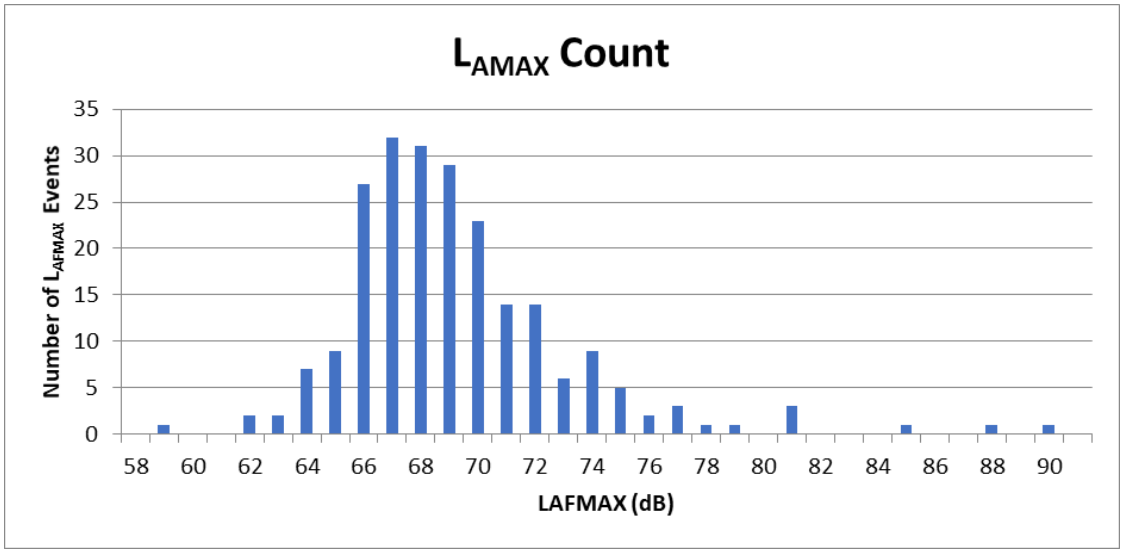

Figure 9.4: Distribution of L_{Amax} events – Night-time

It is noted that the baseline noise survey was carried out during the Covid-19 Pandemic. Due to restrictions applied during the pandemic period it is possible that road traffic levels were not typical of *'normal'* levels. In the interest of providing the most robust assessment reference has also been made to the noise maps prepared by Transport Infrastructure Ireland (TII). The following noise maps have been referred to when carrying out the desk-top assessment of the baseline noise environment:

- Round 3 Noise Maps for Roads – Dublin Agglomeration, and;
- Round 3 Noise Maps for Rail – Dublin Agglomeration.

The above noise maps are provided for the overall day evening night period in terms of L_{den} and for the night-time period in terms of $L_{night.}$

All data has been sourced from the EPA Mapping website.[14]

Figures 9.5 and 9.6 present the predicted noise levels across the development site for road traffic in terms of L_{den} and L_{night}.

[14] EPA Mapping website http://gis.epa.ie.

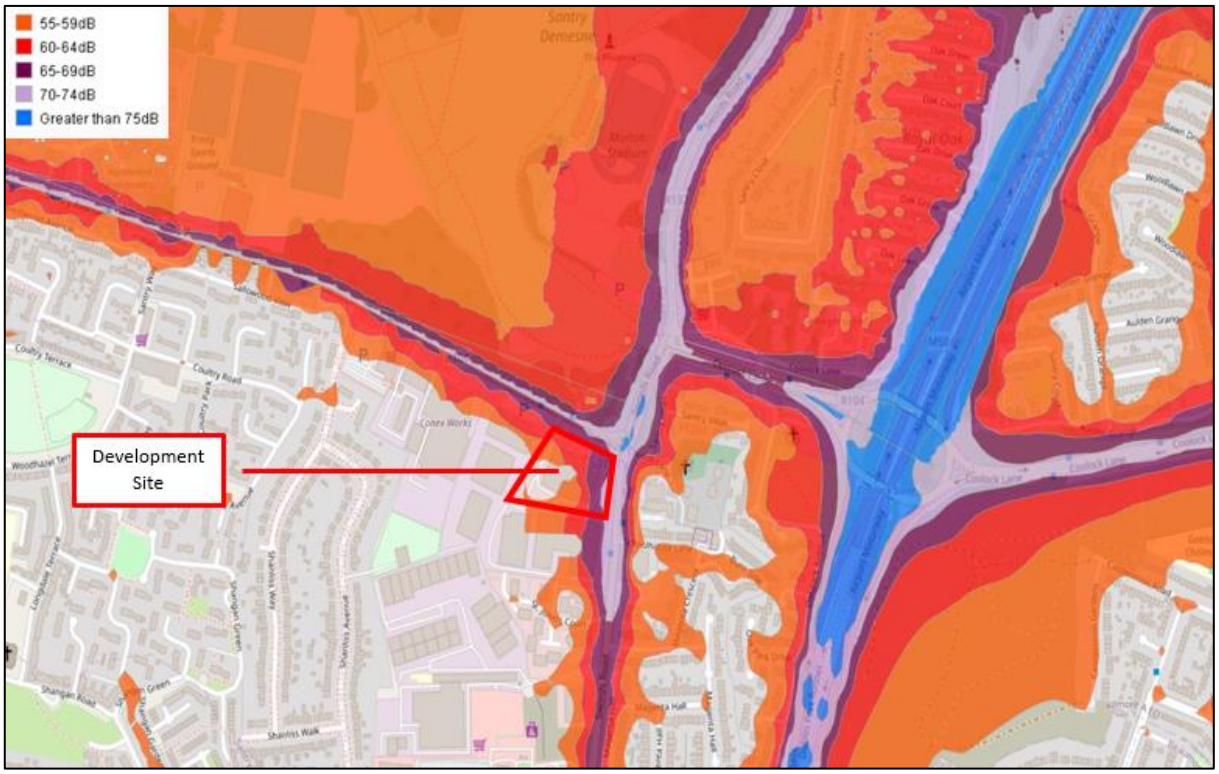

Figure 9.5: L_{den} Road Traffic Noise Levels

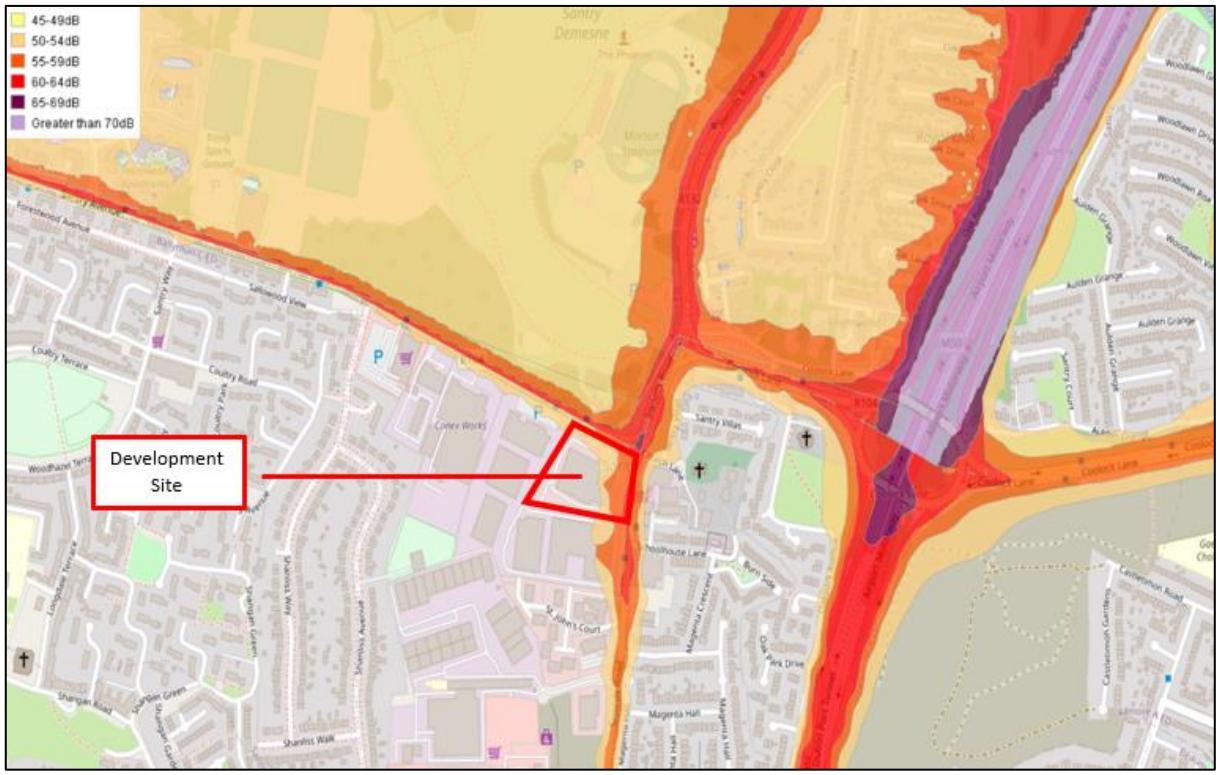

Figure 9.6: L_{Night} Road Traffic Noise Levels

A review of the noise maps has confirmed that measured daytime levels from the baseline noise survey may be below the noise levels arising from traffic in *'normal'* times. Night-time noise levels were in-line with those measured during the baseline noise survey. Therefore, in order to provide a robust assessment, 3 dB will be added to measured daytime baseline noise levels. This is assumed as a worst-case scenario as with road traffic noise, typically a 25% increase in volumes would be required to give rise to a 1 dB increase in noise levels.

Survey Summary

The baseline noise levels were typical of an urban location. At Location N2 the noise environment was dominated by traffic on the Swords Road. At N1 and N3 the noise environment was dictated more so by local sources such as pedestrian and vehicular activity around residential units and industrial buildings, with traffic noise from the Swords Road and its junctions with the R104 and Santry Avenue at N1 and distant construction from numerous sites surrounding Location N3 contributing to background noise levels.

9.3.1.2 Do Nothing Scenario

In the absence of the proposed development being constructed, the noise environment at the nearest noise sensitive locations and within the development site will remain largely unchanged.

9.4 Characteristics of the Proposed Development

9.4.1 General Characteristics

The proposed development is located on the Chadwicks Santry site (formerly Heiton Buckley) and consists of circa 350 no. dwelling units, ground floor amenity and retail spaces and all associated ancillary site development works. A detailed description of the development is provided in Chapter 3 (Project Description).

When considering a development of this nature, the potential noise and vibration impact on the surroundings is considered for each of two distinct stages:

- Construction and demolition phase; and,
- Operational phase.

The construction phase will involve demolition, excavation over the development site, construction of foundations and buildings, landscaping, and vehicle movements to site using the local road network. This phase will generate the highest potential noise impact due to the works involved, however the time frame is short term in nature.

The primary sources of outward noise in the operational context are deemed to be long term in duration and will comprise traffic movements to the development site using the existing road network and plant noise emissions from the completed buildings. These issues are discussed in detailed in the following sections.

Inward noise incident on the development from existing noise sources, namely road traffic and aircraft noise, has also been assessed.

9.5 Potential Impacts

The potential noise and vibration impacts associated with the construction and operational phases of the proposed development are discussed in the following sections.

9.5.1 Construction Phase

9.5.1.1 Noise

During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, dumper trucks, compressors and generators. AWN has been advised that initial site investigations indicate that it is not anticipated that piling will be required during the construction of building foundations.

Due to the nature of daytime activities undertaken on a construction site of this nature, there is potential for generation of significant levels of noise. The flow of vehicular traffic to and from a construction site is also a potential source of relatively high noise levels.

Taking into account the outline construction programme, it is possible to predict typical noise levels using guidance set out in BS 5228-1:2009+A1:2014. Table 9.15 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme.

Activity	Item of Plant *(BS5228 Ref)*	L_{Aeq} at 10m
Site Clearance/Demolition	Tracked excavator (C2.21)	71
	Dump Truck (C2.30)	79
	Concrete Breaker (C1.4)	85
	Tracked Mobile Crane (C4.50)	71
	Tracked Crusher (C1.14)	82
General Construction	Dump Truck (C2.30)	79
	Tracked excavator (C2.21)	71
	Compressor (D7.8)	70
	Telescopic Handler (C4.54)	79
	Hand-Held Circular Saw (C4.72)	79
	Diesel Generator (C4.76)	61
	Internal Fit out	70
Road Works/Landscaping	Asphalt Paver & Tipping Lorry (C5.30)	75
	Electric Water Pump (C5.40)	68
	Vibratory Roller (C5.20)	75

Table 9.16 Reference Plant Noise Emissions

The calculations also assume that the equipment will operate for 66% of the 12-hour working day (i.e. 8 hours) and that a standard site hoarding, typically 2.4m height will be erected around the perimeter of the construction site for the duration of works. It is assumed that construction works will take place during normal working hours only.

The closest noise sensitive locations have been identified as shown in Figure 9.7 and described below.

NSL 1 A residential development currently under construction at Santry Place some 25m from the nearest significant site works;
NSL 2 Residential units above retail units on the Swords Road some 35m from the nearest significant site works;
NSL 3 A residential dwelling located to the north of the proposed site some 35m from the nearest significant site works; and,
NSL4 Commercial units, some 30m from the nearest significant site works, located to the west of site.

Review of the baseline noise survey and the Construction Noise Thresholds detailed in Section 9.2.1.2 indicates that the appropriate daytime CNTs for construction noise at residential properties are as follows:

- NSL 1: 65 dB $L_{Aeq,1hr}$
- NSL 2: 75 dB $L_{Aeq,1hr}$
- NSL 3: 65 dB $L_{Aeq,1hr}$

The following CNT has been applied to NSL4:

- NSL 4: 75 dB $L_{Aeq,1hr}$

It is assumed that construction works will take place during normal working hours only.

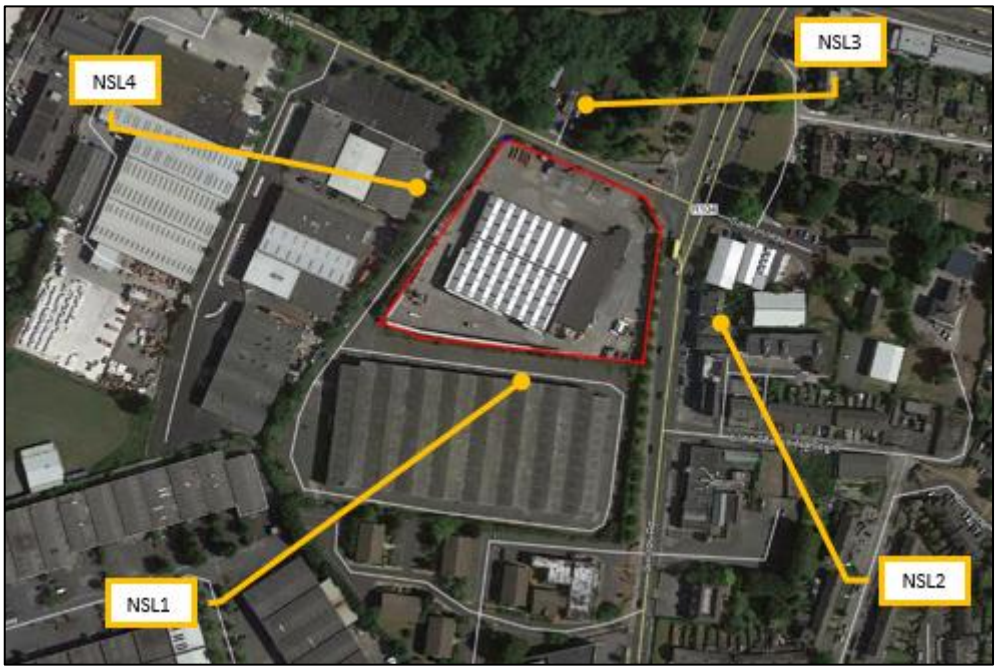

Figure 9.7: Site Context & Noise Assessment Locations (Image Source: Google Maps)

Table 9.17 below presents the predicted daytime noise levels from an indicative construction period at these noise sensitive locations (NSLs).

Construction Phase	Item of Plant (*BS 5228-1* Ref)	L_{Aeq} at distance (m)			
		NSL1 (25m)	NSL2 (35m)	NSL3 (35m)	NSL4 (30m)
Site Clearance and Demolition	Tracked excavator (C2.21)	56	**53**	**53**	55
	Dump Truck (D2.30)	64	**61**	**61**	63
	Concrete Breaker (C4.76)*	68	65	65	66
	Tracked Mobile Crane (C4.50)	61	58	58	60
	Tracked Crusher (C1.4)	67	64	64	66
	Cumulative Site Clearance and Demolition	**72**	**69**	**69**	**71**
General Construction	Dump Truck (C2.30)	64	61	61	63
	Tracked excavator (D2.21)	56	53	53	55
	Compressor (D7.08)	55	52	52	54
	Telescopic Handler (C4.54)	64	61	61	63

Construction Phase	Item of Plant (*BS 5228-1* Ref)	L_{Aeq} at distance (m)			
		NSL1 (25m)	NSL2 (35m)	NSL3 (35m)	NSL4 (30m)
	Hand Held Circular Saw (C4.72)	64	61	61	63
	Diesel Generator (C4.76)	46	43	43	45
	Internal Fit out	55	52	52	54
	Cumulative General Construction	**70**	**67**	**67**	**68**
Road Works/ Landscaping	Asphalt Paver & Tipping Lorry (C5.30)	60	57	57	59
	Electric Water Pump (C5.40)	53	50	50	52
	Vibratory Roller (C5.20)	60	57	57	59
	Cumulative Landscaping and Road Works	**64**	**61**	**61**	**62**

*An on-time of 40% has been assumed for concrete breaking during demolition.

Table 9.17: Indicative Construction Noise Levels at Nearest Noise Sensitive Locations

At a distance of 25m from areas of major construction, representative of NSL1, the predicted construction noise levels associated with breaking and crusher activities are above the 65 dB(A) CNT. The impact of this, assuming breaking and crushing occurring at the same time is negative, significant to very significant and temporary. Other activities are predicted to be under the CNT and therefore with reference to Table 9.2, it is expected that there will be a negative, moderate to significant and short-term impact associated with general construction, and a negative, slight to moderate and temporary impact associated. These predicted effects are presented in the absence of mitigation measures.

At a distance of 35m from areas of major construction, representative of NSL2, the predicted construction noise levels are in-line and below the CNT, i.e. 75 dB(A) and therefore it is expected that there will be a negative, moderate and short-term impact at this location in the absence of mitigation.

At a distance of 35m from areas of major construction, representative of NSL3, taking into account the measured ambient noise levels and the derived CNT, i.e. 65 dB(A), the individual construction activities noted in Table 9.16 are predicted to be in line or below the CNT. Considering a worst case scenario whereby several of these activities may occur at the same time, a negative, moderate to significant and short-term impact is predicted, in the absence of mitigation.

Predicted noise levels at the commercial units to the west of the site are below the CNT adopted for non-residential receptors, i.e. 75 dB(A). Therefore a significant impact is not predicted.

At greater distances predicted construction noise levels are lower, therefore any impact is expected to be negative, moderate and short-term.

Construction Traffic

The noise levels associated with mobile plant items such as concrete mixer trucks, loaders etc. operational on site have been included as part of the construction noise assessment and calculated noise levels in Table 9.18. Consideration should also be given to the addition of construction traffic along the site access routes. Access to the development site for construction traffic will be via the site entrance on Santry Avenue to the north-east of the site.

It is possible to calculate the noise levels associated with the passing vehicle using the following formula.

$$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 10\log_{10}(r_1/r_2)\ dB$$

where:

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T in seconds);
L_{AX} is the "A-weighted" Sound Exposure Level of the event considered(dB);
N is the number of events over the course of time period T;
r_1 is the distance at which L_{AX} is expressed;
r_2 is the distance to the assessment location.

A calculation distance of 5m from the road has been used to assess noise levels at the closest buildings along the construction routes. The mean value of Sound Exposure Level for truck moving at low to moderate speeds (i.e. 15 to 45km/hr) is of the order of 82dB L_{AX} at a distance of 5 metres from the vehicle. This figure is based on a series of measurements conducted under controlled conditions.
The construction vehicle numbers for the various construction phases are summarised below:

Construction Phase	No. of trucks/peak hour	Calculated Noise level at edge of road (5m), dB $L_{Aeq,1hr}$
Site Clearance	12	61
Excavation	12	61
General Construction	8	60

Table 9.18: Calculated Construction Traffic Noise Levels at Edge of Road

The predicted noise level associated with construction vehicle traffic numbers above is in the range 60-61 dB $L_{Aeq,1hr}$. This level is below the construction noise threshold and the prevailing noise levels along the Swords Road and Santry Avenue, and would result in a negative, slight and short-term impact.

9.5.1.2 Vibration

During demolition and ground-breaking in the excavation phase, there is potential for vibration to propagate through the ground. Empirical data for this activity is not provided in the BS 5228-2:2009+A1:2014 standard, however the likely levels of vibration from this activity is expected to be below the vibration threshold for building damage on experience from other sites.

AWN have previously conducted vibration measurements under controlled conditions, during trial construction works, on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator
- 6 tonne hydraulic breaker on large Liebherr tracked excavator

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 Tonne Breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10 to 50m respectively from the breaking activities. Using a 6 Tonne Breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10 to 50m respectively.

The range of values recorded provides some context in relation typical ranges of vibration generated by construction breaking activity likely required on the proposed site. This range of vibration magnitudes indicate vibration levels at the closest neighbouring buildings are likely to be below the limits set out in Table 9.4 to avoid any cosmetic damage to buildings.

In terms of disturbance to building occupants, works undertaken within close proximity to the residential receptors on the site perimeter have the potential to emit perceptible vibration levels.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration threshold set out in Table 9.4 during all activities. Further discussion on mitigation measures during this phase are discussed in Section 9.6.1.

It is anticipated that excavations will be made using standard excavation machinery, which typically do not generate appreciable levels of vibration close to the source. Taking this into account and considering the distance that these properties are from the works and the attenuation of vibration levels over distance, the resultant vibration levels are expected to be well below a level that would cause disturbance to building occupants or even be perceptible.

9.5.2 Operational Phase

9.5.2.1 Mechanical Plant

Building and mechanical services plant items are proposed that will serve the apartments and ground floor commercial/retail units.

The selection of building services plant will ensure that noise levels comply with the criteria described in Section 9.2.3.1. It is acknowledged that the selection of the specific plant items is subject to change during the detailed design stage, and this is normal industry practice. However, noise from any new plant items will be designed and/or controlled so as not to give rise to any adverse effects at the nearest noise sensitive locations.

9.5.2.2 Additional Traffic on Adjacent Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site on some surrounding roads.

A traffic impact assessment relating to the proposed development has been prepared by DBFL Consulting Engineers, as part of this EIAR. Using this information, the related noise impacts along the relevant road links has been assessed.

Figure 9.8 below outlines the breakdown of sections of road and Table 9.19 displays the predicted change in noise level at different road links around the site for the year of opening and the design year using the Annual Average Daily Traffic (AADT) flows along the road links under consideration.

Figure 9.8: Traffic Assessment – Road Links

Road Link	Opening Year (2022)		
	AADT Without Development	AADT With Development	Change in Noise Level (dB)
A	12,562	12,821	+ 0.1
B	1,608	2,126	+1.2
C	12,562	12,821	+ 0.1
D	12,261	12,517	+ 0.1
E	19,894	22,676	+0.6
F	425	476	+0.5
G	20,740	20,834	0.0
H	20,548	20,706	0.0
I	20,429	20,572	0.0
Road Link	**Design Year (2037)**		
	AADT Without Development	**AADT With Development**	**Change in Noise Level (dB)**
A	14,508	14,770	+0.1
B	1,608	2,126	+1.2
C	14,508	14,770	+0.1
D	14,305	14,561	+0.1
E	25,934	26,045	0.0
F	489	541	+0.4
G	23,881	23,974	0.0
H	23,852	28,365	+0.8
I	23,733	23,876	0.0

Table 9.19: Predicted Change in Noise Level associated with Vehicular Traffic

For the opening year (2022) traffic flows, the predicted changes in noise level along the road links range from +0.0 to +1.2 dB. For the design year (2037) traffic flows, the predicted changes in noise level along the road links also range from +0.0 to +1.2 dB.

With reference to Table 9.7, the predicted change in noise level associated with additional traffic on the existing road network, is negligible in magnitude. The impact is therefore imperceptible and long term.

9.5.2.3 Inward Noise Assessment

The development lands in question are bounded to the north and east by Santry Avenue and Swords Road respectively. The site is also located some 2.6km south of Dublin Airport. Noise from road traffic and aircraft movements has the potential to impact on residential dwellings within the proposed development.

In order to establish noise levels across the development site an acoustic noise model was developed and calibrated against noise levels measured during the baseline study.

Noise Model of Study Area

Proprietary noise calculation software was used for the purposes of establishing the prevailing noise levels on the proposed site. The selected software, Brüel & Kjær Type 7810 Predictor, calculates noise levels in accordance with the *Calculation of Road Traffic Noise* (CRTN) issued by the UK Department of Transport in 1988. This is the standard recognised for the prediction of

road traffic noise by Transport Infrastructure Ireland (TII) and the *Environmental Noise Regulations 2006* SI/140 2006.

The following information was included in the model:

- Site layout drawings of proposed development;
- OS mapping of surrounding environment; and
- Annual Average Daily Traffic (AADT) along adjacent roads estimated from site calibration results.

Noise Model Validation

Noise levels recorded during the unattended survey were used to calibrate the noise model to within 1 dB of the calculated values. This is regarded as very strong correlation in respect of predicted noise levels. Noise levels are calculated over daytime periods, i.e. 07:00 to 23:00hrs and night-time periods, 23:00 to 07:00 hrs.

Location	Time Period	Measured Noise Level (dB)	Calculated Noise Level (dB)
NM4	Daytime, $L_{Aeq,16hr}$	65*	65
	Night-time, $L_{Aeq,8hr}$	56	55

*Note *3dB has been added to daytime measured noise levels as outlined in section 9.3.1.1*

Table 9.20: Calculated and Measured Noise Levels at Development Site

Figures 9.9 and 9.10 display the calculated noise contours across the site for day and night-time periods at a height of 4m above ground, i.e. the typical height of a first floor window.

The results of the modelling exercise demonstrate that highest noise levels are experienced along the north and east of the site in proximity to the road edges and reduce considerably by more than 10 dB towards the southwest part of the site, in the absence of any development buildings.

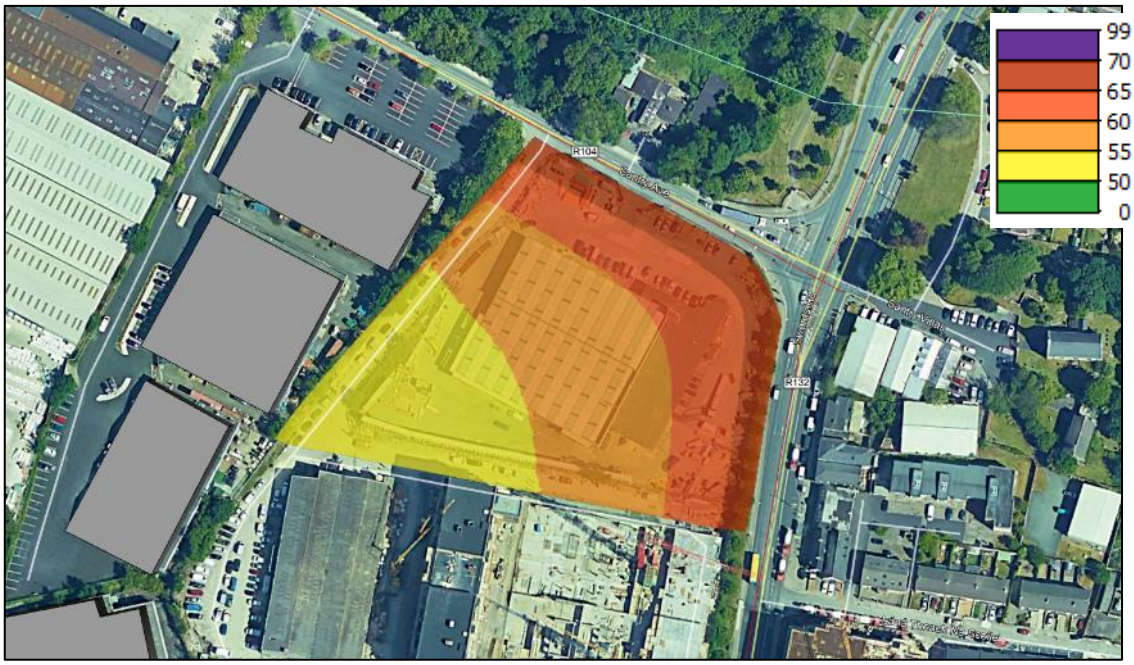

Figure 9.9: ProPg Stage 1 – Initial Noise Risk Assessment – Daytime

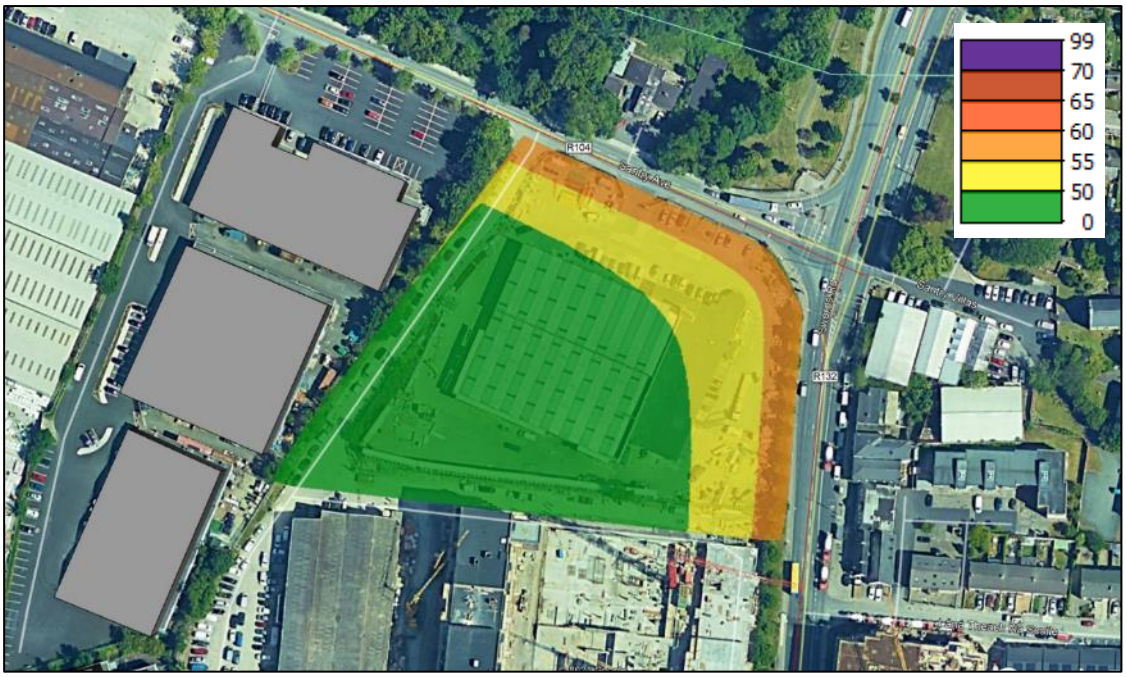

Figure 9.10: ProPg Stage 1 – Initial Noise Risk Assessment – Night-time

Giving consideration to the noise levels presented in the previous sections the initial site noise risk assessment has concluded that the level of risk across the site lies within the low to medium noise risk categories.

ProPG states the following with respect to low, medium and high risks areas:

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 the Acoustic Design Statement (following here and also in Section 9.6.3.4) is required to demonstrate that suitable care and attention has been applied in mitigating and minimising noise impact to such an extent that an adverse noise impacts 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."*

Following the guidance contained in ProPG, therefore, it does not preclude residential development on sites that are identified as having medium or high 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 suitably 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.

Acoustic Design Statement – Part 1

Façade Noise Levels

Noise levels have been predicted across the proposed development site during day and night-time periods using the noise model developed to include the development buildings. Figures 9.11 and 9.12 illustrate the predicted traffic noise levels for daytime and night-time.

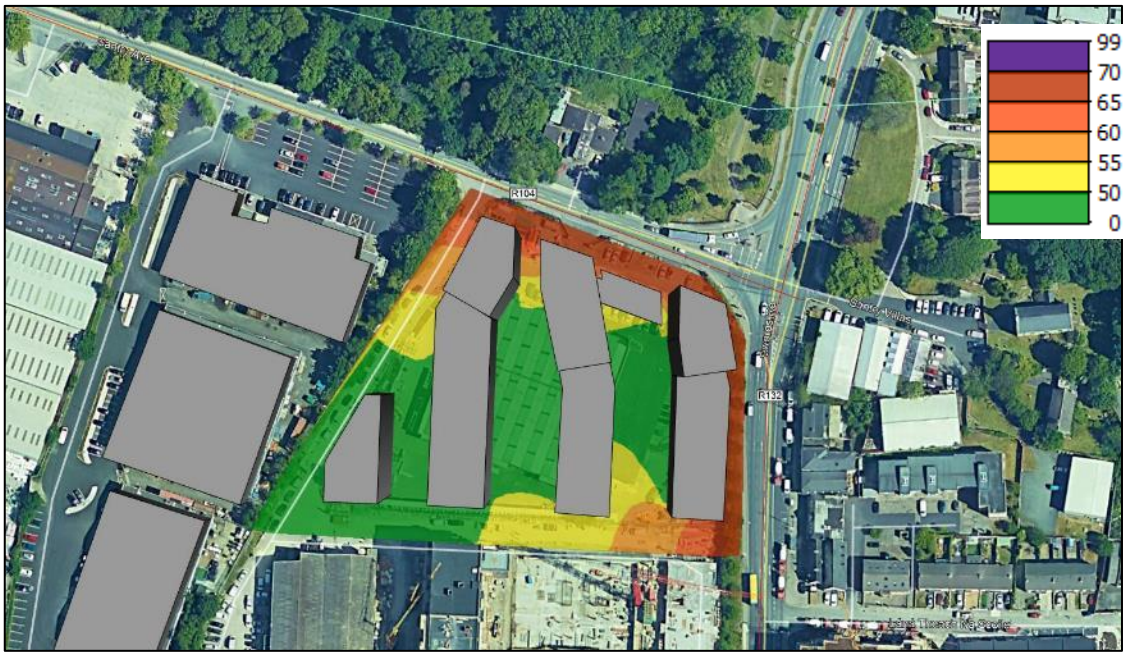

Figure 9.11: ProPg Stage 2 – Predicted Noise Levels – Daytime

Predicted daytime noise levels across the site range from 40 dB in sheltered areas, screened from road traffic, to 70 dB along the northern and eastern boundary which face on to Santry Avenue and Swords Road.

Predicted night-time noise levels across the site range from 29 dB in sheltered areas, screened from road traffic, to 60 dB along the northern and eastern boundary which face on to Santry Avenue and Swords Road.

Figure 9.12: ProPg Stage 2 – Predicted Noise Levels – Night-time

Where façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night it is possible to achieve reasonable internal noise levels while also ventilating the dwellings with open windows. Therefore, for those properties where the façade noise levels are less than 55 dB $L_{Aeq,16hr}$ during the day and 50 dB $L_{Aeq,8hr}$ at night no further mitigation is required.

Where façade levels are above these levels the sound insulation performance of the building façade becomes important and a minimum sound insulation performance specification is required for windows to ensure that when windows are closed the internal noise criteria are achieved.

Predicted noise levels on several facades are above a level whereby internal noise levels are achieved with standard double glazing and therefore mitigation in the form of enhanced glazing will be required. These facades include:

- Block A (northern façade, eastern façade, western façade - partial);
- Block B (eastern façade, southern façade);
- Block C (southern façade, eastern façade - partial);
- Block D (northern façade, western façade – partial, eastern façade - partial);
- Block E (northern façade, western façade, eastern façade – partial); and
- Block F (western façade – partial).

The specification of this enhanced façade is discussed in Section 12.6.3.

External Noise Levels

Figure 9.13 presents the calculated day time noise levels across the site with the development buildings in place. The contours are calculated for a height of 1.5m.

External noise levels within the vast majority of communal open spaces across the development site are within the recommended range of noise levels from ProPG of between 50 – 55 dB $L_{Aeq,16hr}$ as illustrated in Figure 9.13. It is considered that the objectives of achieving suitable external noise levels is achieved within the overall site, therefore no further mitigation is required to control external noise levels across amenity areas.

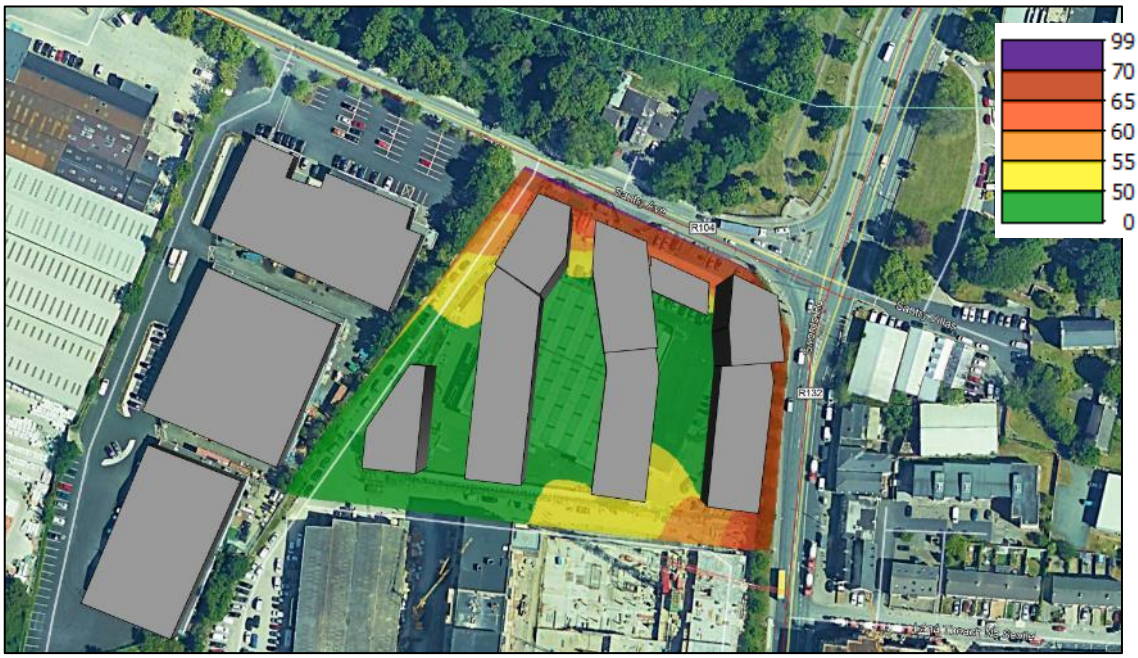

Figure 9.13: Predicted Noise Levels across External Areas (1.5m above ground)

Future Aircraft Noise Levels

Due to the location of the proposed development site, future aircraft noise levels have been reviewed in order to consider the potential for noise impacts on the development. The noise levels set out for Zone D have been determined not to pose a potential for noise impacts as the predicted worst case aircraft noise levels are sufficiently below prevailing noise levels across the development site, which is dictated by road traffic noise as presented in the above section.

9.6 Mitigation Measures

Mitigation measures for the construction phase are set out below in order to reduce potential impacts as far as practicable to within the adopted criteria for noise and vibration. These mitigation measures should be read in tandem with the specific noise mitigation measures in line with the DCC GPG for high risk sites, as presented in Appendix 9.1.

9.6.1 Construction Phase - Noise

The contract documents will clearly specify the construction noise criteria included in this chapter which the construction works must operate within. The Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise* and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001*. These measures will ensure that: -

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps that is required to operate outside of normal permitted working hours will be surrounded by an acoustic enclosure or portable screen.

BS 5228 -1:2009+A1 2014 includes guidance on several aspects of construction site practices, which include, but are not limited to: -

- selection of quiet plant;
- noise control at source;
- screening;
- liaison with the public, and;
- monitoring.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

9.6.1.1 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.

9.6.1.2 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.

Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be considered:

- Where practical, site compounds will be located in excess of 30m from noise sensitive receptors 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 dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling.
- For 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.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

9.6.1.4 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. Construction site hoarding will be constructed around the site boundaries as standard. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. The placement of site buildings such as offices and stores will be used, where feasible, to provide noise screening when placed between the source and the receiver.

9.6.1.5 Liaison with the Public

A designated environmental 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, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

9.6.1.6 Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*.

9.6.1.7 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. During excavation/ demolition or other high noise generating 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 prevent unacceptable disturbance at any time.

9.6.2 Construction Phase – Vibration

9.6.2.1 The vibration from construction activities will be limited to the values set out in Section 9.2. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

9.6.3 Operational Phase – Noise

9.6.3.1 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.

9.6.3.2 Mechanical Services Plant

Taking into account that sensitive receivers within the development are much closer than off-site sensitive receivers, once the relevant noise criteria 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.

9.6.3.4 Inward Noise

As is the case in most buildings, the glazed elements and ventilation paths of the building

envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. block work or concrete and spandrel elements) 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.

In this instance, the facades highlighted in Figure 9.14 will be provided with glazing and ventilation that achieves the minimum sound insulation performances as set out in Table 9.20 and Table 9.21. Other facades in the development have no minimum requirement for sound insulation.

Mark-up	Octave Band Centre Frequency (Hz)						R_w
	125	250	500	1000	2000	4000	
RED	26	27	34	40	38	46	**37**
ORANGE	26	29	33	28	24	24	**33**

Table 9.20: Sound Insulation Performance Requirements for Glazing, SRI (dB)

The overall R_w and $D_{ne,w}$ outlined in this section 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 and ventilation configurations. Any selected system will be required to provide the same level of sound insulation performance set out in Table 9.20 and Table 9.21 or greater.

The following performance requirements apply to all ventilation paths from outside the building. This can be achieved by passive acoustic wall or window vents or via mechanical ventilation systems.

Octave Band Centre Frequency (Hz)						$D_{n,e,w}$
125	250	500	1000	2000	4000	
30	33	38	37	36	36	**38**

Table 9.21: Sound Insulation Performance Requirements for Ventilation, $D_{n,e,w}$ (dB)

Figure 9.14: Façade Acoustic Requirements

It is important to note that the acoustic performance specifications detailed herein are minimum requirements which apply to the overall glazing and ventilation systems. In the context of the acoustic performance specification the *'glazing system'* is understood to include any and all of the component parts that form part of the glazing element of the façade, i.e. glass, frames, seals, openable elements etc.

The assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage. Consequently, these may be subject to change as the project progresses.

9.6.4 Operational Phase – Vibration

No vibration mitigation measures are required applicable the operational phase.

9.7 Residual Impacts

9.7.1 Construction Phase

During the construction phase of the project there is the potential for significant and moderate impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, so that noise and vibration will have a ***negative***, ***moderate to significant*** and ***short-term*** impact on the surrounding environment.

9.7.2 Operational Phase

9.7.2.1 Additional Vehicular Traffic

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.

9.7.2.2 Mechanical Plant

Assuming the operational noise levels do not exceed the adopted design goals in line with the relevant noise criteria, the resultant residual noise impact from this source will be of ***neutral***, ***imperceptible***, ***long term*** impact.

9.8 Cumulative Impacts

During the construction phase of the proposed development, construction noise on site will be localised and will therefore likely the primary noise source at the nearest noise sensitive receivers. There is a development currently under construction to the south of the proposed development. Should construction of both sites occur simultaneously there is potential for cumulative noise impacts at noise sensitive receivers equidistant from the sites.

In this scenario, it is recommended that liaison between construction sites is on-going throughout the duration of the construction phase. Contractors should schedule work in a co-operative effort to limit the duration and magnitude of potential cumulative impacts on nearby sensitive receptors.

Cumulative construction noise impacts are expected to be negative, significant and short-term at times of high activity on both sites.

The contractor will be required to control noise impacts associated with this development in line with the guidance levels included in Table 9.1 and follow the best practice control measures within BS 5228 -1.

With the above in mind, it is likely that the neighbouring development will be completed before construction commences on the subject development.

In the context of the operational phase, permitted developments are included in the traffic impact and therefore the potential for a cumulative impact has been assessed (and found to be negative, imperceptible to moderate, and long-term).

Any large scale future projects that are not yet proposed or permitted would also need to be the subject of EIA in turn, to ensure that no significant impacts resulting from noise and vibration will occur as a result of those developments.

9.9 Difficulties Encountered

No difficulties were encountered during the preparation of the EIAR chapter.

9.10 References

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Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017);
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Appendix 9.1 – Dublin City Council Good Practice Guide – Mitigation Measures

1. General Considerations

All site staff shall be briefed on noise mitigation measures and the application of best practicable means to be employed to control noise.	All sites
Good Quality site hoarding should be erected to maximise the reduction in noise levels	Medium and High risk sites
The contact details of the contractor and site manager shall be displayed to the public, together with the permitted operating hours, including any special permissions given for out of hours work	Medium and High risk sites
The site entrance shall be located to minimise disturbance to noise sensitive receptors	Medium and High risk sites
Internal haul routes shall be maintained and steep gradients shall be avoided	Medium and High risk sites
Material and plant loading and unloading shall only take place during normal working hours unless the requirement for extended hours is for traffic management (i.e road closure) or health and reasons (application must be made to DCC a minimum of 4 days prior to proposed works)	All sites
Use rubber linings in chutes, dumpers and hoppers to reduce impact noise	High risk sites
Minimise opening and shutting of gates through good coordination of deliveries and vehicle movements	Medium and High risk sites
No materials shall be burned on site	All sites
Adequate dust/debris screening should be in place at the site boundary to contain and minimise the amount of windblown dust. This must be maintained in good condition at all times.	Medium and High Risk sites
All consignments containing material with the potential to cause air pollution being transported by skips, lorries, trucks or tippers must be covered during transit on and off site.	All sites
The site shall be dampened down as necessary to minimise windblown dust when necessary or during periods of dry weather.	All sites

Dust suppression equipment must be used when point source emissions are likely.	All sites
The entry and exit points to the site should be constructed of hard standing which is regularly dampened to minimise dust emissions.	Medium and High Risk Sites

2. **Plant**

Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC	All sites
Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer	All sites
Use all plant and equipment only for the tasks for which it has been designed	All Sites
Shut down all plant and equipment in intermittent use in the intervening periods between work or throttle down to a minimum	All sites
Power all plant by mains electricity where possible rather than generators	Medium and High Risk Sites
Maximise screening from existing features or structures and employ the use of partial or full enclosures for fixed plant	Medium and High Risk Sites
Locate movable plant away from noise sensitive receptors	All sites

3. **Vehicle activity**

Ensure all vehicle movements (on site) occur within normal working hours. (other than where extension of work requiring such movements has been granted in cases of required road closures or for health and safety reasons)	All sites
Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public roads. If unavoidable engines should be turned off.	Medium and High Risk Sites
Minimise the opening and closing of the site access through good coordination of deliveries and vehicle movements	Medium and High Risk Sites

Plan the site layout to ensure that reversing is kept to a minimum	Medium and High Risk Sites
Where reversing is required use broadband reverse sirens or where it is safe to do so disengage all sirens and use banks-men	Medium and High Risk Sites
Rubber/neoprene or similar non-metal lining material matting to line the inside of material transportation vehicles to avoid first drop high noise levels.	Medium and High Risk Sites
Wheel washing of vehicles prior to exiting the site shall take place to ensure that adjoining roads are kept clean of dirt and debris. Regular washing of adjoining streets should also be carried out by the developer, as required by mechanical road sweepers	Medium and High Risk Sites

4. **Demolition Phase**

Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.	Medium and High Risk Sites
If working out of hours for Health and Safety reasons (following approval by DCC) limit demolition activities to low level noise activity unless absolutely unavoidable)	All sites
Use low impact demolition methods such as non-percussive plant where practicable	Medium and High Risk Sites
Use rotary drills and 'bursters' activated by hydraulic or electrical power or chemically based expansion compounds to facilitate fragmentation and excavation of hard material.	High Risk sites
Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings	Medium and High Risk Sites
Consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off site.	High Risk Sites

5. **Ground Works and Piling Phase**

The following hierarchy of groundwork/piling methods should be used if ground conditions, design and safety allows: • pressed in methods, e.g., hydraulic jacking • Auger/bored piling • Diaphragm walling • Vibratory piling or vibro-replacement • Driven Piling or dynamic consolidation	Medium and High Risk Sites
The location and layout of the piling plant should be designed to minimise potential noise impact of generators and motors	Medium and High Risk Sites
Where impact piling is the only option utilise a non-metallic dolly between the hammer and driving helmet or enclose the hammer and helmet with an acoustic shroud	Medium and High Risk Sites
Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible to avoid overruns	Medium and High Risk Sites
Where obstructions are encountered, work should be stopped and a review undertaken to ensure that work methods that minimise noise are used.	Medium and High Risk Sites
When using an auger piling rig do not dislodge material from the auger by rotating it back and forth. Use alternate methods where safe to do so.	Medium and High Risk Sites
Prepare pile caps using methods which minimise the use of breakers, e.g., use hydraulic splitters to crack the top of the pile.	Medium and High Risk Sites

6. **Monitoring**

Establish pre-existing levels of ambient noise by baseline monitoring or use of the noise maps.	Medium and High Risk Sites
Carry out regular on site observation monitoring and checks/audits to ensure that BPM is being used at all times. Such checks shall include; • Hours of work • Presence of mitigation measures • Number and type of plant	High Risk Sites

• Construction methods Site reviews must be recorded and made available for inspection	
Monitor noise and vibration continuously during demolition, piling, excavation and sub and superstructure works at agreed locations and report to DCC at agreed intervals and in an agreed format. To comply with this the following must take place. The monitoring locations for existing sites as agreed with officers of Dublin City Council must remain in situ. If additional monitoring is required this will be provided and the new locations will be agreed with Dublin City Council. For all new sites the monitoring locations must be agreed with Dublin City Council. The results of the monitoring must be forwarded to officers of the Air Quality Monitoring and Noise Control Unit every two weeks in the following format: • Provide the construction noise level as defined in British Standard 5228 and the peak particle velocity readings for the hours of operation of the site. This will include the construction noise level for any overtime period worked outside of normal working hours. Provide a report detailing and discussing the noise and vibration levels over the reporting period. If a breach is recorded the follow up action that took place to prevent any further breaches must be included in the report. • This information must be provided in electronic format If results are required owing to complaints the results will be provided as soon as possible by the contractor to Dublin City Council.	High Risk Sites

Appraise and review working methods, processes and procedures on a regular basis to ensure continuous development of BPM	Medium and High Risk Sites
The 'ABC' Method detailed in Paragraph E.3.2 of BS 5228-1:2009 shall be used to determine acceptable noise levels for day, evening and night time work.	Medium and High Risk Sites
Vibration levels must be kept below 1.0 mm/sec (PPV) where possible. Where levels are expected to exceed this value residents must be warned and an explanation given.	Medium and High Risk Sites
Appropriate dust suppression must be employed to prevent fugitive emissions affecting those occupying neighbouring properties or pathways	All sites
Street and footpath cleaning must be undertaken during the demolition and ground works phase to minimise dust emissions	Medium and High Risk Sites
Continuous dust monitoring along the site boundary should be undertaken during any demolition or ground works	High Risk Sites

7. Communication and Liaison

A Community Liaison Plan should be developed by the developer in consultation with local residents/businesses and a single point of contact nominated to engage with Dublin City Council and the residents/businesses and to handle complaints and communication of site information. A copy of this plan must be sent to Dublin City Council Planning Department as a matter of urgency in the case of sites where development has already commenced and 14 days in advance of commencement of works for any other site	Medium and High Risk Sites
Contact details for the site manager and liaison officer should be displayed prominently on the site hoarding	Medium and High Risk Sites
All staff should be briefed on the complaints procedure and the mitigation requirement and their responsibilities to register and escalate complaints received.	Medium and High Risk Sites
Send regular updates at appropriate intervals to all indentified affected neighbours/ businesses via a newsletter and post relevant information on the site	Medium and High Risk Sites

hoarding. Also make the information available via email/website including weekly noise monitoring reports	
Arrange regular community liaison meetings at appropriate intervals including prior to commencement of the project.	High Risk Sites
Meet regularly with neighbouring construction sites to ensure activities are coordinated to minimise any potential cumulative issues.	High Risk Sites

Extensions of Working Hours in exceptional circumstances

Ensure at least 4 days notice is given to Dublin City Council Planning Department when applying for extensions to normal working hours. Do not undertake out of hours work unless permission to do so has been granted.	All sites
The applicant must demonstrate in writing that the works required cannot be carried out during normal working hours. The documentation sent in must be accompanied by a detailed engineering or/and traffic management or/and safety case as to why the works are required outside normal hours. Power floating after 6pm is the only activity that will be permitted during the extensions where they relate to required large concrete pours. All reasonable and appropriate measures to minimise noise associated with these works must be put in place and no works other than those approved may be carried out during extended working hours. The Developer/his agent must give the times and dates of the proposed work, and the mitigation measures that are to be used to minimise noise/disturbance	All sites
Advise neighbours about requirement for and duration of any permitted works outside of normal working hours, and associated environmental mitigation measures being put in place during the course of the extended works, following receipt of approval from DCC	All sites
All complaints will be referred directly to the site liaison person and a reply must issue to the complaint within 3 hours of receipt of the complaint.	All sites

A log of all complaints and a summary of how they were dealt with should be kept and be made available to DCC, as required	All sites
Any breaches of permitted working hours or permitted extended working hours or developers or subcontractors not carrying out their requirements under this protocol may lead to enforcement action and may also result in the withdrawal of any extension of hours of works for a period that will be at the discretion of Dublin City Council.	All sites

10.0. Material Assets: Built Services

10.1 Introduction

This chapter of the EIAR assesses and evaluates the likely impact of the proposed development on existing surface water and foul drainage, and utility services in the vicinity of the site during both the construction and operational phases, as well as identifying the nature of any impacts and provide the necessary mitigation measures arising from the proposed development. The material assets considered in this chapter include Surface Water Drainage, Foul Drainage, Water Supply, Power, Gas and Telecommunications.

This chapter of the EIAR was prepared by Laura McLoughlin, Senior Civil Engineer, B.Eng, C.Eng. and Daniel Hodnett, Graduate Civil Engineer, B.Eng. of DBFL Consulting Engineers.

10.2 Assessment Methodology

The methodology followed for this section is in accordance with the EPA *"Revised Guidelines on the Information to be contained in Environmental Impact Statements, Draft September 2015*" and "*Advice Notes for Preparing Environmental Impact Statements Draft September 2015".*

The following legislation, standards and guidelines were consulted to inform the assessment:

As part of assessing the likely impact of the proposed development, surface water runoff, foul drainage discharge and water usage calculations were carried out in accordance with the following guidelines:

- Irish Waters Code of Practice for Water Infrastructure;
- Irish Waters Code of Practice for Wastewater Infrastructure;
- Greater Dublin Strategic Drainage Study, (DCC 2005);
- Regional Code of Practice for Drainage Works, (DCC 2005).

Assessment of the potential impacts of the proposed development on existing built services in the vicinity of the site included:

- Review of Irish Water utility plans (foul drainage and water supply)
- Review of Dublin City Council utility plans (surface water drainage)
- Receipt of Confirmation of Feasibility (CoF) letter from Irish Water
- Review of ESB Network Utility Plans
- Review of Gas Networks Ireland Service Plans
- Review of EIR E-Maps
- Liffey Contracts topographical mapping
- Dublin City Development Plan 2016-2022
- GSI.ie Geological datasets

10.3 Existing Receiving Environment (Baseline Scenario)

The proposed site is bordered to the north by the Santry Avenue, Swords Road to the east, permitted residential development to the south and industrial units to the west. There are existing surface water and foul networks that traverse the site.

The proposed development provides for 350 no. dwellings comprised of 1, 2 & 3 bed apartments, accommodated in 4 no. blocks, all on a site area of 1.5ha. The site is bounded to the north by

Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (Ref.s 2713/17 & 2737/19) and to the west by the Santry Avenue Industrial Estate.

Permission is sought for the demolition of the existing buildings on site (4,196.8m^2). Vehicular access to the proposed development will be via two proposed access points: (i) on Santry Avenue and (ii) off Swords Road, and as permitted under the adjoining development at Santry Place.

Figure 10.1 – Site Location – Swords Road, Santry, Dublin 9.

10.3.1 Existing Surface (Storm) Water Infrastructure

There are existing 225mm diameter public surface water sewers located on the Swords Road (R104) to the east of the site and Santry Avenue to the north of the site.

A surface water system is currently under construction within the previously approved mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of the proposed development. This system contains an attenuation system, hydrobrake and petrol interceptor on the outfall surface water sewer. This outfall sewer discharges to the existing 225mm diameter sewer located on Swords Roads as noted above. A connection to the public sewer has been made at the junction of the Swords Road with Schoolhouse Lane. This connection has been approved under Planning Ref: 2713/17 & 2737/19 and agreement with Dublin city Council. Existing surface water infrastructure within the site boundary is currently unknown. Further investigatory work is to be undertaken to determine the presence of any private infrastructure and such will be removed/utilised if appropriate.

10.3.2 Existing Foul Water Infrastructure

There is an existing 300mm diameter public foul sewer located on Swords Road (R104) to the east of the proposed site.

As part of Irish Water Connection Reference No: CDS19003221 a 225mm diameter foul sewer is currently under construction to connect the previously approved mixed-use development

(Planning Ref: 2713/17 & 2737/19) to the public foul network. This connection has been approved by Irish Water and the sewer will be taken in charge. It is proposed to connect to the foul sewer constructed as part of the planning ref above within site boundaries and therefore utilise this connection to the public foul network and cause minimal disruption to members of the public.

Existing foul water infrastructure within the site boundary is currently unknown. Further investigatory work is to be undertaken to determine the presence of any private infrastructure and remove/utilise if appropriate.

10.3.3 Existing Potable Water Infrastructure

There is an existing 4" cast iron 1965 watermain in Santry Avenue to the north of the site. There is a 12" cast iron 1955 watermain and 100mm ductile iron 1996 watermain in Swords Road (R104).

Existing water infrastructure within the site boundary is unknown. Further investigatory work is to be undertaken to determine the presence of this infrastructure and removed/utilised if appropriate.

10.3.4 Existing ESB Infrastructure

An ESB Networks plan is included in Appendix 10.1 showing the locating of existing electrical services in the vicinity of the site.

There is an MV/LV (10KV/20KV/400V/230V) underground cable route along the western boundary of the site. Santry Place Kiosk is on this route. This cable route continues under Santry Avenue and Swords Road. There are 38KV & higher voltage underground cable routes and LV (400V/230V) overhead lines in Santry Avenue and Swords Road.

10.3.5 Existing Telecoms Infrastructure

EIR network plans are included in Appendix 10.2 showing the location of telecommunications infrastructure in the vicinity of the site.

Telecommunications infrastructure is located along Brawny Road to the west and north west of the proposed development and the R916 road to the east.

10.3.6 Existing Gas Infrastructure

Gas Networks Ireland plans are included in Appendix 10.3 showing the location of gas distribution infrastructure in the vicinity of the site.

There is an existing 90 PE 25 mbar CP connection from Heiton Buckley Building Suppliers to an unknown size gas pipe in Swords Road. This pipeline then connects to a 200mm ST 19 bar transmission pipeline at junction of Swords Road and Santry Avenue.

10.4 Characteristics of the Proposed Development

The proposed development provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 4 no. blocks. The proposed development also provides for 5 no. commercial / retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

The development will consist of the following:

Demolition of the existing building on site i.e. the existing Chadwicks Builders Merchants (c. 4,196.8m^2).

Construction of 350 no. 1, 2, & 3 bed apartments, retail / commercial and community uses in 4 no. buildings that are subdivided into Blocks A-G as follows:

- Block A is a 7 to 14 storey block consisting of 59 no. apartments comprised of 26 no. 1 bed & 33 no. 2 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 132.4m^2 & 173m^2 respectively). Adjoining same is Block B, which is a 7 storey block consisting of 38 no. apartments comprised of 6 no. 1 bed, 20 no. 2 bed, & 12 no. 3 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 162.3m^2 & 130.4m^2 respectively). Refuse storage areas are also provided for at ground floor level.

- Block C is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. Refuse storage areas are provided for at ground floor level. Adjoining same is Block D which is a 7 to 10 storey block consisting of 51 no. apartments comprised of 25 no. 1 bed, 19 no. 2 bed, & 7 no. 3 bed dwellings, with 1 no. commercial unit / café located on the ground floor (c. 163.3m^2). A refuse storage area is also provided for at ground floor level.

- Block E is a 7 to 10 storey block consisting of 58 no. apartments comprised of 10 no. 1 bed & 48 no. 2 bed dwellings, with 1 no. community use unit located on the ground floor (c. 188.1m^2). A refuse storage area, substation, & switchroom are also provided for at ground floor level. Adjoining same is Block F which is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

- Block G is a 7 storey block consisting of 34 no. apartments comprised of 20 no. 1 bed & 14 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

Construction of a 1 storey residential amenity unit (c. 187.9m^2) located between Blocks A & D.

Construction of basement level car parking (c.5,470.8m^2) accommodating 173 no. car parking spaces & 719 no. bicycle parking spaces. Internal access to the basement level is provided from the cores of Blocks A, B, C, D, E, & F. External vehicular access to the basement level is from the south, between Blocks B & C. 36 no. car parking spaces & 58 no. bicycle parking spaces are also provided for within the site at surface level.

Public open space of c. 1,915m^2 is provided for between Blocks C, D, E, & F. Communal open space of c. 3,122m^2 provided for between (i) Blocks E, F, & G, (ii) Blocks A, B, C, & D, and (iii) in the form of roof gardens located on Blocks A, C, & F and the proposed residential amenity use unit. The development includes for hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels.

Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).

The development includes for all associated site development works above and below ground, bin & bicycle storage, plant (M&E), sub-stations, public lighting, servicing, signage, surface water attenuation facilities etc.

10.4.1 Proposed Surface (Storm) Water Design

The surface water management strategy for the proposed development is outlined in a separate document prepared by DBFL Consulting Engineers entitled "*Engineering Services Report*". Also refer to Chapter 7 - Water of this EIAR for further information on the surface water infrastructure impacts and mitigation measures.

The surface water drainage from this development is proposed to discharge, following attenuation, via a new 225mm diameter surface water sewer to a manhole constructed as part of the previously approved mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development.

The location of the proposed connection will be on the existing 225mm surface water sewer constructed for the mixed-use development (Planning Ref: 2713/17 & 2737/19), after the installed hydrobrake and before the petrol interceptor. The petrol interceptor, which has been installed under the aforementioned planning reference, has been designed to accommodate the combined permitted discharge rate from both of this development and the development located to the south (Planning Ref: 2713/17& 2737/19). This proposed connection location will negate the requirement for any construction outside of the site boundary and minimise any disruption to the public.

Surface water runoff from the site's road network and parking bays will be directed to a proposed surface water pipe network via the porous aggregates beneath permeably paved road surfacing (providing an additional element of attenuation). Road gullies will be installed at low points on the permeable paving road surface in addition.

Extensive green roofs will be provided at roof level and intensive green roofs provided on podium slab. Surface water run off from the roofs of blocks A, B, C, D, E and F will be collected by slung drainage and directed to the attenuation system. Surface water runoff from block G will be directed into the proposed surface water pipe network and then travel to the proposed attenuation structure.

Surface water will pass through silt trap (catchpit) manholes prior to entering the attenuation system. The discharge rate from the proposed surface water drainage network will be controlled by a vortex flow control device (Hydrobrake or equivalent) and run-off contained in the associated underground attenuation tanks (Pluvial Cube or equivalent). Surface water discharge existing the flow control device will pass through a by-pass fuel / oil separator sized to accommodate the combined permitted discharge rate from both of this development and the development located to the south (Planning Ref: 2713/17& 2737/19).

Surface water calculations are based on permissible site discharge rate of 5.0 l/s in accordance with the Greater Dublin Strategic Drainage Strategy (GDSDS). This results in a total attenuation volume required for the proposed development of approx. 416m³.

The surface water drainage network, attenuation storage and site levels are designed to accommodate a 100-year storm event (provision for 20% climate change included). Floor levels of the residential units are set above the 100-year flood levels by a minimum of 0.4m. For storms in excess of a 100 year event, the development has been designed to provide overland flood routes towards green areas and away from structures.

The Proposed surface water drainage network has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS), the Department of the Environment's Recommendations for Site Development Works for Housing Areas, the Department of the Environment's Building Regulations "*Technical Guidance Document - Part H: Drainage and Waste Water Disposal*" and BS EN 752: 2008 "*Drain and Sewer Systems Outside Buildings".*

10.4.2 Proposed Foul Drainage Design

The foul sewerage from this development is proposed to discharge via a new 225mm diameter sewer to a manhole constructed as part of the previously approved mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development. This will negate the requirement for any construction outside of the site boundary and minimise any disruption to the public.

A Pre-Connection Enquiry was submitted to Irish Water CDS20003546 and subsequent confirmation of feasibility letter states that connection is feasible subject to upgrades.

The proposed foul drainage network will comprise of a series of main sewers 150mm/225mm diameter in size. Foul sewage from apartment blocks A, B, C, D, E and F will be drained on separate systems via 150mm diameter pipes slung from the underside of basement roof slabs and adjacent to the basement walls. Service pipes from individual apartments will project through ground floor slabs and connect into the slung drainage system which in turn will connect by gravity to the proposed external drainage system.

Any surface water from the basement car park generated by incidental run-off only will drain through an underground system of collector pipes, gullies and ACO drains which in turn will drain through a petrol interceptor prior to discharging into a pumping station located beneath the basement slab. This run-off will then be pumped to ground level and enter the gravity foul drainage system for the site.

The foul drainage network for the proposed development has been designed in accordance with the following guidance:

- Irish Water Code of Practice for Wastewater Infrastructure & Standard Details for Wastewater Infrastructure;
- Department of the Environment's Recommendations for Site Development Works for Housing Areas;
- Department of the Environment's Building Regulations *"Technical Guidance Document Part H Drainage and Waste Water Disposal";*
- BS EN 752: 2008 Drain and Sewer Systems Outside Buildings;
- IS EN 12056: Part 2 (2000) Gravity Drainage Systems Inside Buildings

A peak flow rate of 11.05l/s has been calculated using the EN752 method, which equates to a daily foul discharge volume of 955m³.

A BOD (Biochemical Oxygen Demand) loading (based on 60g per person per day) of 56.70kg has been calculated for the proposed development as outlined in the EPA Waste Water Treatment Manual.

10.4.3 Proposed Water Supply

It is proposed to form a connection to the existing 300mm diameter cast iron public watermain located on the Swords Road adjacent to the proposed site entrance to the south east of the site.

All connections, valves, hydrants, meters etc. have been designed and are to be installed in accordance with Irish Water's Code of Practice / Standard Details and the Department of the Environment's Building Regulations *"Technical Guidance Document Part B Fire Safety"*.

An average daily domestic demand of approx. 144.6m³ has been calculated as outlined in Irish Water's Pre-Connection Enquiry Application Form.

A Pre-Connection Enquiry was submitted to Irish Water CDS20003546 and subsequent confirmation of feasibility letter states that connection is feasible subject to upgrades.

Commercial properties will be individually metered.

10.4.4 Proposed ESB Infrastructure

Electricity supply for the proposed development will be taken from the existing ESB Network.

10.4.5 Proposed Telecoms Infrastructure

Existing EIR connection from Chadwick Building Suppliers will be utilised for new development.

10.5 Construction Impacts, Mitigation and Monitoring Measures

10.5.1 Construction Phase

Power and water will be required during construction activities and servicing of the temporary site compound. The development site will be connected to the local electricity network system and mains water supply. Given the scale and transient nature of construction works, the power and water demand on the local electricity and mains water systems would not be considered significant and would not be anticipated to impact upon local power or water supply.

Telecommunications requirements during the construction phase will be provided using mobile phones / broadband. There would be no anticipated impacts to the local telecommunications system. Foul water from staff welfare facilities generated during the construction phase will be collected on site in designated waste holding containers / port-a-loo units and emptied on a regular basis by a licenced waste contractor.

The installation of the utilities for the development will be conducted in parallel with the other services. This will mainly involve excavation of trenches to lay ducting, construction/installation of access chambers and backfilling of trenching. The trenching and backfilling works will be carried out in conjunction with the construction of the roads and footpaths throughout the scheme.

Connecting to ESB cable routes may lead to loss of connectivity to and / or interruption of the supply from the electrical grid to the surrounding areas. Any loss of supply will be managed by ESB Networks to minimise impact on neighbouring properties.

There may be a potential loss of connection to the Gas Networks Ireland infrastructure while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, regionally short term, moderate impact.

Again, there may be potential loss of connection to the telecommunications infrastructure while carrying out works to provide service connections. This likely adverse impact may be characterised as a temporary, regionally short term, moderate impact. The site compound will require a power and telecommunications connection. This likely adverse impact will be temporary and negligible.

10.5.2 Construction Mitigation Measures

A detailed "*Construction Management Plan"* will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practices as outlined in the *"Construction Management Plan".*

The construction works contractor shall liaise with the relevant utility providers prior to works commencing, with on-going consultation throughout the proposed development. Where new services are required, the construction works contractor shall apply to the relevant utility provider and adhere to the requirements outlined in the connection permit / licence.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company or local authority and will be in compliance with any requirements or guidelines they may
have.

Where new services or diversions to existing services are proposed, the Contractor will apply to the relevant utility company for a connection permit, where appropriate, and will adhere to their requirements. Where possible, backup network supply to any services will be provided should the need for relocation or diversion or existing services be required. Otherwise, relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

Connections to the utility networks will be coordinated with the relevant utility provider and carried out by approved contractors.

10.5.2.1 Surface (Storm) Water Infrastructure

Please refer to Chapter 7 of this EIAR "*Water"* for further mitigation measures associated with surface water during the construction stage.

10.5.2.2 Foul Infrastructure

All foul water infrastructure is under the control of Irish Water. The proposed development will be serviced by a new separate internal foul network for the proposed development. The proposed

development will discharge to sewer constructed as part of the previously approved mixed-use development (Planning Ref: 2713/17 & 2737/19) to the south of this development as outlined above.

The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

In order to reduce the risk of defective or leaking sewers, all new sewers should be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects.

It is envisaged that the development would take place and be occupied over a reasonable time period, and therefore the downstream foul sewerage system (foul sewer network and wastewater treatment facility) would be gradually loaded.

As required by the SHD process, Irish Water are required to review the schemes foul drainage proposal and to issue a letter of Design Acceptance. This has been received by the design team and is included as an appendix in the DBFL Consulting Engineering Services Report accompanying this submission.

10.5.2.3 Potable Water Infrastructure

All potable water infrastructure is under the control of Irish Water. It is proposed to connect to the existing 300mm diameter cast iron public watermain located on the Swords Road adjacent to the proposed site entrance to the south east of the site.

The construction compound's potable water supply shall be protected from contamination by any construction activities or materials.

Where possible backup network supply to any services will be provided should the need for relocation or diversion of existing services be required, otherwise relocation or diversion works will be planned to incur minimal impact, with users notified in advance of any works.

As required by the SHD process Irish Water are required to review the schemes potable water proposal and to issue a letter of Design Acceptance, this has been received by the design team and is included as an appendix in the DBFL Consulting Engineering Services Report accompanying this submission.

10.5.2.4 Electrical Supply

Contractor to prepare a Method Statement detailing proposals for works in the vicinity of existing utilities (method statement to be agreed with PSDP).

Contractor to locate and record all services on site prior to commencement of excavations (including but not limited to a GPR utility survey along Swords Road and slit trench investigation to confirm the location of electrical infrastructure).

Connections to the existing electrical networks will be coordinated with the relevant utility provider and carried out by approved contractors.

Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services. Relocation, if required, of existing overhead ESB lines will be fully coordinated with ESB Networks to ensure interruption to the existing electricity network is minimized (e.g. agreeing electricity outage to facilitate relocation of cables).

10.5.2.5 Telecommunications

Contractor to prepare a Method Statement detailing proposals for works in the vicinity of existing utilities (method statement to be agreed with PSDP).

Contractor to locate and record all services on site prior to commencement of excavations (including but not limited to a GPR utility survey along Swords Road and slit trench investigation to confirm the location of existing telecommunications infrastructure).

Connections to the existing telecoms networks will be coordinated with the relevant utility provider (e.g. agreeing outage to facilitate connection) and carried out by approved contractors. Contractor to comply with HSA Code of Practice for Avoiding Danger from Underground Services.

10.6 Operational Impacts, Mitigation and Monitoring Measures

10.6.1 Operational Impacts

Potential operational phase impacts on the water infrastructure are noted below:

- Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in hardstanding areas);
- Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate);
- Increased discharge to foul drainage network (Daily Foul Discharge Volume = approx. 955m³);
- Increased potable water consumption (Average Daily Domestic Demand = approx. 144.6m³).

Implementation of the mitigation measures described in this report will prevent and minimize the potential impacts of this interaction.

10.6.1.1 Surface Water

During the operational phase of the works, the surface water drainage has been designed to maintain the flows from the site at the greenfield run-off rates.

10.6.1.2 Foul Water

The impact of the operational phase of the proposed development on the foul drainage network will be the increased flows to the foul network. Irish Water have confirmed in the pre-connection response that the existing drainage network can accommodate the proposed development subject to upgrades.

10.6.1.3 Watermains

The impact of the operational phase of the proposed development on the water supply network will be the increased demand on the local system. Irish Water have confirmed in the pre-

connection response that the existing watermain network can accommodate the proposed development subject to upgrades.

10.6.1.4 Power & Telecommunications

The impact of the operational phase of the proposed development on the power supply network will be the requirement for an Electrical Diversified Load.

The impact of the operational phase of the proposed development on the telecommunications network will be to increase the demand on the existing network.

On completion of the construction phase no further mitigation measures are proposed in relation to the electrical, gas and telecommunications infrastructure.

10.6.2 Operational Mitigation Measures

Please refer to Chapter 7 of this EIAR *"Water"* for mitigation measures associated with the surface water treatment. All new drainage lines (foul and surface water) will be pressure tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational.

Chapter 7 includes the mitigation measures associated with the surface water system for the development.

Water conservation methods such as the use of low flush toilets and low flow taps should be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development.

Similarly, water conservation methods would reduce the loading on the foul sewer network. As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and quantity of the runoff and maximise the amenity and biodiversity opportunities within the site.

The measures detailed below have been designed to take account of potential percolation but have not been incorporated into any storage calculations. This will result in additional storage being available in extreme events.

The proposed SuDS measures will include a combination of Source Control, Site Control and Regional Control measures as part of a Management Train whereby the surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment. The combination of SuDS measures will maximise the potential for surface water interception, reducing the impact on the existing surface water drainage network. The proposed techniques will offer a high level of treatment processes and nutrient removal of the turnoff, particularly during the *"first flush"*.

The proposed development is located within an area designated for the type of development proposed.

As such the services pertaining to the development are required to facilitate the proposed scheme. It is not possible to not provide the services required. Notwithstanding this, the potable water, foul and stormwater services have all been designed in accordance with the requirements of the various stake holders, notable, Irish Water for the foul and potable water utilities and Dublin City Council for the surface

water services.

10.6.2.1 ESB Infrastructure

ESB will engaged at an early stage to ensure any potential issues with utility connections are reviewed and mitigated as early in the process as possible. ESB will not engage with design process until such time as planning has been approved and scheme name and numbering has been approved.

The proximity to an existing ESB sub-station ensures access to MV network which avoids the need for extensive network upgrades and infrastructure. The proposed development has been designed in accordance with the ESB Networks requirements.

10.6.3 Operational Monitoring

All internal potable water and drainage services within the proposed development will be monitored by the local authority / management firm and their maintenance personnel will routinely inspect and carry out maintenance as required. The external potable water and foul drainage connections to the public system will be maintained by Irish Water. The public surface water drainage connections and sewers will be maintained by Dublin City Council.

The electricity network will be monitored by ESB networks. Telecoms will be monitored by EIR and Gas Networks Ireland will monitor the existing gas network.

10.7 Residual Impacts

10.7.1 Construction Phase

Implementation of the measures outlined in above will ensure that the potential impacts of the proposed development on the site's material assets do not occur during the construction phase and that any residual impacts will be short term.

10.7.2 Operational Phase

The demand on power supply and telecommunications supply will all increase due to the development of the lands.

10.7.2.1 Surface (Storm) Water Infrastructure

The potential impacts of the proposed development are such that the requirement to attenuate the subject site to greenfield run-off rates will ensure that during extreme storm events the surface water from the development is limited to the greenfield run off rate in accordance with the GDSDS and Dublin City Council requirements. The use of sustainable urban drainage features will aid in improving overall storm water quality prior to ultimate discharge. Please refer to DBFL report 200060-DBFL-XX-XX-RP-C-0001 for further details.

10.7.2.2 Foul Infrastructure

The potential impacts on the local and regional foul drainage system are that the proposed development would reduce capacity in the public sewer. However, A condition as per Irish Water confirmation of feasibility letter states *"There are capacity constraints in the downstream network. In order to provide capacity for the development the Santry Pumping Station will need to be*

redirected to the North Fringe sewer catchment via already laid rising main on Northwood Ave." Should the connection go ahead and these works undertaken the capacity in the public foul network in the area would increase. Please refer to DBFL report 200060-DBFL-XX-XX-RP-C-0001 for confirmation of feasibility letter.

10.7.2.3 Potable Water Infrastructure

The potential impacts for the local public potable water are that the proposed development will reduce the capacity in the public main. However, Irish Water have confirmed in Confirmation of Feasibility and Statement of Design Acceptance that there is sufficient capacity within the Irish Water network to enable the development however, a new section of watermain will need to be laid to facilitate connection. Please refer to DBFL report 200060-DBFL-XX-XX-RP-C-0001 for further details.

10.7.2.4 ESB Infrastructure

Potential impacts for ESB are impacts on existing network capacity and potential issues with current harmonics if heat pumps are selected as energy source.

The proposed development has been designed in accordance with the ESB Networks requirements. The predicted impacts on power and electrical supply will be long-term, neutral and imperceptible.

10.7.2.5 Telecoms Infrastructure

Potential impact for telecoms is considered to be negligible.

10.8 '*DO NOTHING*' Impact

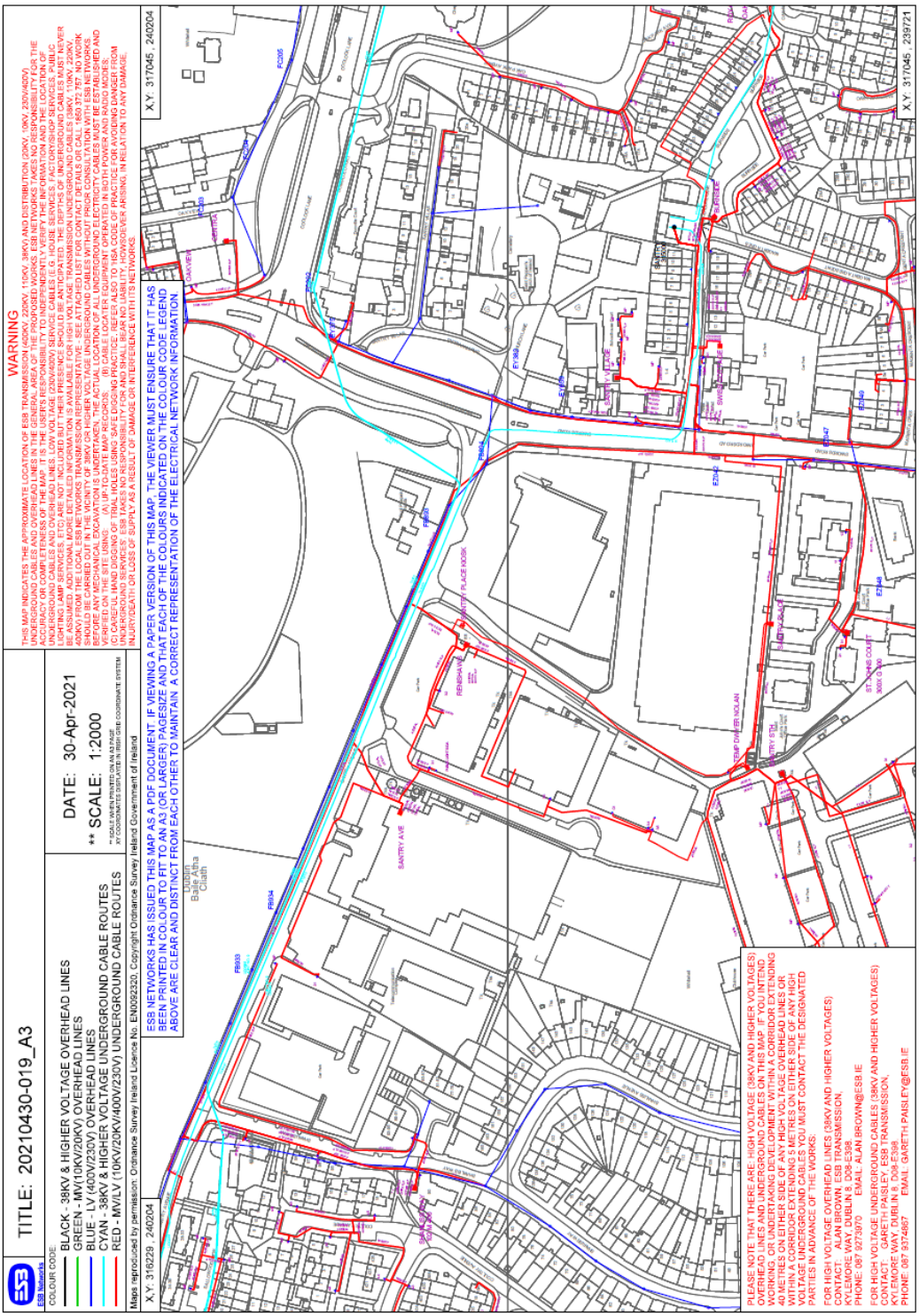
In the "do-nothing" scenario the proposed site would not be redeveloped and therefore there would be no adverse impacts to the foul, stormwater and potable water system.

There are no predicted impacts on these material assets should the proposed development not proceed.

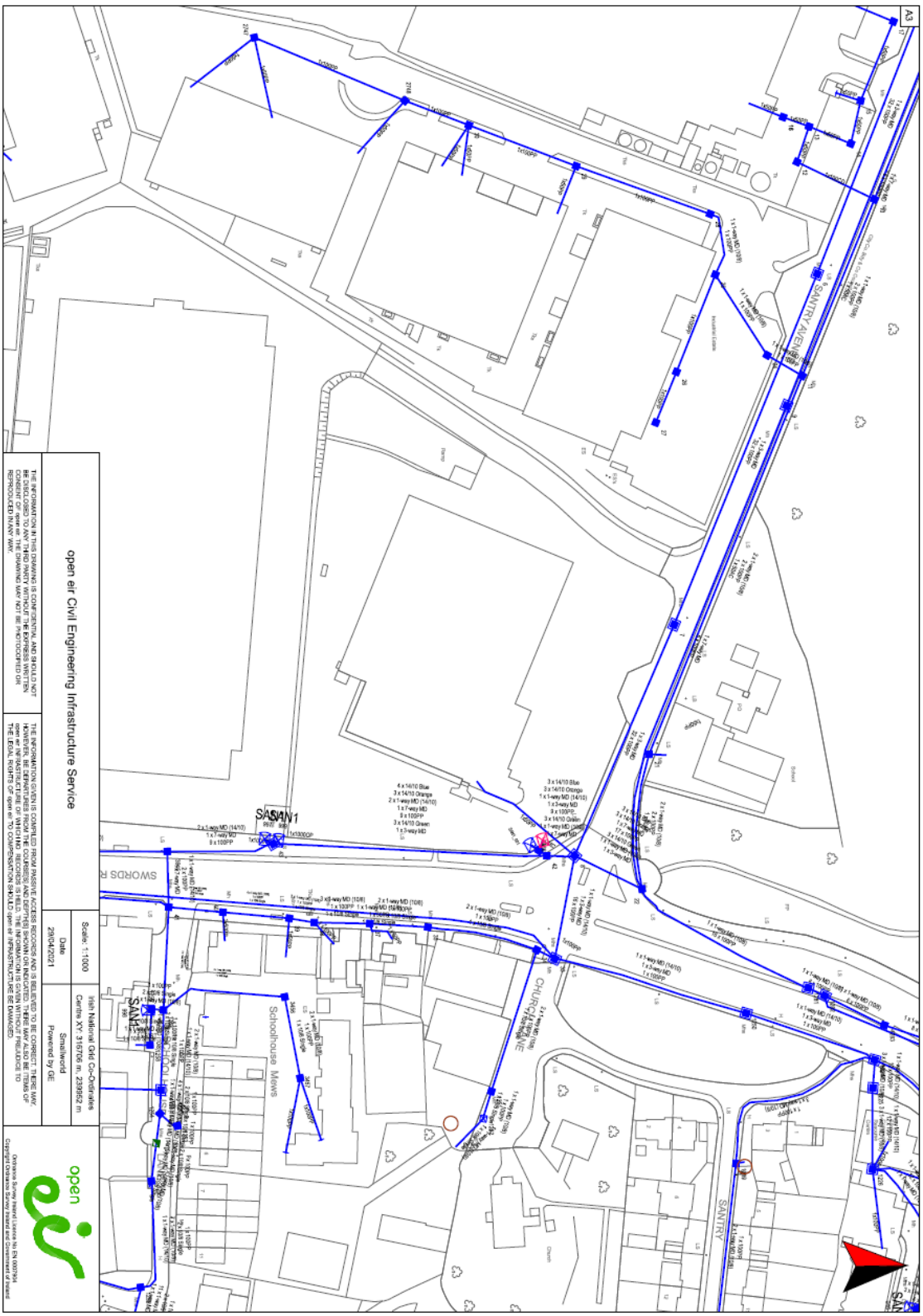
10.9 Reference List

The baseline environment and the assessment of the development in this chapter was described based on the information collected from the sources mentioned in Section 10.2.

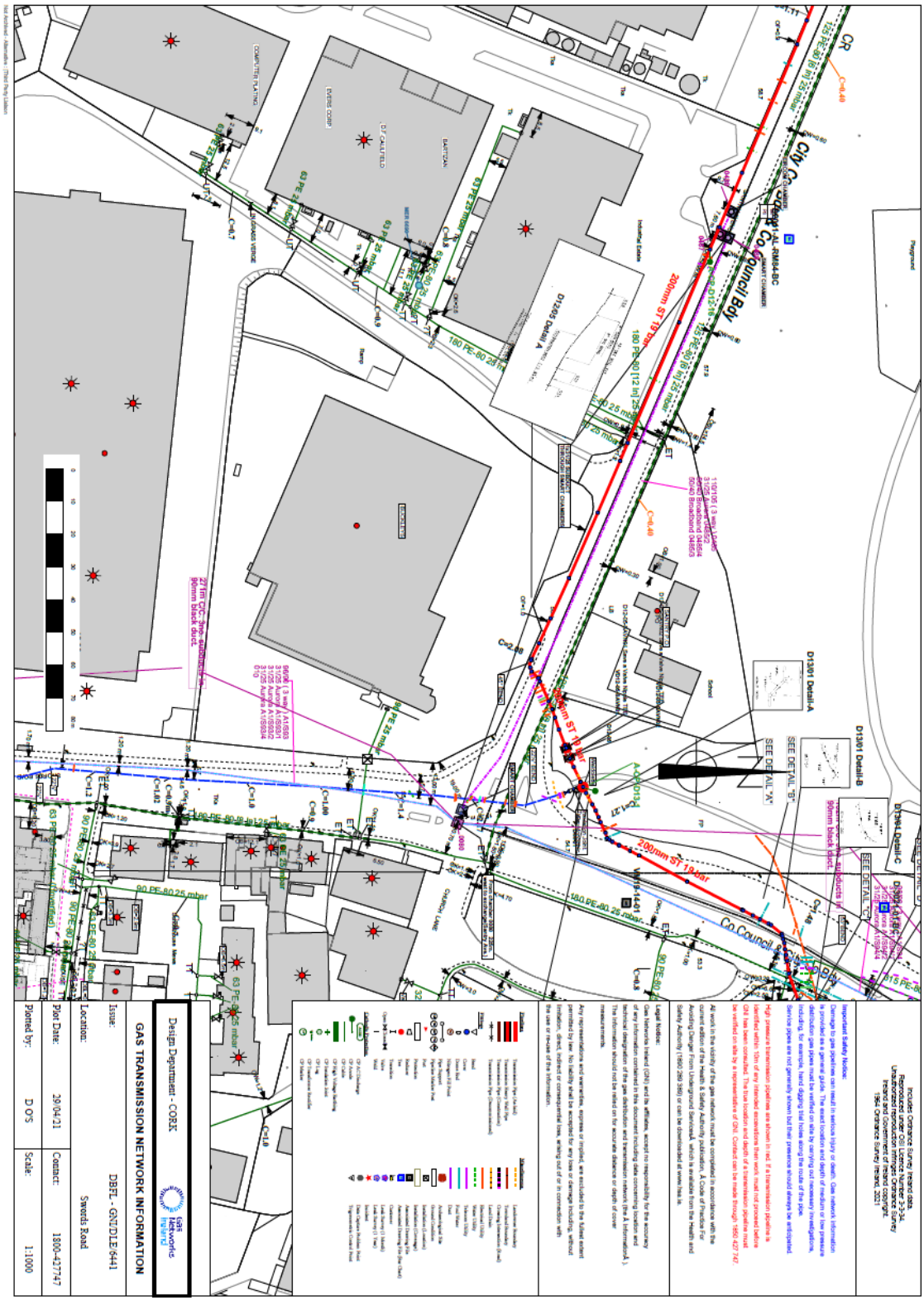
Appendix 10.1: ESB Networks Plan



Appendix 10.2: EIR Networks Plan



Appendix 10.3: Gas Network Ireland Plan



11.0 Material Assets: Transportation

11.1 Introduction

This section of the report assesses and evaluates the likely impact of the proposed development on the existing transportation system in the vicinity of the site, as well as identifying proposed mitigation measures to minimise any identified impacts arising from the mixed-use development at Santry Avenue, Dublin 9

The material assets considered in the traffic section include pedestrian, bicycle, public transport (bus, heavy Rail) infrastructure and associated services in addition to the local road network and associated junction nodes.

This chapter was prepared by Thomas Jennings BEng (Hons) MSc MIEI CMILT MIHT and Sayed Ahmad Saeed BEng Tech BE(Hons) MIEI of DBFL Consulting Engineers. Thomas is a Director with DBFL Consulting Engineers with 24 years' experience as a traffic engineer and transport planner with particular expertise in network management and design. Thomas currently leads the Transportation section within DBFL. Sayed Ahmad is a Transportation Engineer with DBFL Consulting Engineers and has over 3 years' experience in the industry. He has considerable knowledge and experience in transport planning and design along with highway engineering.

11.2 Assessment Methodology

The purpose of this assessment is to quantify the existing transport environment and to detail the results of assessment work undertaken to identify the potential level of transport impact generated as a result of the proposed mixed-use development. The scope of the assessment covers transport and sustainability issues including vehicular access and pedestrian, cyclist and public transport connectivity. Recommendations contained within this report are based on existing and proposed road layout plans, site visits, traffic observations and junction vehicle turning count data. Our methodology incorporated a number of key inter-related stages, including;

- **Site Audit:** A site audit was undertaken to quantify existing road network characteristics and identify local infrastructure management arrangements, in addition to establishing the level of accessibility to the site in terms of walking, cycling and public transport. An inventory of the local road network was also developed as this stage of the assessment.

- **Preplanning Meeting:** A preplanning meeting was undertaken with officers of Dublin City Council including representatives of the Transport Planning Department.

- **Traffic Counts:** Junction turning counts were undertaken and analysed with the objective of establishing local traffic characteristics in the immediate area of the proposed mixed-use development.

- **Trip Generation:** A trip generation exercise has been carried out to establish the potential level of vehicle trips generated by the proposed mixed-use development.

The assessment of effects of the proposed development on material assets are assessed in terms of quality (positive, neutral or negative effects), significance (imperceptible, not significant, slight, moderate, significant, very significant or profound effects), extent, context, probability (likely, unlikely effects) and duration (temporary, short term, long term or permanent effects) in line with the criteria set out in Table 3.3 Description of Effects of the Environmental Protection Agency

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (August 2017).

11.3 Receiving Environment (Baseline Situation)

11.3.1 Site Location

The subject site fronts onto the R104 Santry Avenue and is located along the western side of the R132 Swords Road in Santry approximately 6.5km north of Dublin City Centre.

The general site location is shown in **Figure 11.1**. This figure also demonstrates the site's proximity to several schools in addition to the Dublin City University campus being located within 1.8km and large retail outlet Omni Shopping Centre located approximately 370m south of the subject development site.

The indicative site boundary is presented in **Figure 11.2**. Existing walking time isochrones from the development site, shown in **Figure 11.3**, illustrate the high levels of accessibility for pedestrians walking to/from the site.

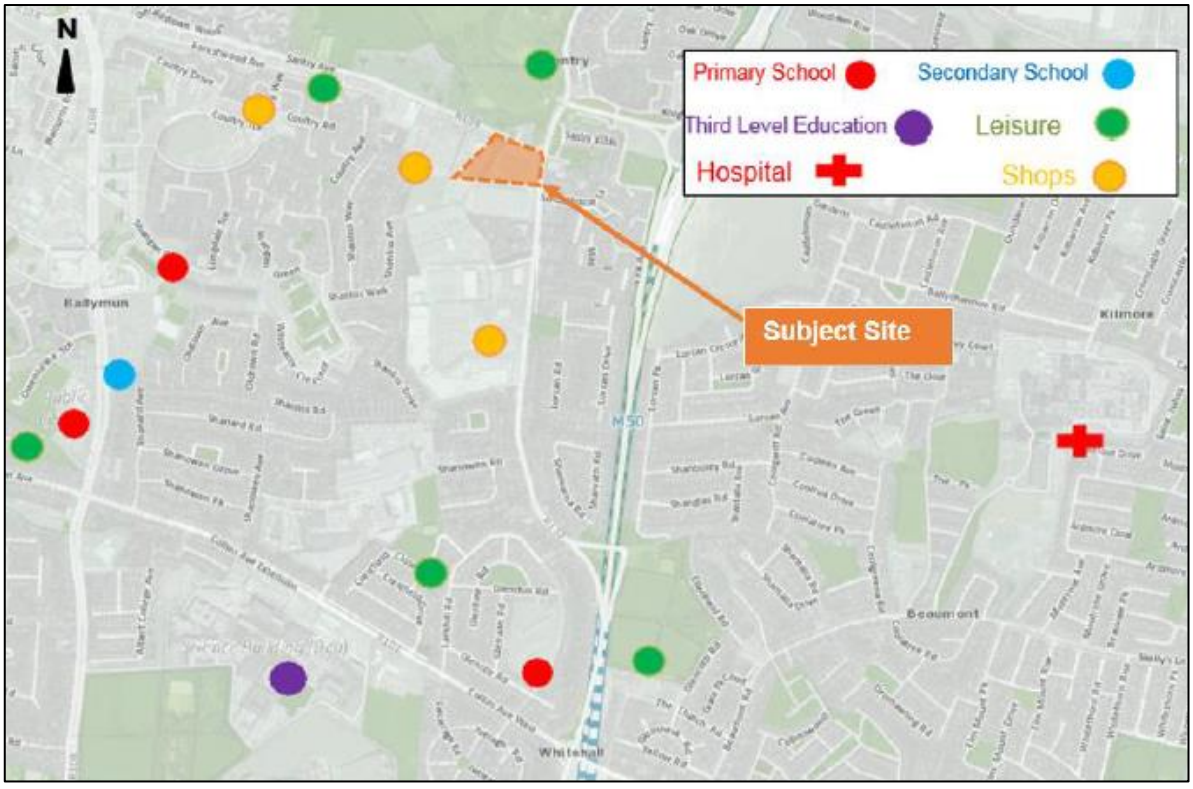


Figure 11.1: Site Location

Figure 11.2: Indicative Site Boundary

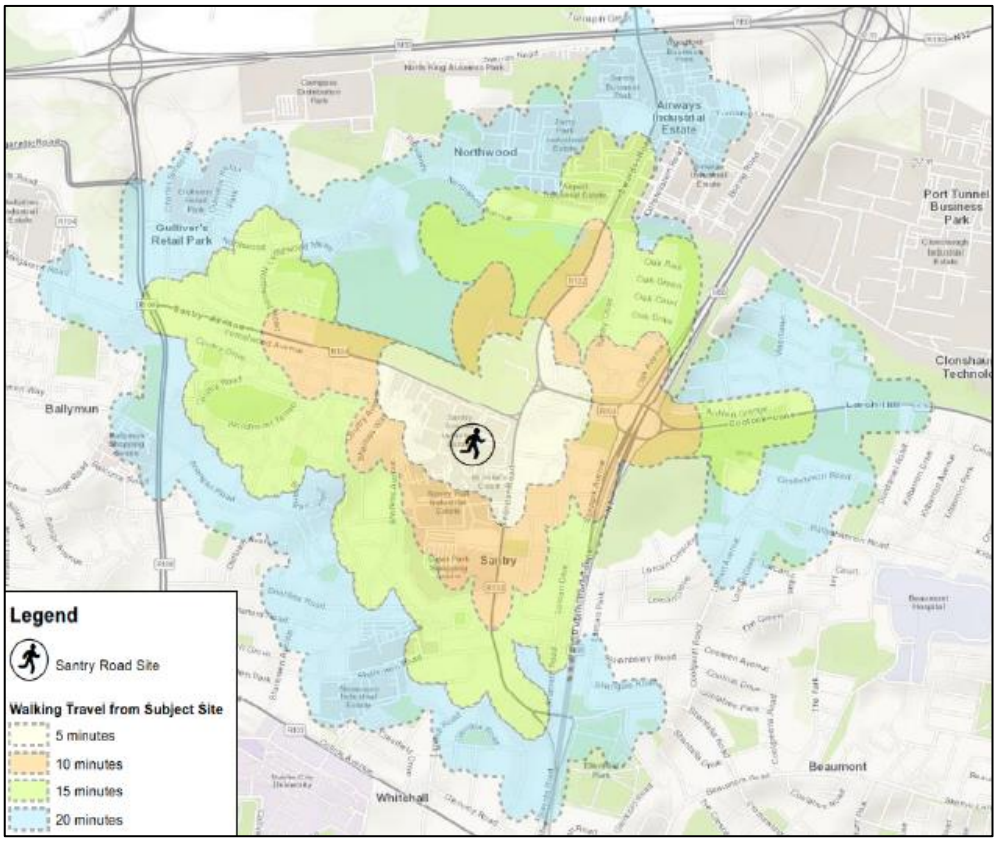


Figure 11.3: Walking Isochrones from the Subject Development Site

11.3.2 Existing Transportation Infrastructure

The main arterial roads in vicinity of the subject site are i) R132 Swords Road immediate east of the subject providing links to Swords and Balbriggan to the north and also allows access to the M50/M1 motorway via Junction No. 2.ii) Santry Avenue immediate north of the subject site providing links to Swords Road and to Ballymun and Finglas westbound as well as M50 via Junction 4 at Ballymun. The subject site can be easily accessed by road from a number of directions including:

(i) From the North and South M1/N1 via R132;
(ii) From the east 104 Coolock Road; and
(iii) From the west M50 via R104 Santry Avenue

The proposed development will be accessed by both vehicles and pedestrians via the R104 Santry Avenue as located in the Site's north-western corner as well as Swords Road to the southeast of the site as being accommodated by the neighbouring permitted scheme proposals 2737/19.

In the immediate vicinity of the site, pedestrians benefit from the provision of good quality footways along both sides of the Swords Road carriageway, in addition to the pedestrian crossing facilities provided as part of the traffic signal controls at the R132 Swords Rd / R104 Santry Avenue Junction.

Footpaths are also provided on both sides of the Santry Avenue with signal-controlled pedestrian crossing (60m to the west of the existing Chadwicks Access) in close proximity of the subject site's exiting main entrance, in addition to the controlled pedestrian crossings provided at Swords Road/Santry Avenue Junction and immediately to the west of the main site access on Santry Avenue.

Both Swords Road and Santry Avenue are subject to 50kph with public street lighting available on both sides of the carriageways.

In terms of existing cycling facilities surrounding the site, cyclists benefit from Cycle lanes provided on both sides of R132 Swords Road corridor north of the Swords Road/ Santry Avenue signalised junction whereas no dedicated cycle facilities are currently provided towards the south of the junction along the R132 corridor. However, southbound cyclists along the R132 Swords Road corridor can benefit from the use of a bus lane though, whilst northbound cyclists along this corridor must share the road carriageway with motorised vehicular traffic.

The subject site benefits from excellent public transport accessibility with Dublin Bus and Go-Ahead bus operating several routes including 16, 33, 27b, 41, 41a, 41b and 41c along the R132 Swords Road corridor providing links to Swords northbound and Dublin City Centre and Ballinteer to the south. Also, Go-Ahead operates 17a along R104 Santry Avenue providing links to/from Blanchardstown and Kilbarrack. All of the above routes are highly accessible with the closest interchange opportunities being within approximately 5m except service 27b bus stop which is located within 500m.

The proposed development site also has connection opportunities to the Railway network, with the closest interchange (Drumcondra Train station) being located approximately 4km from the subject site. The station provides excellent linkages to major national destinations and serves routes a) Dublin Connolly-Sligo, b) Dublin-Maynooth, Longford and M3 Parkway and c) Grand Canal Dock and Dublin Heuston – Portlaoise.

11.3.3 Proposed Transportation Infrastructure

The subject site lies within the "*Dublin North Central Sector*" of the Greater Dublin Area Cycle Network Plan published by NTA in December 2013. The sector *"extends between the Malahide Road to the east, the M50 motorway to the north, Finglas to the west and the North Circular Road to the South*". The proposed development will benefit from the following proposed routes in vicinity of the subject site;

- **Primary Radial Route 2A**: *"Swords via Drumcondra, Whitehall and Santry*", runs directly adjacent to the proposed development site.

- **Secondary Orbital Route NO5**: "*from Donaghmede to Ballymun on Kilbarrack Road, Tonlegee Road, Oscar Traynor Road, Coolock Lane and Santry Avenue*"; and

- **Santry River Greenway**: *"from the back of Northside Shopping Centre to Northwood at Santry via a series of public parks and open spaces*" with minor greenway links from Santry Avenue and Swords Road through Santry Demesne as located to the north of the subject site.

The proposed development site is also ideally located to benefit from the enhanced accessibility levels that will be delivered by the BusConnects proposals. The subject site will be directly serviced by the following BusConnects routes;

- **Route A2/A4:** will run adjacent to the subject site along the Swords Road and will serve the site with frequency of every 12 minutes in peak period. A2 will connect the subject site to Airport, City Centre, Ballinteer and Dundrum whereas A4 connect the site to Swords, City Centre and Nutgrove.

- **Route 82:** will run adjacent to the subject site along the Swords Road and will serve Glen Ellan Road, River Valley and City Centre with a frequency of every 15 minutes.

- **Route N8:** will run along Santry Avenue just opposite the site entrance, with a proposed frequency of 10 minutes. The route provides a connection to Spine Route E located within approximately 1.2km west of the site and the future Metrolink stop on Ballymun Road. It also connects the site to Finglas, Santry, Coolock and Donaghmede.

The MetroLink project is an urban high capacity rail service connecting Swords, Dublin Airport, City Centre and Charlemont with a journey time of approximately 20 mins (between O'Connell St and Dublin Airport) and offering a frequency of up to 30 trains per hour per direction. The closest interchanges near the subject site are Northwood and Ballymun both located within approximately 1.6km from to the entrance of the subject site.

11.4 Characteristics of the Proposed Development

The subject development proposals comprise of 350 no. residential apartment units over 4 no. blocks with 5 no. commercial/retails units at ground floor, all on a site area of 1.5ha on Santry Avenue. The development schedule comprises the following:

Demolition of the existing building on site i.e. the existing Chadwicks Builders Merchants (c. 4,196.8m^2).

Construction of 350 no. 1, 2, & 3 bed apartments, retail / commercial and community uses in 4 no. buildings that are subdivided into Blocks A-G as follows:

- Block A is a 7 to 14 storey block consisting of 59 no. apartments comprised of 26 no. 1 bed & 33 no. 2 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 132.4m^2 & 173m^2 respectively). Adjoining same is Block B, which is a 7 storey block consisting of 38 no. apartments comprised of 6 no. 1 bed, 20 no. 2 bed, & 12 no. 3 bed dwellings, with 2 no. commercial/retail units located on the ground floor (c. 162.3m^2 & 130.4m^2 respectively). Refuse storage areas are also provided for at ground floor level.

- Block C is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. Refuse storage areas are provided for at ground floor level. Adjoining same is Block D which is a 7 to 10 storey block consisting of 51 no. apartments comprised of 25 no. 1 bed, 19 no. 2 bed, & 7 no. 3 bed dwellings, with 1 no. commercial unit / café located on the ground floor (c. 163.3m^2). A refuse storage area is also provided for at ground floor level.

- Block E is a 7 to 10 storey block consisting of 58 no. apartments comprised of 10 no. 1 bed & 48 no. 2 bed dwellings, with 1 no. community use unit located on the ground floor (c. 188.1m^2). A refuse storage area, substation, & switchroom are also provided for at ground floor level. Adjoining same is Block F which is a 7 storey block consisting of 55 no. apartments comprised of 13 no. 1 bed & 42 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

- Block G is a 7 storey block consisting of 34 no. apartments comprised of 20 no. 1 bed & 14 no. 2 bed dwellings. A refuse storage area & bicycle storage area are also provided for at ground floor level.

Construction of a 1 storey residential amenity unit (c. 187.9m^2) located between Blocks A & D.

Construction of basement level car parking (c.5,470.8m^2) accommodating 173 no. car parking spaces & 719 no. bicycle parking spaces. Internal access to the basement level is provided from the cores of Blocks A, B, C, D, E, & F. External vehicular access to the basement level is from the south, between Blocks B & C. 36 no. car parking spaces & 58 no. bicycle parking spaces are also provided for within the site at surface level.

Public open space of c. 1,915m^2 is provided for between Blocks C, D, E, & F. Communal open space of c. 3,122m^2 provided for between (i) Blocks E, F, & G, (ii) Blocks A, B, C, & D, and (iii) in the form of roof gardens located on Blocks A, C, & F and the proposed residential amenity use unit. The development includes for hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels.

Vehicular access to the development will be via 2 no. existing / permitted access points: (i) on Santry Avenue in the north-west of the site (ii) off Swords Road in the south-east of the site, as permitted under the adjoining Santry Place development (Ref. 2713/17).

The development includes for all associated site development works above and below ground, bin & bicycle storage, plant (M&E), sub-stations, public lighting, servicing, signage, surface water attenuation facilities etc.

The proposed development will be accessed by both vehicles and pedestrians via the R104 Santry Avenue as located in the Site's north-western corner as well as Swords Road to the southeast of the site (Left-in/Left-out junction) as being accommodated by the neighbouring permitted development scheme proposals 2737/19.

11.5 Construction Impacts, Mitigation and Monitoring Measures

11.5.1 Management of Construction Activities

All construction activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Dublin City Council (DCC) prior to the commencement of construction activities on site.

The principal objective of the CTMP is to ensure that the impacts of all building activities generated during the construction of the proposed development upon both the public (off-site) and internal (on-site) workers environments, are fully considered and proactively managed / programmed respecting key stakeholders thereby ensuring that both the public's and construction workers safety is maintained at all time, disruptions minimised and undertaken within a controlled hazard free / minimised environment. The impact of the construction period will be temporary in nature.

11.5.2 Construction Traffic

Construction traffic will only be generated on weekdays (0700-1900 subject to Planning conditions) and will consist of the following two principal categories:

- Private vehicles owned and driven by site construction staff and by full time supervisory staff.
- Excavation plant, dumper trucks and delivery vehicles involved in site development works and material delivery vehicles for the following: granular fill materials, concrete pipes, manholes, reinforcement steel, ready-mix concrete and mortar, concrete blocks, miscellaneous building materials, etc.

On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 16:00. It should be noted that a large proportion of construction workers are anticipated to arrive in shared transport. Considering the sensitivity of the site, opportunities for remote off-site compound parking will be explored. Deliveries will be actively controlled and subsequently arrive at a dispersed rate during the course of the working day.

The number of staff on site will vary during the construction period of each construction phase (3 No.) but is predicted to be greatest in the early period of phase 2. Based upon the experience of similar developments, a development of this type and scale would at a maximum necessitate approximately 50 staff on site at any one time, subsequently generating no more than 34 two-way vehicle trips during the peak AM and PM periods over the period of the phased construction works.

It is anticipated that the proposed development would be constructed over three phases and a combined period of approximately 24 months. Following the completion of the initial site clearance works and basement excavation, the generation of HGV movements during the build period will be evenly spread throughout the day and as such will not impact significantly during the peak traffic periods. For this scale of development, we do not expect HGV vehicle movements

to exceed 4 vehicles per hour during the busiest period of construction *'build'* works.

Based on a preliminary review of the existing survey data and proposed site levels we estimate that approximately 20,000 m^3 of material will require excavation as part of the scheme proposals It is estimated that 20,000 m^3 equates to 5 to 6 truckloads per hour depending upon vehicle characteristics. At 44 loads removed per day this equates to 52 days of earthmoving works as part of the adopted worst-case assessment to clear the entire site in one single activity.

It is predicted that the build period will occur over a longer period of time when compared to the demolition and waste material removal stage. Accordingly, the concentration of imported material activities will be spread over time. The busiest build period is predicted to be generated during the construction of the basement facility, however, the level of the HGV movements generated during this period is estimated to be less than the 5 to 6 truckloads per hour during the excavation period. Throughout the build period, it is estimated that between 3 to 4 HGV trips will be generated per hour.

An appropriate control and routing strategy for HGVs can also be implemented for the duration of site works as part of the CTMP. It is not proposed to utilise any roads with weight/height restrictions as part of the routing of HGVs during the construction phase. HGVs will be directed to use Santry Avenue (e.g. Existing Chadwicks access) when accessing/egressing the site from the wider strategic network thereby maximising the opportunity to segregate construction vehicles from other traffic.

A significant benefit of the subject development site's characteristics is that all construction traffic vehicle parking demands can be accommodated on-site thereby minimising the impact upon the operational performance and safety levels of the adjacent public road network and adjoining properties.

Considering the site's proximity to the strategic road network and following the implementation of an appropriately detailed CTMP, it is concluded that construction traffic will not give rise to any significant traffic concerns or impede the operational performance of the local road network and its surrounding junctions. At its peak, the level of construction vehicle trips generated is predicted to be less when compared to when the scheme is completed and operational.

11.6 Operational Impacts, Mitigation and Monitoring Measures

11.6.1 Development Schedule's Trip Generation

Whilst a significant proportion of person trips to/from the proposed development will be undertaken by sustainable modes of travel, the specific impact of the subject scheme will be predominantly influenced by the number of additional vehicle movements that the scheme could potentially generate. To assist in determining this a review of trip generation factors contained within the TRICS database was carried out. TRICS data is primarily UK based, although a number of Irish sites have recently been included and the number of Irish sites continues to expand. Nevertheless, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

Notwithstanding the above, internal research undertaken by TRICS has shown that there is no direct evidence of trip rate variation by country or region. The use of English, Scottish or Welsh data can be equally applicable to Ireland if users take into account important site selection filtering factors such as levels of population, location type, local public transport provision, and

development size and car ownership level, amongst others.

Data supplied for inclusion in TRICS undergoes a procedure of validation testing, and there is no evidence from this procedure suggesting that data from Ireland bears any significant fundamental differences to that from the other countries included. Consequently, we consider that TRICS will provide a reasonable indication of traffic generation from the proposed development.

Table 11.1 below presents the trip rates (using data from TRICS) adopted for the proposed development during the morning and evening peak hour periods. The trip rate is adjusted to reflect the low car allocation characteristics of the development based upon the ratio of proposed car parking to the corresponding Equivalent parking (1 space/1 unit) parking level compared to DCC development management standards. It has been assumed that the developments non-residential units will serve predominantly the proposed development, the local walk in catchment and passing traffic. As such these non-residential uses are not predicted to give rise to material levels of the additional vehicular traffic.

The proposed residential development will be implemented in three different phases i) Phase 1: Blocks A & B, ii) Phase 2: Blocks C, D & Amenity Building and iii) Phase 3: Blocks D, F & G. For the purpose of this assessment, it is assumed that Phase 1 could at the earliest be completed and occupied in late 2022 and Phase 2 & 3 then completed and occupied in 2027 as summarised below.

- 2022 Opening Year = 97 Residential Units (Blocks A & B)
- 2027+ Years – Full Development = 350 Residential Units + Amenity Building

Period	AM Peak (08:00-09:00)			PM Peak (17:00 - 18:00)		
Vehicle Movement	**Arr**	**Dep**	**Total**	**Arr**	**Dep**	**Total**
Original Trip Rates	0.056	0.205	0.261	0.187	0.086	0.273
Adjusted Trip Rates	0.034	0.125	0.159	0.114	0.052	0.166

Table 11.1: Proposed Development Trip Trips

Based on the above trip rates, potential peak hour traffic generation is calculated, and the predicted peak hour AM and PM traffic generated by the proposed development are presented in Table 6.13 and Table 6.14 below. The **Tables 11.2 & 11.3** below outline the potential peak hour vehicle trips for the horizon years, that have been calculated based on the proposed development schedule.

Land Use	Quantity/GFA	AM Peak Hour (08:00-09:00)			PM Peak Hour (17:00-18:00)		
		Arr	**Dep**	**Total**	**Arr**	**Dep**	**Total**
Apartments	Phase 1: 97 units	3	12	15	11	5	16
Total		**3**	**12**	**15**	**11**	**5**	**16**

Table 11.2: Predicted Vehicle Trip Generation (2022 Opening Year)

Land Use	Quantity/GFA	AM Peak Hour (08:00-09:00)			PM Peak Hour (17:00-18:00)		
		Arr	Dep	Total	Arr	Dep	Total
Apartments	350	12	44	56	40	18	58
Total		**12**	**43**	**55**	**39**	**18**	**57**

Table 11.3: Predicted Vehicle Trip Generation (2027+ Years)

The trip generation exercise reveals that the proposed development within 2027+ Years has the potential to generate a total of 55 two-way vehicle trips during AM peak hour and 57 two-way vehicle trips during PM peak hour period.

11.6.2 Traffic Growth

With the objective of quantifying the existing traffic movements across the local road network a local traffic survey data recorded on 06th February 2020 was obtained and used in this assessment.

Traffic Surveys (weekday classified junction turning counts) were conducted by IDASO between 07:00 AM to 10:30 AM and from 16:00 to 19:00 PM. The surveys undertaken included Junction Turning Counts (JTC). JTCs were carried out at two junctions within close proximity to the proposed development site. The following two locations were included within the survey:

- **1** – R132 Swords Road/R104 Santry Avenue junction;
- **2** – Swords Road/Schoolhouse Lane

The traffic surveys established that the local AM and PM peak hours occur between 08:00-09:00 and 17:00-18:00 respectively. In order to analyse and assess the impact of the proposed development on the surrounding road network, a traffic generation and distribution model (excel based) of the above key junctions was created and the following traffic scenarios were assessed:

- 2022 Opening Year without/with development;
- 2027 Interim Year without/with development
- 2037 Future Design Year without/with development.

To ensure a robust analysis of traffic upon the local road network, growth rates using the National Roads Authority (NRA) Project Appraisal Guideline projections were adopted. Table 6.1 within the TII Project Appraisal Guidelines (May2019) provides Annual National Traffic Growth Factors for the different regions within Ireland. The subject site lies within '*Dublin Metropolitan Area'.*

Applying the annual factors (medium growth) for the adopted Opening Year of 2022 and Future Design Year of 2037, the following growth rates have been adopted to establish corresponding 2022 and 2032 baseline network flows:

- 2020 to 2022 – 1.0326 (or 3%);
- 2020 to 2027 – 1.1191 (or 12%); and
- 2020 to 2037 – 1.2036 (or 20%).

11.6.3 Assessment Scenarios & Network Impact

It is anticipated that the earliest the scheme (Phase 1) could be built and occupied would be some time in late 2022. Accordingly, 2022, 2027 and 2037 (e.g. Opening Year plus 5 &15 years) have been adopted as the Opening Year, Interim Year and Future Design Years respectively. Two different traffic scenarios have been assessed, namely (a) the '*Base*' (Do-Nothing) traffic characteristics and (b) the *'Post Development'* (Do-Something) traffic characteristics.

The *'Base'* traffic scenario takes into account the existing flows travelling across the local road network. The proposed development traffic is then added to the network's *'Base'* traffic flows to establish the *'Post Development'* traffic flows. In summary, the following scenarios have been investigated:

Base	2020 - Base Traffic Flows
Do-Nothing	2022 – 'Do Nothing' Scenario
	2027 – 'Do Nothing' Scenario
	2037 – 'Do Nothing' Scenario
Do-Something	2022 – 'Do Something' Scenario
	2027 – 'Do Something' Scenario
	2037 – 'Do Something' Scenario

Table 11.4: Proposed Traffic Scenarios

The TII document '*Guidelines for Traffic Impact Assessments'* states that the impact of any specific development upon the local road network is considered material when the level of traffic it generates surpasses 10% and 5% on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the networks operational performance. An assessment was therefore undertaken for the relevant links surrounding the site, to determine the percentage level of impact generated by the proposed development as presented in Table 11.5.

Ref	Junction	Period	Opening Year 2022	Design Year 2027	Design Year 2037
1	Swords Road / Santry Avenue	AM Peak	0.2%	0.8%	0.7%
		PM Peak	0.3%	0.9%	0.8%
2	Site Access 1/Santry Avenue	AM Peak	1%	3.5%	3.3%
		PM Peak	1.1%	3.5%	3.3%
3	Site Access 2/Swords Road	AM Peak	0.5%	1.1%	1%
		PM Peak	0.3%	0.9%	0.9%

Table 11.5: Proposed Development Predicted Scale of Traffic Impact (Percentage)

The impact predicted for all three junctions within all design years is considered to be insignificant and well below the 5% threshold for necessitating further more detailed analysis. However, for the purpose of robust analysis both site access junctions (predicted impact >1%) will be subject to further assessment in order to determine pre-development and post-development performance of the junctions using the modelling software Junction 9.0 PICADY respectively.

11.6.5 Potential Cumulative Impacts

The analysis detailed above represents an appraisal in terms of potential cumulative impacts for a typical weekday as it is focussed upon the key two busiest periods of the day (e.g. AM and PM peak hours). During the other 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods.

The following local third party committed developments have been included within this appraisal to investigate the cumulative impact of both the subject development proposals and local third party committed developments.

The Santry Place committed development ((Ref 2737/19) a mixed-use development immediately south of the proposed residential development predicted peak hour vehicle trips as outlined in the TTA submitted as part of the planning application are incorporated into the subject development assessment.

Swiss Cottages Development (Ref. ABP 303358-19) mixed use development located on Swords Road East of the proposed residential development predicted peak hour vehicle trips as outlined in the TTA submitted as part of the planning application are also incorporated into the subject development assessment.

The Committed developments (Ref. 2876/21, 2075/21, 3811/20 and 3767/18) within Omni Shopping Centre which have proposals of slight changes in the exiting developments and some only with change of use as detailed in TTA were also included in the assessment to determine cumulative impact.

Furthermore, if all the adjacent zoned lands in the area were to be developed, this would have an effect on the local road network. However, the scale of potential impact would be fully assessed during the planning procedures for any of these individual third-party developments (which currently do not benefit from planning permission). Nevertheless, the utilisation of TII's growth rates does take some account of the potential additional traffic that such third-party site could generate. Figure 11.4 overleaf illustrates cumulative impact of the proposed development.

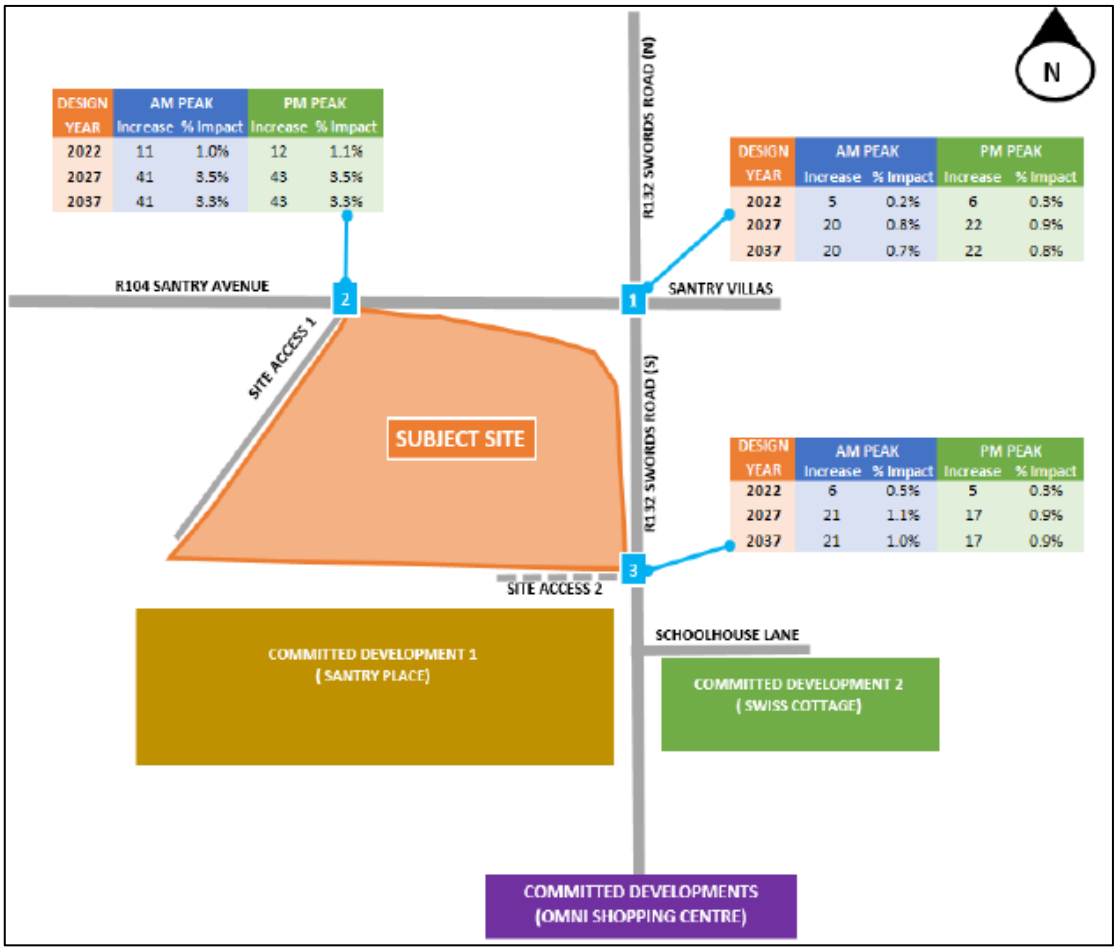


Figure 11.4: Cumulative Impact at Key Local Junctions

11.6.6 Mitigation and Monitoring Measures

11.6.6.1 Construction Phase

The Construction Management Plan will be prepared as part of the planning application with an associated Construction Traffic Management Plan (CTMP) which will incorporate a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated construction period impacts:

- The works will be undertaken across three phases thereby minimising the otherwise concentration of construction activities into a single defined period.
- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network;
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential;
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low;

- Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Westmeath County Council will be adhered to;
- Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual *"Chapter 8 Temporary Traffic Measures and Signs for Roadworks*" and "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010); and
- Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway.
- Material storage zone will be established in the compound area and will include material recycling areas and facilities;
- *'Way finding'* signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;
- Dedicated construction haul routes will be identified and agreed with Westmeath County Council prior to commencement of activities on-site; and
- On completion of the works, all construction materials, debris, temporary hardstands etc. form the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

11.6.6.2 Operational Phase

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised below.

- **Management** – A Mobility Management (MMP) has been compiled by DBFL with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor to be implemented upon occupation of the site. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed development.

- **Car Parking Management Strategy** - A management regime will be implemented by the development's management company to control and actively manage the availability of on-site car parking for residents. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a '*low car allocation'* development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Dublin City Council for a residents parking

  permit (to park on-street in one of the neighbouring streets). Nevertheless, all residents of the proposed residential apartment scheme will have the opportunity to apply to the on-site management company for both a (i) residents car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated

(assigned) on-site basement car parking space or (ii) a visitor's car parking permit for a short period of time. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space. All surface located parking bays will also be subject to parking management regime.

- **Infrastructure** – Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the development. The level of parking provision for the development will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.

- **Infrastructure** – Development proposed provision of dedicated pedestrian footpaths and cycle paths throughout the development site.

- **Car Sharing –** The provision of 4 no. dedicated car share (GoCar) spaces for the use of the scheme's residents. The availability of these on-site provide a viable alternative to residents owning private vehicles whilst still having access to a car as and when required.

11.6.6.3 '*Worst Case*' Scenario

As stated previously, the analysis carried out represents a worst-case appraisal of a typical weekday as (i) it is focused upon the two busiest periods of the day (i.e. AM and PM peak hours). During the remaining 22 hours of the day, traffic flows are predicted to be significantly lower resulting in the network operating with additional reserve capacity to that forecast for the peak hour periods. Similarly, over the weekend periods both the site generated traffic and the external road network traffic flows are generally lower compared to the weekday peak hour periods that have been assessed, (ii) considers local committed developments, and (iii) adopts TII growth rates.

11.7 Residual Impacts

11.7.1 Construction Phase

Provided the above mitigation measures and management procedures are incorporated during the construction phase, the residual impact on the local receiving environment will be temporary in nature and neutral in terms of quality and effect.

The significance of each of the projected impacts are detailed in Table 11.6 for the following key junctions:

- Swords Road / Santry Avenue

- Site Access 1/Santry Avenue

- Site Access 2/Swords Road

The significance of the impacts has been determined in accordance with the classifications stipulated within the Environmental Protection Agency Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft (August 2017).

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Negative - Low	Slight	Temporary
2	Low Sensitivity	Negative - Low	Slight	Temporary
3	Low Sensitivity	Neutral Effects	Not Significant	Temporary

Table 11.6: Impact Significance – Construction Phase

11.7.2 Operational Phase

The implementation of the mitigation measures outlined above, including the MMP, will ensure that the residual effect on the local receiving environment is both managed and minimised. In reference to Table 11.3, the analysis predicts the scale of residual impact, during the 2022, 2027 and 2037 design years, is largely being well below the TII thresholds of 5% on the surrounding links. As a result, the impact can be classified as sub threshold.

The significance of each of the projected impacts at each of the key links is detailed within the following table for the worst case (e.g. peak hours) 2037 Future Year scenarios.

Ref	Environment Character	Quality / Scale of Impact	Impact Significance	Duration
1	Low Sensitivity	Negative - Negligible	Not Significant	Long Term
2	Low Sensitivity	Negative - Negligible	Slight	Long Term
3	Low Sensitivity	Negative - Negligible	Not Significant	Long Term

Table 11.7: Impact Significance – 2037 Design Year (AM & PM)

11.8 Monitoring

11.8.1 Construction Phase

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

11.8.2 Operational Phase

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage

sustainable travel characteristics.

11.9 *'Do Nothing'* Impact

In the absence of the proposed development, the overall operational performance of the existing junctions on the surrounding road network will be affected by (i) the retention of the existing onsite `*Chadwicks*` generated traffic, (ii) committed developments and (iii) the impact caused by the forecast background network traffic growth (should that growth arise).

11.10 Reinstatement

11.10.1 Construction Phase

The construction work areas will be reinstated following completion of development with landscaped areas provided where proposed. The works will be restricted to the footprint of the site for the proposed development. Excavated topsoil and subsoil will be reused in reinstatement and landscaping where appropriate or dealt with in the appropriate manner i.e. sent for soil recovery as appropriate.

11.10.2 Operational Phase

No reinstatement requirements have been identified in relation to the operational phase of the proposed development.

11.11 Interactions

No impact interactions have been identified and it is considered that any minor impacts will be avoided through the implementation of best working practices as stipulated within the Construction Traffic Management Plan and Mobility Management Plan prepared in support of the proposed development.

11.12 Difficulties Encountered in Compiling

There were no material difficulties encountered in compiling and assessing the data for this EIAR sufficient to prevent modelling of the likely transport effects of the proposed development. The analysis reported within this chapter is based upon the traffic survey data recorded in February 2020 (Pre- Covid travel restrictions).

11.13 References

The Institution of Highways and Transportation '*Guidelines for Traffic Impact Assessments*' (1994)
Department of Transport's Traffic Signs Manual "*Chapter 8 Temporary Traffic Measures and Signs for Roadworks*"
Department of Transport's "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010)
Environmental Protection Agency *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (August 2017)*
NRA '*Traffic and Transport Assessment Guidelines*' (2014)
Dublin City Council Development Plan (2016-2022)
National Transport Authority; Greater Dublin Area Cycle Network Plan (2013)
Ordnance Survey Ireland (www.osi.ie)
Transport for Ireland (www.transportforireland.ie)
Transport Infrastructure Ireland (www.tii.ie)
Bus Eireann website (https://www.buseireann.ie)
Irish Rail website (www.irishrail.ie)
Bus Connects website (www.busconnects.ie)

12.0. Material Assets: Resource and Waste Management

12.1. Introduction

Chonaill Bradley of AWN Consulting. Chonaill Bradley is a Senior Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science. He is an Associate Member of the Institute of Waste Management (CIWM). Chonaill has over seven years' experience in the environmental consultancy sector.

The resource and waste management impacts associated with the project are considered in this Chapter. This assessment covers potential impacts from the construction phase as well as the operational phase of the development. The principle objective of sustainable resource and waste management procedures is to ensure efficient consumption of resources, to promote the minimisation of waste generation and, where this is not possible, to encourage reuse, recycling and recovery of waste to minimise the quantity of waste requiring disposal.

A site-specific Construction and Demolition Waste Management Plan (C&D WMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the demolition, excavation and construction phases of the proposed development and has been included as Appendix 12.1. The C&D WMP was prepared in accordance with the *'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

A separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the proposed development and is included as Appendix 12.2 of this Chapter.

These documents will ensure the sustainable management of wastes arising at the development site in accordance with legislative requirements and best practice standards.

12.2. Assessment Methodology

The assessment of the impacts of the proposed development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in the C&D WMP and in the OWMP provided in Appendices 12.1 and 12.2.

This Chapter is based on the proposed development, as described in Chapter 3 (Description of the proposed development) and considers the following aspects:

- Legislative context;
- Construction phase (including demolition, site preparation and excavation); and
- Operational phase.

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the *National Waste Reports and National Waste Statistics*, data recorded from similar previous developments, Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 12.5.

A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 6 of this EIAR (Land, Soils, Geology and Hydrogeology). Chapter 6 also discusses the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed development.

12.2.1. Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of '*waste hierarchy*', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 12.1).

Figure 12.1: Waste Hierarchy (Source: European Commission)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland*, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, *A Resource Opportunity,* in 2012. The need to embed climate action in all strands of public policy aligns with the goals of the European Green Deal.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*, published by the Department of Environment, Heritage and Local Government (DoEHLG) in 2006. The guidance documents, *Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers* (FÁS & Construction Industry Federation, 2002) and Environmental Protection Agency (EPA) 'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects' Draft for public consultation (April 2021) were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*, *BS 5906:2005 Waste Management in Buildings – Code of Practice*, the Dublin City Council (DCC) Waste Management (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018, the EPA National Waste Database Reports 1998 – 2018 and the EPA National Waste Statistics Web Resource.

12.2.2 Terminology

Note that the terminology used herein is generally consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
b) the adverse impacts of the generated waste on the environment and human health; or
c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I sets out a non-exhaustive list of disposal operations.

12.3. Existing Receiving Environment (Baseline Scenario)

The development consists of the demolition of the existing building onsite and provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 4 no. blocks. The proposed development also provides for 5 no. commercial / retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

In terms of waste management, the receiving environment is largely defined by DCC as the local authority responsible for setting and administering waste management activities in the area. This

is governed by the requirements set out in the *EMR Waste Management Plan 2015 – 2021*, which sets out the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets a specific target for C&D waste of "*70% preparing for reuse, recycling and other recovery of construction and demolition waste*" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in August 2020 identifies that Ireland's current progress against this C&D waste target is at 77% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 51%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive; however, the EPA are yet to confirm that these were met.

The Dublin City Development Plan 2016 – 2022 also sets policies and objectives for the DCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, DCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

12.4. Characteristics of the Proposed Development

A full description of the proposed development can be found in Chapter 3 (Description of the proposed development). The characteristics of the proposed development that are relevant in terms of waste management are summarised below.

12.4.1 Demolition Phase

There will be a quantity of waste materials generated from the demolition of the existing building and hardstanding areas on site, as well as from the excavation of the building foundations.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific C&D WMP in Appendix 12.1. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed development. The reuse, recycling / recovery and disposal rates have been estimated using the

EPA National Waste Reports and these are summarised in Table 12.1.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	56.7	0	0.0	85	48.2	15	8.5
Concrete, Bricks, Tiles, Ceramics	513.0	30	153.9	65	333.5	5	25.7
Plasterboard	25.2	30	7.6	60	15.1	10	2.5
Asphalts	6.3	0	0.0	25	1.6	75	4.7
Metals	94.4	5	4.7	80	75.5	15	14.2
Timber	75.5	10	7.6	60	45.3	30	22.7
Total	**771.1**		173.7		519.2		78.2

Table 12.1: Estimated off-site Reuse, Recycle and Disposal Rates for Demolition Waste

12.4.2 Construction Phase

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

In addition, topsoil, subsoil, clay and made ground will require excavation to facilitate site levelling, construction of foundations, along with the installation of underground services. The Project Engineers (DBFL) have estimated that c. 20,000 m^3 of material will require excavation. It is envisaged that all of this material will be removed off-site and none is expected to be kept for on-site reuse. These estimates will be refined prior to commencement of construction.

If the material that requires removal from site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011). For more information in relation to the envisaged management of by-products, refer to the C&D WMP (Appendix 12.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2019).

Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP (Appendix 12.1). The C&D WMP provides an estimate of the main waste types likely to be generated during the Construction phase of the proposed development These are summarised in Table 12.2.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	652.0	10	65.2	80	521.6	10	65.2
Timber	553.2	40	221.3	55	304.3	5	27.7
Plasterboard	197.6	30	59.3	60	118.5	10	19.8
Metals	158.1	5	7.9	90	142.3	5	7.9
Concrete	118.5	30	35.6	65	77.1	5	5.9
Other	296.4	20	59.3	60	177.8	20	59.3
Total	**1975.7**		**448.5**		**1341.5**		**185.7**

Table 12.2: Estimated off-site Reuse, Recycle and Disposal Rates for Construction Waste

12.4.3. Operational Phase

As noted in Section 12.1, an OWMP has been prepared for the proposed development and is included as Appendix 12.2. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the operational phase including dry mixed recyclables (DMR), organic waste and mixed non-recyclable waste (MNR), as well as providing a strategy for management of waste glass, batteries, WEEE, printer / toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the proposed development for the main waste types,

based on the AWN waste generation model (WGM), is presented in Table 12.3, below, and is based on the uses and areas as advised by the Project Architects. Further unit breakdowns can be found in Appendix 12.2.

Waste Type	Waste Volume (m^3/week)	
	Residential Units (Combined)	Commercial Units (Combined)
Organic Waste	5.36	0.39
DMR	36.62	4.45
Glass	1.04	0.11
MNR	21.29	4.45
Total	**64.30**	**7.20**

Table 12.3: Estimated Waste Generation During Operational Phase

The residents and tenants will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the residents. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). WSAs can be viewed on the plans submitted with the application under separate cover.

The OWMP seeks to ensure that the proposed development contributes to the targets outlined in the *EMR Waste Management Plan 2015 – 2021* and the DCC (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018.

Mitigation measures proposed to manage impacts arising from wastes generated during the operational phase of the proposed development are summarised below.

12.5. Construction Impacts, Mitigation and Monitoring Measures

12.5.1. Construction Impacts

The proposed development will generate a range of non-hazardous and hazardous waste materials during site demolition, excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to

inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***Long-term, significant*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

There is a quantity of excavated material which will need to be excavated to facilitate the proposed development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 9. It is anticipated that c. 20,000 m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

12.5.2 Mitigation

12.5.2.1 Construction Phase

The following mitigation measures will be implemented during the construction phase of the proposed development:

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (DoEHLG, 2006), and is included as Appendix 12.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the C&D WMP (Appendix 12.1) in agreement with DCC or submit an addendum to the C&D WMP to DCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.

- The Contractor will be required to fully implement the C&D WMP throughout the duration of the proposed construction and demolition phases.

A quantity of topsoil, sub soil, clay and made ground which will need to be excavated to facilitate the proposed development. Project Engineers have estimated that c. 20,000 m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.
In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to '*design out waste'*;
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Waste Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition, excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development s dealt with in compliance with the provisions of the Waste Management

Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the *EMR Waste Management Plan 2015 – 2021*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

12.5.3 Monitoring Measures

The management of waste during the construction phase will be monitored by the Contactor's appointed Waste Manager to ensure compliance with the above-listed mitigation measures, and relevant waste management legislation and local authority requirements, including maintenance of waste documentation.

12.5.3.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the demolition, excavation and construction works, where there is a potential for waste management objectives to become secondary to other objectives, i.e. progress and meeting construction schedule targets. The C&D WMP specifies the need for a Waste Manager to be appointed, who will have responsibility for monitoring the actual waste volumes being generated and ensuring that contractors and sub-contractors are segregating waste as required. Where targets are not being met, the Waste Manager will identify the reasons for this and work to resolve any issues. Recording of waste generation during the construction phase of the proposed development will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future developments.

12.5.4 Interactions

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

12.5.4.1 Land, Soils, Geology & Hydrogeology

During the construction phase, excavated soil, stone, clay and made ground (c. 20,000 m^3) will be generated from the excavations required to facilitate site levelling, construction of the basement and construction of new foundations. It is estimated that c. 20,000 m^3 of excavated material will need to be removed off-site. Where material has to be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures and the requirements of the C&D WMP (Appendix 12.1), will ensure the effect is ***long-term***, ***imperceptible*** and ***neutral.***

12.5.4.2 Traffic & Transportation

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the proposed development. The increase in vehicle movements as a result of waste generated during the construction phase will be *temporary* in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will

be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 18 (Traffic and Transportation). Provided the mitigation measures detailed in Chapter 18 and the requirements of the OWMP (included as Appendix 12.2) are adhered to, the predicted effects are ***short to long-term***, ***imperceptible*** and ***neutral***.

12.5.4.3 Population & Human Health

The potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific C&D WMP and OWMP (Appendices 12.1 and 12.2, respectively), will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be ***long-term***, ***imperceptible*** **and** ***neutral***.

12.5.5 Cumulative Effects

12.5.5.1 Construction Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place and the potential for more future development in the area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be ***short-term, not significant*** and ***neutral***.

12.5.5.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place and the potential for more future development in the area. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible** and **neutral**.

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12.6. Operational Impacts, Mitigation and Monitoring Measures

12.6.1.1 Operational Impacts

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***Long-term, significant*** and ***negative***.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative***.

Waste contractors will be required to service the proposed development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***Long-term, significant*** and ***negative***.

12.6.2 Mitigation

12.6.2.1 Operational Phase

As previously stated, a project specific OWMP has been prepared and is included as Appendix 12.2.

- The Operator / Buildings Manager of the site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse and recovery at the site of the proposed development.

In addition, the following mitigation measures will be implemented:

- The Operator / Buildings Manager will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;

- Dry Mixed Recyclables;
- Mixed Non-Recyclable Waste;
- Glass;
- Waste electrical and electronic equipment (WEEE);
- Batteries (non-hazardous and hazardous);
- Cooking oil;
- Light bulbs;
- Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
- Furniture (and from time to time other bulky waste); and
- Abandoned bicycles.

- The Operator / Buildings Manager will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator / Buildings Manager will ensure that all waste collected from the site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator / Buildings Manager will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, *the Litter Pollution Act 1997*, the *EMR Waste Management Plan 2015 – 2021* and the DCC Waste Management (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

12.6.3 Monitoring Measures

The management of waste during the operational phase will be monitored by the Operator / Buildings Manager to ensure effective implementation of the OWMP internally and by the nominated waste contractor(s).

12.6.3.1 Operational Phase

During the operational phase, waste generation volumes will be monitored by the Operator / Buildings Manager against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs, where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

12.7 Residual Impacts

The implementation of the mitigation measures outlined in Section 12.5 and 12.6 will ensure that

high rates of reuse, recovery and recycling are achieved at the site of the proposed development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

12.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 12.5 and adherence to the C&D WMP during the construction phase will ensure that the predicted effect on the environment will be ***short-term***, ***imperceptible*** **and** ***neutral***.

12.7.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 12.6 and adherence to the OWMP will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be ***long-term, imperceptible*** **and** ***neutral***.

12.7.3 Conclusion

Assuming the full and proper implementation of the mitigation measures set out herein and in the C&D WMP (Appendix 12.1) and the OWMP (Appendix 12.2), no likely significant negative effects are predicted to occur as a result of the construction or operational of the proposed development.

12.8. '*Do Nothing*' Scenario

The resource and waste management impact assessment assumes that under the '*Do-Nothing Scenario'* the proposed development would not be undertaken. Consequently, there will be a neutral impact on resource and waste management.

12.9. Reference List

Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation include:

European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.

Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.

Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.

Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended.

European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.

Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.

Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015).

European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014).
European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015).
Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988).
European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011).
European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended.

BS 5906:2005 Waste Management in Buildings – Code of Practice.
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FÁS and the Construction Industry Federation (CIF) (2002). *Construction and Demolition Waste Management-a handbook for Contractors and Site Managers.*
Forum for the Construction Industry-Recycling of Construction and Demolition Waste.
Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended.

Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended.
Protection of the Environment Act 2003, (No. 27 of 2003) as amended.

Appendix 12.1: Construction & Demolition Waste Management Plan

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CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN FOR A PROPOSED STRATGIC HOUSING DEVELOPMENT

JUNCTION OF SANTRY AVENUE AND SWORDS ROAD, SANTRY, DUBLIN 9.

Report Prepared For

Dwyer Nolan Developments Ltd

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Our Reference

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Contents Page

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Construction & Demolition Waste Management Plan (C&D WMP) on behalf of Dwyer Nolan Developments Ltd. The proposed development consist of the demolition of the existing building onsite and provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 7 no. blocks. The proposed development also provides for 5 no. commercial / retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

This plan will provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with the current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations [1], *Protection of the Environment Act 2003* as amended [2], *Litter Pollution Act 1997* as amended [3] and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* [4]. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998, *Changing Our Ways*[5], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*' [6] concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020 the government released a new national policy document outlining a new action plan for Ireland and its waste to cover the period of 2020-2025. This plan, 'A Waste Action Plan for a Circular Economy' [7], was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan 'A Resource Opportunity (2012)'

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already in place (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken is the development of a high-level, whole of Government Circular Economy Strategy to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity. This strategy was issued for public consultation in April 2021.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' [8] in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Dublin City Council, etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- New residential development of 10 houses or more; and
- Demolition/renovation/refurbishment projects generating in excess of 100 m³ in volume, of C&D waste.

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [9], published by FÁS and the Construction Industry Federation in 2002 and the Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects'* Draft for public consultation [10] (April 2021).

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC). The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan to the administrative area, published in May 2015.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other recovery of construction and demolition waste"* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - €150 per tonne of waste, which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012.*

The *Dublin City Development Plan 2016 – 2022* [10] sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council. Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*
- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*

Objectives:

- *SIO17: To promote the re-use of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of re-use/recycled materials to be used shall be implemented by the developer.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the development are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
  - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
  - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
  - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
  - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
  - European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
  - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
  - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
  - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended;
  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended [11].

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of *"Polluter Pays"* whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the

Block D is a 7 to 10 storey block consisting of 51 no. apartments with commercial unit / café on the ground floor.

Block E is a 7 to 10 storey block consisting of 58 no. apartments with a community use unit, switchroom, substation and a refuse storage area on the ground floor.

Block F is a 7 storey block consisting of 55 no. apartments with a refuse storage area and bicycle storage area on the ground floor.

Block G is a 7 storey block consisting of 34 no. apartments with a refuse storage area and bicycle storage area on the ground floor.

The development also provides for a residential amenity unit at ground floor level located between Blocks A and D.

The development includes for a basement level car park accommodating 173 no. car parking spaces and 719 no. cycle parking spaces with internal access to same provided from Blocks A, B, C, D, E & F. 36 no. surface level car parking spaces also catered for (including 4 no. car club spaces & 5 set down spaces) along with 86 no. surface level bicycle parking spaces, including 42 visitor spaces.

3.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition of the existing building and hardstanding areas on site, as well as from the further excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete, etc.

There will be soil, stones, clay and made ground excavated to facilitate construction of the basement, new foundations, underground services, and the installation of the proposed basement. The development engineers (DBFL) have estimated that 20,000m^3 of material will need to be excavated to do so. It is currently envisaged that there will be limited opportunity for reuse of excavated material on site and all excavated material will need to be removed offsite. When excavated material is required to be removed offsite it will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the Developer ensures that the waste contractors engaged by demolition and construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a Waste or Industrial Emissions Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE DEVELOPMENT

3.1 Location, Size and Scale of the Development

Dwyer Nolan Developments Ltd. intend to apply to An Bord Pleanála for permission for a strategic housing development on a site measuring c. 1.5 hectares located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19), and to the west by the Santry Avenue Industrial Estate.

The proposed development provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 7 no. blocks. The proposed development also provides for 5 no. commercial / retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

The development will consist of the following:

Demolition of the existing buildings on site (measuring c. 4,196.8m^2). Construction of 350 no. 1, 2 & 3 bed apartments in 7 no. blocks (Blocks A - G) as follows:

Block A is a 7 to 14 storey block consisting of 59 no. apartments with 2 no. commercial units located on the ground floor.

Block B is a 7 storey block consisting of 38 no. apartments with 2 no. commercial units and a refuse storage area on the ground floor.

Block C is a 7 storey block consisting of 55 no. apartments with 2 no. refuse storage areas on the ground floor.

Block D is a 7 to 10 storey block consisting of 51 no. apartments with commercial unit / café on the ground floor.

Block E is a 7 to 10 storey block consisting of 58 no. apartments with a community use unit, switchroom, substation and a refuse storage area on the ground floor.

Block F is a 7 storey block consisting of 55 no. apartments with a refuse storage area and bicycle storage area on the ground floor.

Block G is a 7 storey block consisting of 34 no. apartments with a refuse storage area and bicycle storage area on the ground floor.

The development also provides for a residential amenity unit at ground floor level located between Blocks A and D.

The development includes for a basement level car park accommodating 173 no. car parking spaces and 719 no. cycle parking spaces with internal access to same provided from Blocks A, B, C, D, E & F. 36 no. surface level car parking spaces also catered for (including 4 no. car club spaces & 5 set down spaces) along with 86 no. surface level bicycle parking spaces, including 42 visitor spaces.

3.2 Details of the Non-Hazardous Wastes to be Produced

There will be waste materials generated from the demolition of the existing building and hardstanding areas on site, as well as from the further excavation of the building foundations. The volume of waste generated from demolition will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. plasterboard on timber ceiling joists, steel embedded in concrete, etc.

There will be soil, stones, clay and made ground excavated to facilitate construction of the basement, new foundations, underground services, and the installation of the proposed basement. The development engineers (DBFL) have estimated that 20,000m^3 of material will need to be excavated to do so. It is currently envisaged that there will be limited opportunity for reuse of excavated material on site and all excavated material will need to be removed offsite. When excavated material is required to be removed offsite it will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles generated. There may also be excess concrete during construction which will need to be disposed of. Plastic and cardboard waste from packaging and supply of materials will also be generated. The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

3.3 Potential Hazardous Wastes Arising

3.3.1 Contaminated Soil

Site investigations and environmental soil testing have not yet been undertaken for this site as the site is currently occupied and operating. Prior to any material being removed offsite, site investigations and appropriate environmental soil testing will be undertaken to classify the material for appropriate reuse, recycling or disposal.

If any potentially contaminated material is encountered, it will need to be segregated from clean / inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [12] using the HazWasteOnline application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC* [13], which establishes the criteria for the acceptance of waste at landfills.

In the event that Asbestos Containing Materials (ACMs) are found within the excavated material, the removal will only be carried out by a suitably permitted waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.* All asbestos will be taken to a suitably licensed or permitted facility.

In the event that hazardous soil, or historically deposited waste is encountered during the construction phase, the contractor will notify DCC and provide a Hazardous / Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for disposal / treatment, in addition to information on the authorised waste collector(s).

3.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials; any on-site storage of fuel / oil, and all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel / oil waste generated at the site.

3.3.3 Invasive Plant Species

An invasive species survey was undertaken by Enviroguide Consulting in May 2021 for the purpose of identifying and managing any schedule 3 (*Regulations SI No. 355/2015)* invasive species such as Japanese Knotweed (*Fallopia japonica)*. There were no invasive species found on the site.

3.3.4 Asbestos

An asbestos refurbishment / demolition survey will be undertaken prior to the demolition of the existing structures on site to determine the presence of asbestos or asbestos containing materials (ACMs).

Removal of asbestos or ACMs will be carried out by a suitably qualified contractor and ACMs will only be removed from site by a suitably permitted / licenced waste contractor, in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to*

Asbestos) Regulations 2006-2010. All material will be taken to a suitably licensed or permitted facility.

3.3.5 Other Known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner / cartridges, batteries (Lead, Ni-Cd or Mercury) and / or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes, if generated, will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.4 Main Construction and Demolition Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (applicable as of 1 June 2015) (also referred to as the European Waste Code (EWC)) for each waste stream is also shown.

Table 3.1 *Typical waste types generated and LoW codes (individual waste types may contain hazardous substances)*

Waste Material	LoW/EWC Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Treated wood, glass, plastic, containing hazardous substances	17-02-04*
Bituminous mixtures, coal tar and tarred products	17 03 01*, 02 & 03*
Metals (including their alloys) and cable	17 04 01-11
Soil and stones	17 05 03* & 04
Gypsum-based construction material	17 08 01* & 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-10
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04
Organic (food) waste	20 01 08
Mixed Municipal Waste	20 03 01

** Individual waste type may contain hazardous substances*

4.0 WASTE MANAGEMENT

4.1 Demolition Waste Generation

The demolition stage will involve the demolition and renovation of the existing warehouse style building with attached office and hard standing on- site. The demolition areas are identified in the planning drawings provided with this application. The anticipated demolition waste and rates of reuse, recycling / recovery and disposal are shown in Table 4.1, below.

Table 4.1 *Estimated off-site reuse, recycle and disposal rates for demolition waste*

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	56.7	0	0.0	85	48.2	15	8.5
Concrete, Bricks, Tiles, Ceramics	513.0	30	153.9	65	333.5	5	25.7
Plasterboard	25.2	30	7.6	60	15.1	10	2.5
Asphalts	6.3	0	0.0	25	1.6	75	4.7
Metals	94.4	5	4.7	80	75.5	15	14.2
Timber	75.5	10	7.6	60	45.3	30	22.7
Total	**771.1**		173.7		519.2		78.2

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports* [14] *and the joint EPA & GMIT study* [15].

Table 4.2: *Waste materials generated on a typical Irish construction site*

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	**100**

Table 4.3, below, shows the estimated construction waste generation for the proposed Project based on the gross floor area of construction and other information available to date, along with indicative targets for management of the waste streams. The estimated amounts for the main waste types (with the exception of soils and stones) are based on an average large-scale development waste generation rate per m^2, using the waste

breakdown rates shown in Table 4.2. These have been calculated from the schedule of development areas provided by the architect.

Table 4.3: *Predicted on and off-site reuse, recycle and disposal rates for construction waste*

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	652.0	10	65.2	80	521.6	10	65.2
Timber	553.2	40	221.3	55	304.3	5	27.7
Plasterboard	197.6	30	59.3	60	118.5	10	19.8
Metals	158.1	5	7.9	90	142.3	5	7.9
Concrete	118.5	30	35.6	65	77.1	5	5.9
Other	296.4	20	59.3	60	177.8	20	59.3
Total	**1975.7**		**448.5**		**1341.5**		**185.7**

In addition to the waste streams in Table 4.3, there will be c. 20,000 m^3 of soil, stones, clay and made ground excavated to facilitate construction of new foundations, underground services, and the installation of the proposed basements. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited and all of the excavated material is expected to be removed off- site for appropriate reuse, recovery and / or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on- site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off- site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source, where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off- site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

During construction, some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (per Article 30 (1) (b) of the Waste Collection Permit Regulations 2007, as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste off- site in their work vehicles (which are

not designed for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s), detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR / permit / licence for the receiving waste facility for all waste removed off- site for appropriate reuse, recycling, recovery and / or disposal

Dedicated bunded storage containers will be provided for hazardous wastes which may arise, such as batteries, paints, oils, chemicals, if required.

The anticipated management of the main waste streams is outlined as follows:

Soil, Stone, Clay & Made Ground

The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works so the preferred option (prevention and minimisation) cannot be accommodated for the excavation phase.

When material is removed off- site it could be reused as a by-product (and not as a waste). If this is done, it will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*, which requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received.

The next option (beneficial reuse) may be appropriate for the excavated material, pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end use.

If the material is deemed to be a waste, then removal and reuse / recovery / disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Bedrock

While it is not envisaged that bedrock will be encountered, if bedrock is encountered, it is anticipated that it will not be crushed on site. Any excavated rock is expected to be removed off- site for appropriate reuse, recovery and / or disposal. If bedrock is to be crushed on- site, the appropriate mobile waste facility permit will be obtained from DCC.

Silt & Sludge

During the construction phase, silt and petrochemical interception will be carried out on run-off and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed off- site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible. If concrete is to be crushed on- site, the appropriate mobile waste facility permit will be obtained from DCC.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues, etc., will be disposed of in a separate skip and recycled off- site.

Metal

Metals will be segregated, where practical, and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site Manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical & Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages / receptacles / pallets pending collection for recycling.

Other Recyclables

Where any other recyclable wastes, such as cardboard and soft plastic, are generated, these will be segregated at source into dedicated skips and removed off- site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip / receptacle will be examined by a member of the waste team (see Section 7.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Asbestos Containing Materials

Any asbestos or ACM found on- site should be removed by a suitably competent contractor and disposed of as asbestos waste before the demolition works begin. All asbestos removal work or encapsulation work must be carried out in accordance with *S.I. No. 386 of 2006 Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006-2010.*

Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and / or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

On-Site Crushing

It is currently not envisaged that the crushing of waste materials will occur on- site. However, if the crushing of material is to be undertaken, a mobile waste facility permit will first be obtained from DCC and the destination of the accepting waste facility will be supplied to the DCC waste unit.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by a weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project Waste Manager (see Section 7.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager (see Section 7.0) will maintain a copy of all waste collection permits on-Site.

If the waste is being transported to another site, a copy of the Local Authority waste COR / permit or EPA Waste / Industrial Emissions Licence for that site will be provided to the nominated project Waste Manager (see Section 7.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all Local Authorities in Ireland) and kept on-

Site along with details of the final destination (COR, permits, licences, etc.). A receipt from the final destination of the material will be kept as part of the on-Site waste management records.

All information will be entered in a waste management recording system to be maintained on-Site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is outlined below. The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle / recovery / disposal costs associated with the requirement for a waste contractor to take the material off-Site. Clean and inert soils, gravel, stones, etc., which cannot be reused on-Site may be used as access roads or capping material for landfill sites, etc. This material is often taken free of charge or at a reduced fee for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate, which can be offset against the costs of collection and transportation of the skips. Clean, uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste. Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes, such as timber, from a site than mixed waste.

5.3 Disposal

Landfill charges are currently at around €130 - €150 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill Levy) Regulations 2015.* In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc., is also used as fill / capping material, wherever possible.

6.0 DEMOLITION PROCEDURES

The demolition stage will involve the demolition of multiple brick style buildings on-Site. The demolition areas are identified in the planning drawings submitted as part of this application. A formal demolition plan including safety procedures will be prepared by the demolition contractor. However, in general, the following sequence of works should be followed during the demolition stage:

Check for Hazards

Prior to commencing works, buildings and structures to be demolished will be checked for any likely hazards including asbestos, ACMs, electrical power lines or cables, gas reticulation systems, telecommunications, unsafe structures and fire / explosion hazards, e.g. combustible dust, chemical hazards, oil, fuels and contamination.

Removal of Components

All hazardous materials will be removed first. All components from within the buildings that can be salvaged will be removed next. This will primarily be comprised of metal; however, may also include timbers, doors, windows, wiring and metal ducting, etc.

Removal of Roofing

Steel roof supports, beams, etc., will be dismantled and taken away for recycling / salvage.

Excavation of Services, Demolition of Walls and Concrete

Services will be removed from the ground and the breakdown of walls will be carried out once all salvageable or reusable materials have been taken from the buildings. Finally, any existing foundations and hard standing areas will be excavated.

7.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the Waste Manager to ensure commitment, operational efficiency and accountability in relation to waste management during the C&D phases of the development.

7.1 Waste Manager Training and Responsibilities

The nominated Waste Manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site.

The Waste Manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the Waste Manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The Waste Manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The Waste Manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

7.2 Site Crew Training

Training of site crew in relation to waste is the responsibility of the Waste Manager and, as such, a waste training program should be organised. A basic awareness course will be

held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

8.0 RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arisings on Site.

A waste tracking log should be used to track each waste movement from the site. On exit from the site, the waste collection vehicle driver should stop at the site office and sign out as a visitor and provide the security personnel or Waste Manager with a waste docket (or Waste Transfer Form (WTF) for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by, e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC / LoW

The waste vehicle will be checked by security personal or the Waste Manager to ensure it has the waste collection permit no. displayed and a copy of the waste collection permit in the vehicle before they are allowed to remove the waste from the site.

The waste transfer dockets will be transferred to the Waste Manager on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the DCC Waste Regulation Unit when requested.

Alternatively, each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets / WTF maintained on file and available for inspection on site by the main contractor as required.

Waste receipts from the receiving waste facility will also be obtained by the site contractor(s) and retained. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times. Subcontractors who have engaged their own waste contractors, should provide the main contractor with a copy of the waste collection permits and COR / permit / licence for the receiving waste facilities and maintain a copy on file, available for inspection on site as required.

9.0 OUTLINE WASTE AUDIT PROCEDURE

9.1 Responsibility for Waste Audit

The appointed Waste Manager will be responsible for conducting a waste audit at the site during the C&D phase of the proposed Project. Contact details for the nominated Waste Manager will be provided to the DCC Waste Regulation Unit after the main contractor is appointed and prior to any material being removed from site.

9.2 Review of Records and Identification of Corrective Actions

A review of all waste management costs and the records for the waste generated and transported off-site should be undertaken mid-way through the demolition and construction phase of the proposed Project.

If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery / reuse / recycling targets for the site. Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Upon completion of the C&D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling / reuse / recovery figures for the development.

10.0 CONSULTATION WITH RELEVANT BODIES

10.1 Local Authority

Once construction contractors have been appointed and have appointed waste contractors, and prior to removal of any C&D waste materials off-site, details of the proposed destination of each waste stream will be provided to the DCC Waste Regulation Unit.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

10.2 Recycling / Salvage Companies

The appointed waste contractor for the main waste streams managed by the demolition and construction contractors will be audited in order to ensure that relevant and up-to-date waste collection permits and facility registrations / permits / licences are held. In addition, information will be obtained regarding the feasibility of recycling each material, the costs of recycling / reclamation, the means by which the wastes will be collected and transported off- site, and the recycling / reclamation process each material will undergo off- site.

11.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation includes:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.
   - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended.
   - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
   - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
   - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 430 of 2015)
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
   - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations 1988 (S.I. No. 248 of 1988)
   - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste.*
7. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
8. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
9. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and* site *Managers* (2002).
10. Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource Management Plans for Construction & Demolition Projects'* Draft *(April 2021)*

11. Dublin City Council (DCC), Dublin City Council Development Plan 2016-2022 (2016)

12. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended

13. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)

14. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.

15. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012.*

16. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).

Appendix 12.2: Operational Waste Management Plan

OPERATIONAL WASTE MANAGEMENT PLAN FOR A PROPOSED STRATGIC HOUSING DEVELOPMENT

JUNCTION OF SANTRY AVENUE AND SWORDS ROAD, SANTRY, DUBLIN 9.

Report Prepared For

Dwyer Nolan Developments Ltd

Report Prepared By

Chonaill Bradley, Senior Environmental Consultant

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CONTENTS

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) on behalf of Dwyer Nolan Developments Ltd. The proposed development consist of the demolition of the existing building onsite and provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 7 no. blocks. The proposed development also provides for 5 no. commercial / retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the proposed Development is undertaken in accordance with the current legal and industry standards including, the Waste Management Act 1996 – 2011 as amended and associated Regulations [1], Protection of the Environment Act 2003 as amended [2], Litter Pollution Act 2003 as amended [3], the *'Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021'* [4] and Dublin City Council (DCC) 'Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws' 2018 [5]. In particular, this OWMP aims to provide a robust strategy for the storage, handling, collection and transport of the wastes generated at Site.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed Development during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Government issued a policy statement in September 1998 entitled *'Changing Our Ways'* [6], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, *Changing Our Ways* stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document, *'Preventing and Recycling Waste – Delivering Change'* was published in 2002 [7]. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled *'Making Irelands Development Sustainable – Review, Assessment and Future Action'* [8]. This document also stressed the need to decouple economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled *'Taking Stock and*

Moving Forward' [9]. Covering the period 1998 – 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

In September 2020, the government released a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan *'A Waste Action Plan for a Circular Economy'* [10], was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities, replacing the previous national waste management plan *"A Resource Opportunity"* (2012).

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and back up the production chain. To support the policy, regulation is already in place (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including circular economy, municipal waste, consumer protection and citizen engagement, plastics and packaging, construction and demolition, textiles, green public procurement and waste enforcement.

One of the first actions to be taken is the development of a high-level, whole of Government Circular Economy Strategy to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity. This strategy was issued for public consultation in April 2021.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic *'National Waste (Database) Reports'* [11] detailing, among other things, estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The *2018 National Waste Statistics*, which is the most recent study published, along with the national waste statistics web resource (August 2020) reported the following key statistics for 2018:

- **Generated** – Ireland produced 2,912,353 t of municipal waste in 2018. This is almost a 5% increase since 2017. This means that the average person living in Ireland generated 600 kg of municipal waste in 2018.
- **Managed** – Waste collected and treated by the waste industry. In 2018, a total of 2,865,207 t of municipal waste was managed and treated.
- **Unmanaged** –Waste that is not collected or brought to a waste facility and is, therefore, likely to cause pollution in the environment because it is burned, buried or dumped. The EPA estimates that 47,546 t was unmanaged in 2017.
- **Recovered** – The amount of waste recycled, used as a fuel in incinerators, or used to cover landfilled waste. In 2018, around 85% of municipal waste was recovered – an increase from 77% in 2017.
- **Recycled** – The waste broken down and used to make new items. Recycling also includes the breakdown of food and garden waste to make compost. The recycling rate in 2018 was 38%, which is down from 41% in 2017.
- **Disposed** – Less than a quarter (15%) of municipal waste was landfilled in 2018. This is a decrease from 23% in 2017.

2.2 Regional Level

The proposed Development is located in the Local Authority administrative area of Dublin City Council (DCC).

The *EMR Waste Management Plan 2015 – 2021* is the regional waste management plan applicable to the DCC administrative area, which was published in May 2015.

The regional plan sets out the following strategic targets for waste management in the region that are relevant to the proposed development:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130-150 per tonne of waste, which includes a €75 per tonne landfill levy introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2013.

The *Dublin City Development Plan 2016 – 2022* [13] sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies a need to further reduce the role of landfilling in favour of higher value recovery options. Waste policies and objectives with a particular relevance to this proposed Development are as follows:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin city and the region to become self-reliant in terms of waste management.*
- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*
- *SI22: To ensure that effect is given as far as possible to the "polluter pays" principle.*

Objectives:

- *SIO16: To require the provision of adequately-sized-recycling facilities in new commercial and large scale residential developments, where appropriate.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015 - 2021 and achieve the plan targets and objectives.*

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the proposed Development are:

- Waste Management Act 1996 (No. 10 of 1996) as amended 2001 (No. 36 of 2001), 2003 (No. 27 of 2003) and 2011 (No 20 of 2011). Sub-ordinate and associated legislation includes:

- European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended
- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
- Waste Management (Facility Permit and Registration) Regulation 2007 (S.I No. 821 of 2007) as amended
- Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended
- European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
- European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended
- European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended
- *European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)*
- European Union (Properties of Waste Which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended

- Environmental Protection Act 1992 (S.I. No. 7 of 1992) as amended;
- Litter Pollution Act 1997 (Act No. 12 of 1997) as amended and
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended [13]

These Acts and subordinate Regulations transpose the relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the Waste Management Act 1996 - 2011 and subsequent Irish legislation, is the principle of "Duty of Care". This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal.) As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is, therefore, imperative that the residents and the proposed building management company undertake on-Site management of waste in accordance with all legal requirements and that the facilities management company employ suitably permitted / licenced contractors to undertake off-Site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contactor handle, transport and reuse / recover / recycle / dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities

cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007, as amended, or a Waste or Industrial Emissions (IE) Licence granted by the EPA. The COR / permit / licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and / or disposed of at the specified site.

2.3.1 Dublin City Council Waste Management Bye-Laws

The DCC "Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018)" were bought into force in May 2019. These bye-laws repeal the previous Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste. The bye-laws set a number of enforceable requirements on waste holders with regard to storage, separation and presentation of waste within the DCC administrative area. Key requirements under these bye-laws of relevance to the operational phase of the proposed Development include the following:

- Kerbside waste presented for collection shall not be presented for collection earlier than 5.00 pm on the day immediately preceding the designated waste collection day;
- All containers used for the presentation of kerbside waste and any uncollected waste shall be removed from any roadway, footway, footpath or any other public place no later than 10:00 am on the day following the designated waste collection day, unless an alternative arrangement has been approved in accordance with bye-law 2.3;
- Documentation, including receipts, is obtained and retained for a period of no less than one year to provide proof that any waste removed from the premises has been managed in a manner that conforms to these bye-laws, to the Waste Management Act and, where such legislation is applicable to that person, to the European Union (Household Food Waste and Bio-Waste) Regulations 2015; and
- Adequate access and egress onto and from the premises by waste collection vehicles is maintained.

The full text of the bye-laws is available from the DCC website.

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the residential sector in the DCC region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the regional waste management plan, there is a decreasing number of landfills available in the region. Only three municipal solid waste landfills remain operational and all are operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There are two existing thermal treatment facilities, one in Duleek, Co. Meath and a second in Poolbeg in Dublin.

There is a DCC Recycling Centre at the Collins Avenue Bring Centre, Whitehall, located c.970m to the south of the Development Site, which can be utilised by the residents of the proposed Development for other household waste streams while a bottle bank can be found c. 265 m to the south at the Supervalue Santry Carpark.

A copy of all CORs and waste permits issued by the Local Authorities are available from the NWCPO website and all Waste / Industrial Emissions Licenses issued are available from the EPA.

3.0 DESCRIPTION OF THE DEVELOPMENT

3.1 Location, Size and Scale of the Development

Dwyer Nolan Developments Ltd. intend to apply to An Bord Pleanála for permission for a strategic housing development on a site measuring c. 1.5 hectares located at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The development site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (granted under Dublin City Council Ref's. 2713/17 & 2737/19), and to the west by the Santry Avenue Industrial Estate.

The proposed development provides for 350 no. apartments comprised of 113 no. 1 bed, 218 no. 2 bed & 19 no. 3 bed dwellings in 7 no. blocks. The proposed development also provides for 5 no. commercial / retail units located at ground floor level facing onto Santry Avenue and Swords Road, a community use unit on the ground floor of Block E, and a residential amenity unit at ground floor level located between Blocks A and D.

The development will consist of the following:

Demolition of the existing buildings on site (measuring c. 4,196.8m^2). Construction of 350 no. 1, 2 & 3 bed apartments in 7 no. blocks (Blocks A - G) as follows:

Block A is a 7 to 14 storey block consisting of 59 no. apartments with 2 no. commercial units located on the ground floor.

Block B is a 7 storey block consisting of 38 no. apartments with 2 no. commercial units and a refuse storage area on the ground floor.

Block C is a 7 storey block consisting of 55 no. apartments with 2 no. refuse storage areas on the ground floor.

Block D is a 7 to 10 storey block consisting of 51 no. apartments with commercial unit / café on the ground floor.

Block E is a 7 to 10 storey block consisting of 58 no. apartments with a community use unit, switchroom, substation and a refuse storage area on the ground floor.

Block F is a 7 storey block consisting of 55 no. apartments with a refuse storage area and bicycle storage area on the ground floor.

Block G is a 7 storey block consisting of 34 no. apartments with a refuse storage area and bicycle storage area on the ground floor.

The development also provides for a residential amenity unit at ground floor level located between Blocks A and D.

The development includes for a basement level car park accommodating 173 no. car parking spaces and 719 no. cycle parking spaces with internal access to same provided from Blocks A, B, C, D, E & F. 36 no. surface level car parking spaces also catered for (including 4 no. car club spaces & 5 set down spaces) along with 86 no. surface level bicycle parking spaces, including 42 visitor spaces.

3.2 Typical Waste Categories

The typical non-hazardous and hazardous wastes that will be generated at the proposed Development will include the following:

- Dry Mixed Recyclables (DMR) - includes waste paper (including newspapers, magazines, brochures, catalogues, leaflets), cardboard and plastic packaging, metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;
- Organic waste – food waste and green waste generated from internal plants / flowers;
- Glass; and
- Mixed Non-Recyclable (MNR)/General Waste.

In addition to the typical waste materials that will be generated at the development on a daily basis, there will be some additional waste types generated less frequently / in smaller quantities which will need to be managed separately including:

- Green / garden waste may be generated from external landscaping;
- Batteries (both hazardous and non-hazardous);
- Waste electrical and electronic equipment (WEEE) (both hazardous and non-hazardous);
- Printer cartridges / toners;
- Chemicals (paints, adhesives, resins, detergents, etc.);
- Light bulbs;
- Textiles;
- Waste cooking oil (if any generated by the residents and tenants);
- Furniture (and, from time to time, other bulky wastes); and
- Abandoned bicycles.

Wastes should be segregated into the above waste types to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3 European Waste Codes

In 1994, the *European Waste Catalogue* [14] and *Hazardous Waste List* [15] were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* [16], which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA *'Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [17], applicable since the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, CORs, permits and licences and the EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code (EWC)) for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1, below.

Table 3.1 Typical Waste Types Generated and LoW Codes

Waste Material	LoW/EWC Code
Paper and Cardboard	20 01 01
Plastics	20 01 39
Metals	20 01 40
Mixed Non-Recyclable Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Oils and Fats	20 01 25
Textiles	20 01 11
Batteries and Accumulators*	20 01 33* - 34
Printer Toner/Cartridges*	20 01 27* - 28
Green Waste	20 02 01
WEEE*	20 01 35*-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.) *	20 01 13*/19*/27*/28/29*30
Fluorescent tubes and other mercury containing waste*	20 01 21*
Bulky Wastes	20 03 07

* *Individual waste type may contain hazardous materials*

4.0 ESTIMATED WASTE ARISINGS

A waste generation model (WGM) developed by AWN has been used to predict waste types, weights and volumes expected to arise from operations within the proposed Development. The WGM incorporates building area and use and combines these with other data, including Irish and US EPA waste generation rates.

The estimated quantum / volume of waste that will be generated from the residential units has been determined based on the predicted occupancy of the units. While the floor area usage (m^2) has been used to estimate the waste arising from the crèche and retail units.

The estimated waste generation for the proposed Development for the main waste types is presented in Tables 4.1 – 4.2.

Table 4.1 *Estimated Waste Generation for Residential Blocks A – D*

Waste Type	Waste Volume (m^3 / week)			
	Block A (Residential)	Block B (Residential)	Block C (Residential)	Block D (Residential)
Organic Waste	0.86	0.64	0.86	0.75
Dry Mixed Recyclables	5.89	4.34	5.87	5.12
Glass	0.17	0.12	0.17	0.14
Mixed Non-Recyclables	3.42	2.53	3.41	2.97
Total	**10.34**	**7.63**	**10.30**	**8.98**

Table 4.2 Estimated Waste Generation for Residential Block E – G and Commercial Units

Waste Type	Waste Volume (m^3 / week)			
	Block E (Residential)	Block F (Residential)	Block G (Residential)	Commercial (Combined)
Organic Waste	0.92	0.86	0.47	0.39
Dry Mixed Recyclables	6.31	5.87	3.34	4.45
Glass	0.18	0.17	0.09	0.11
Mixed Non-Recyclables	3.67	3.41	1.76	4.45
Total	**11.08**	**10.30**	**5.66**	**7.20**

BS5906:2005 Waste Management in Buildings – Code of Practice[18] has been considered in the calculations of waste estimates. AWN's modelling methodology is based on recently published data and data from numerous other similar developments in Ireland and is based on AWN's experience, it provides a more representative estimate of the likely waste arisings from the proposed Development.

5.0 WASTE STORAGE AND COLLECTION

This section provides information on how waste generated within the Site will be stored and collected. This has been prepared with due consideration of the proposed Site layout as well as best practice standards, local and national waste management requirements, including those of DCC. In particular, consideration has been given to the following documents:

- *BS 5906:2005 Waste Management in Buildings – Code of Practice,*
- *EMR Waste Management Plan 2015 – 2021;*
- *Dublin City Council Development Plan 2016 – 2022 (Appendix 10);*
- DCC Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018); and
- *DoEHLG, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities* (2020) [19].

Waste Storage Areas

Locations of all Waste Storage Areas (WSAs) can be viewed on the drawings submitted with the planning application under separate cover.

Residential Block A & B

One (1 no.) shared communal WSA has been allocated within the development design for these residential apartment blocks. The bin store is located at the southern end of Block B. The WSA has been strategically located on the ground floor level, in close proximity to the cores.

Residential Block C

Two (2 no.) shared communal WSAs have been allocated within the development design for the residential apartment block. These have been strategically located on the ground floor level, in close proximity to cores.

Residential Block D

One (1 no.) shared communal WSAs has been allocated within the development design for this residential apartment block. These have been strategically located on the ground floor level, in close proximity to cores.

Residential Block E

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. These have been strategically located on the ground floor level, in close proximity to cores.

Residential Block F

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. These have been strategically located on the ground floor level, in close proximity to cores.

Residential Block G

One (1 no.) shared communal WSA has been allocated within the development design for this residential apartment block. These have been strategically located on the ground floor level, in close proximity to cores.

Café/Commercial and Retail Units Block A, B & D

The café/commercial and retail units (Commercial) in these blocks have been allocated a shared commercial WSA on the ground floor level of Block B.

Bins from the proposed Development will be brought to collection points by the waste contractor or facilities management, immediately prior to collection. All locations for collection can be viewed on the drawings submitted with the planning application under separate cover.

Using the estimated waste generation volumes in Tables 4.1 – 4.2, above, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the WSA. It is envisaged that MNR, DMR, organic waste and glass will be collected on a weekly basis for both residential and commercial WSAs.

Waste Storage Requirements

Estimated waste storage requirements for the operational phase of the proposed Development are detailed in Table 5.1, below.

Table 5.1 Waste storage requirements for the proposed development

Area/Use	Bins Required			
	MNR[1]	DMR[2]	Glass	Organic
Residential Block A & B	6 no. 1100 L	11 no. 1100 L	2 no. 240 L	7 no. 240 L
Residential Block C	3 no. 1100 L 1 no. 240L	6 no. 1100 L	1 no. 240 L	4 no. 240 L
Residential Block D	3 no. 1100 L	5 no. 1100 L	1 no. 240 L	4 no. 240 L
Residential Block E	4 no. 1100 L	6 no. 1100 L	1 no. 240 L	4 no. 240 L
Residential Block F	3 no. 1100 L 1 no. 240L	6 no. 1100 L	1 no. 240 L	4 no. 240 L
Residential Block G	2 no. 1100 L	3 no. 1100 L	1 no. 240 L	2 no. 240 L
Commercial Block A, B & D	2 no. 1100 L	4 no. 1100 L	1 no. 240 L	2 no. 240 L

Note: 1 = Mixed Non-Recyclables
2 = Dry Mixed Recyclables

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type. Waste storage receptacles as per Table 5.1, above, (or similar appropriate approved containers) will be provided by the building management company in the residential WSA.

As outlined in the current *Dublin City Development Plan*, it is preferable to use 1,100 L wheelie bins for waste storage, where practical. However, in the case of organic and glass waste, it is considered more suitable to use smaller waste receptacles due to the weight of bins when filled with organic and glass waste. The use of 240 and 120 L bins, as recommended in Table 5.1, will reduce the manual handling impacts on the building management personnel and waste contractor employees.

The types of bins used will vary in size, design and colour dependent on the appointed waste contractor. However, examples of typical receptacles to be provided in the WSAs are shown in Figure 5.1. All waste receptacles used will comply with the IS EN 840 2012 standard for performance requirements of mobile waste containers, where appropriate.

Figure 5.1 Typical waste receptacles of varying size (240 L and 1100 L)

5.1 Waste Storage – Residential Units

Residents will be required to segregate waste into the following main waste streams:

- DMR;
- MNR;
- Glass; and
- Organic waste.

Residents will be required to take their segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the WSAs are illustrated in the drawings submitted with the planning application under separate cover.

Space will be provided in the residential units to accommodate 3 no. bin types to facilitate waste segregation at source.

Each bin / container in the WSAs will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which waste types can be placed in each bin.

Access to the apartment block WSAs will be restricted to authorised residents, facilities management and waste contractors by means of a key or electronic fob access.

Other waste materials such as textiles, batteries, printer toner / cartridges, light bulbs and WEEE may be generated infrequently by the residents. Residents will be required to identify suitable temporary storage areas for these waste items within their own units and dispose of them appropriately. Further details on additional waste types can be found in Section 5.4.

5.2 Waste Storage – Café/Commercial & Retail Units

The commercial tenants will be required to segregate waste within their own units into the following main waste types:

- DMR;
- MNR;
- Glass; and
- Organic waste.

As required, the staff will need to bring segregated waste materials to their designated WSA and deposit their segregated waste into the appropriate bins. The location of the WSAs are illustrated in the drawings submitted with the planning application under separate cover.

Suppliers for the commercial tenants should be requested by the tenants to make deliveries in reusable containers, minimize packaging or remove any packaging after delivery, where possible, to reduce waste generated by the proposed development.

If any kitchens are allocated in unit areas, this will contribute a significant portion of the volume of waste generated on a daily basis, and as such it is important that adequate provision is made for the storage and transfer of waste from these areas to the WSA.

If kitchens are required it is anticipated that waste will be generated in kitchens throughout the day, primarily at the following locations:

- Food Storage Areas (i.e. cold stores, dry store, freezer stores and stores for decanting of deliveries);
- Meat Preparation Area;
- Vegetable Preparation Area;
- Cooking Area;
- Dish-wash and Glass-wash Area; and
- Bar Area.

Small bins will be placed adjacent to each of these areas for temporary storage of waste generated during the day. Waste will then be transferred from each of these areas to the appropriate waste store within their unit.

All bins / containers in the commercial tenants' areas as well as in the WSA will be clearly labelled and colour coded to avoid cross contamination of the different waste streams. Signage will be posted above or on the bins to show exactly which wastes can be put in each.

Other waste materials such as textiles, batteries, lightbulbs, WEEE, cooking oil and printer toner / cartridges will be generated less frequently. The tenant will be required to store these waste types within their own unit and arrange collection with an appropriately licensed waste contractor. Facilties management may arrange collection, depending on the agreement. Further details on additional waste types can be found in Section 5.4.

5.3 Waste Collection

There are numerous private contractors that provide waste collection services in the Dublin City area. All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered / permitted / licensed facilities only.

Bins from the development will be brought to collection points by the waste contractor or facilities management, immediately prior to collection. All locations for collection can be viewed on the drawings submitted with the planning application under separate cover.

A trolley / tug or suitable vehicle may be required to convey the bins to and from the collection areas. The building management or waste contractor will ensure that empty bins are promptly returned to the WSAs after collection / emptying.

Suitable access and egress has been provided to enable the bins to be moved easily from the WSA to the waste collection vehicles on the appropriate days. Waste will be collected at agreed days and times by the nominated waste contractors.

All waste receptacles should be clearly identified as required by waste legislation and the requirements of the DCC *Waste Bye-Laws*. Waste will be presented for collection

in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

It is recommended that bin collection times are staggered to reduce the number of bins required to be emptied at once and the time the waste vehicle is on-Site. This will be determined during the process of appointment of a waste contractor.

5.4 Additional Waste Materials

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

Green Waste

Green waste may be generated from gardens, external landscaping and internal plants / flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens internal plants / flowers can be placed in the organic waste bins.

Batteries

A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the Waste Management Batteries and Accumulators Regulations 2014, as amended. In accordance with these regulations, consumers are able to bring their waste batteries to their local civic amenity centre or can return them free of charge to retailers which supply the equivalent type of battery, regardless of whether or not the batteries were purchased at the retail outlet and regardless of whether or not the person depositing the waste battery purchases any product or products from the retail outlet.

The commercial tenants cannot use the civic amenity centre. They must segregate their waste batteries and either avail of the take-back service provided by retailers or arrange for recycling / recovery of their waste batteries by a suitably permited / licenced contractor. Facilties management may arrange collection, depending on the agreement.

Waste Electrical and Electronic Equipment (WEEE)

The WEEE Directive (Directive 2002/96/EC) and associated Waste Management (WEEE) Regulations have been enacted to ensure a high level of recycling of electronic and electrical equipment. In accordance with the regulations, consumers can bring their waste electrical and electronic equipment to their local recycling centre. In addition, consumers can bring back WEEE within 15 days to retailers when they purchase new equipment on a like for like basis. Retailers are also obliged to collect WEEE within 15 days of delivery of a new item, provided the item is disconnected from all mains, does not pose a health and safety risk and is readily available for collection.

As noted above, the commercial tenants cannot use the civic amenity centre. They must segregate their WEEE and either avail of the take-back / collection service provided by retailers or arrange for recycling / recovery of their WEEE by a suitably permited / licenced contractor. Facilties management may arrange collection, depending on the agreement.

Printer Cartridge / Toners

It is recommended that a printer cartridge / toner bin is provided in the commercial unit, where appropriate. The commercial tenant will be required to store this waste within their unit and arrange for return to retailers or collection by an authorised waste contractor, as required.

Waste printer cartridge / toners generated by residents can usually be returned to the supplier free of charge or can be brought to a civic amenity centre.

Chemicals

Chemicals (such as solvents, paints, adhesives, resins, detergents, etc) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery / recycling / disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the commercial units that is classed as hazardous (if they arise) will be appropriately stored within the tenants' own space. Facilties management may arrange collection, depending on the agreement.

Any waste cleaning products or waste packaging from cleaning products that are classed as hazardous (if they arise) generated by the residents should be brought to a civic amenity centre.

Light Bulbs

Waste light bulbs (fluorescent, incandescent and LED) may be generated by lighting at the commercial units. It is anticipated that commercial tenants will be responsible for the off-site removal and appropriate recovery / disposal of these wastes. Facilties management may arrange collection, depending on the agreement.

Light bulbs generated by residents should be taken to the nearest civic amenity centre for appropriate storage and recovery / disposal.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse. Commercial and residential tenants will be responsible for disposing of waste textiles appropriately.

Waste Cooking Oil

If the commerial tenants use cooking oil, waste cooking oil will need to be stored within the unit on a bunded area or spill pallet and regular collections by a dedicated waste contractor will need to be organised as required. Under sink grease traps will be installed in any cooking space.

If the residents generate waste cooking oil, this can be brought to a civic amenity centre or placed in the organic waste bins.

Furniture & Other Bulky Waste Items

Furniture and other bulky waste items (such as carpet, etc.) may occasionally be generated by the commercial tenant. The collection of bulky waste will be arranged, as required by the tenant. If residents wish to dispose of furniture, this can be brought a civic amenity centre.

Abandoned Bicycles

Bicycle parking areas are planned for the development. As happens in other developments, residents sometimes abandon faulty or unused bicycles, and it can be difficult to determine their ownership. Abandoned bicycles should be donated to charity if they arise or Facilties management willmay arrange collection by a licensed waste contractor.

Covid-19 Waste

Any waste generated by residential and commercial tenants that have tested positive for Covid-19 should be manged in accordance with the current Covid-19 HSE

Guidelines at the time that that waste arises. At the time this report was prepared, the HSE Guidelines require the following procedure for any waste from a person that tests positive for Covid-19:

- Put all waste (gloves, tissues, wipes, masks) from that person in a bin bag and tie when almost full;
- Put this bin bag into a second bin bag and tie a knot;
- Store this bag safely for 3 days, then put the bag into the non-recyclable waste / general waste wheelie bin for collection / emptying.

Please note that this guidance is likely to be updated by the time the proposed Development is open and occupied and the relevant guidance at the time will need to be reviewed.

5.5 Waste Storage Area Design

The WSAs should be designed and fitted-out to meet the requirements of relevant design Standards, including:

- Be fitted with a non-slip floor surface;
- Provide ventilation to reduce the potential for generation of odours with a recommended 6-10 air changes per hour for a mechanical system for internal WSAs;
- Provide suitable lighting – a minimum Lux rating of 220 is recommended;
- Be easily accessible for people with limited mobility;
- Be restricted to access by nominated personnel only;
- Be supplied with hot or cold water for disinfection and washing of bins;
- Be fitted with suitable power supply for power washers;
- Have a sloped floor to a central foul drain for bins washing run-off;
- Have appropriate signage placed above and on bins indicating correct use;
- Have access for potential control of vermin, if required; and
- Be fitted with CCTV for monitoring.

The building management company, tenants and residents will be required to maintain the resident bins and storage areas in good condition as required by the DCC Waste Bye-Laws.

6.0 CONCLUSIONS

In summary, this OWMP presents a waste strategy that addresses all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the proposed Development.

Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus contributing to the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

Adherence to this plan will also ensure that waste management at the development is carried out in accordance with the requirements of the *DCC Waste Bye-Laws*.

The waste strategy presented in this document will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated areas for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

7.0 REFERENCES

1. Waste Management Act 1996 (S.I. No. 10 of 1996) as amended 2001 (S.I. No. 36 of 2001), 2003 (S.I. No. 27 of 2003) and 2011 (S.I. No. 20 of 2011). Sub-ordinate and associated legislation includes:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended
   - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended
   - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014)
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
   - European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
   - Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended 2015 (S.I. No. 190 of 2015)
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended 2000 (S.I. No. 73 of 2000)
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended
   - *European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)*
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended
2. Environmental Protection Act 1992 (Act No. 7 of 1992) as amended;
3. Litter Pollution Act 1997 (Act No. 12 of 1997) as amended;
4. Eastern-Midlands Waste Region, *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021* (2015)
5. DCC *Dublin City Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2018)*
6. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998)
7. Department of Environment, Heritage and Local Government (DoEHLG) *Preventing and Recycling Waste - Delivering Change* (2002)
8. DoELG, *Making Ireland's Development Sustainable – Review, Assessment and Future Action (World Summit on Sustainable Development)* (2002)
9. DoEHLG, *Taking Stock and Moving Forward* (2004)
10. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (2020).
11. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012.*

12. DCC, *Dublin City Development Plan 2016 – 2022* (2016)
13. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended 2010 (S.I. No. 30 of 2010) and 2015 (S.I. No. 310 of 2015).
14. European Waste Catalogue - Council Decision 94/3/EC (as per Council Directive 75/442/EC).
15. Hazardous Waste List - Council Decision 94/904/EC (as per Council Directive 91/689/EEC).
16. EPA, *European Waste Catalogue and Hazardous Waste List* (2002)
17. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)
18. BS 5906:2005 Waste Management in Buildings – Code of Practice.
19. DoEHLG. Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2018).

13.0. Archaeology and Cultural Heritage

13.1. Introduction

It is proposed to develop a residential development and associated works at on lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9.

This section of the EIAR assesses the impact of the development on the Cultural Heritage of the site and its environs. The report includes a desktop assessment and a site inspection.

Field walking and archaeological testing was undertaken in July 2019. Steven McGlade, BA, MIAI of Archaeology Plan Heritage Solutions undertook this chapter and archaeological testing at the site.

13.2. Assessment Methodology

13.2.1. Guidance and Legislation

As part of the assessment the following legislation and guidelines were consulted as part of the study:

- National Monuments Acts, 1930-2014
- The Planning and Development Act, 2000 (as amended)
- Heritage Act, 1995
- Environment Protection Agency: Advice Notes for preparing Environmental Impact Statements, 2015
- EPA: Draft Revised Guidelines on The Information to be Contained in Environmental Impact Assessment Reports, August 2017
- Frameworks and Principles for the protection of Archaeological Heritage 1999
- Architectural Heritage (National Inventory) and Historic Monuments and the Local Government (Planning and Development) Act 2000
- Dublin City Development Plan 2016-2022

13.2.2. Study Methodology

This assessment consists of a paper survey identifying all recorded sites within the vicinity of the proposed development and a site inspection. The methodology has been conducted based on the guidelines from the Department of Culture, Heritage and the Gaeltacht (DAHG).

13.2.3. Desktop Survey

The desktop survey undertaken consisted of a document and cartographic search utilising a number of sources including the following:

- Record of Monuments and Places (RMP); The RMP records known upstanding archaeological monuments, the original location of destroyed monuments and the location of possible sites identified through, documentary, cartographic, photographic research and field inspections.

- The RMP consists of a list, organised by county and subdivided by 6" map sheets showing the location of each site. The RMP data is compiled from the files of the Archaeological Survey.

- National Inventory of Architectural Heritage; The inventory of architectural heritage lists all post 1700 structures and buildings in the country. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.

- County Development Plans; The Development plan was consulted to ascertain if any structures listed in the Record of Protected Structures (RPS) and/or any Architectural Conservation Areas (ACAs). The Record of Protected Structures lists all protected structures and buildings in Laois. This includes structures of architectural, historical, archaeological, artistic, cultural, social, scientific or technical importance.

- Cartographic Sources; The following maps were examined: Down Survey, 1st edition Ordnance Survey Maps (1837-1842) and 2nd edition Ordnance Survey Maps (1910), Rocque Map and the Cassini Map.

- Literary Sources; Various published sources, including local and national journals, were consulted to establish a historical background for the proposed development site. Literary sources are a valuable means of completing the written record of an area and gaining insight into the history of the environs of the proposed development.

A comprehensive list of all literary sources consulted is given in the references section of this chapter.

13.2.4. Site Inspection

An archaeological field inspection survey seeks to verify the location and extent of known archaeological features and to record the location and extent of any newly identified features. A field inspection should also identify any areas of archaeological potential with no above ground visibility. In certain cases archaeological test trenches can be excavated to examine the sub surface potential of a site. Many monument types do not leave surface markers. Wooden sites such as prehistoric house or burials may only be recorded through excavation works.

13.3. Receiving Environment

The proposed site is bordered to the north by the Santry Avenue, Swords Road to the east, permitted residential development to the south and industrial units to the west. There are existing surface water and foul networks that traverse the site.

The proposed development provides for 350 no. dwellings comprised of 1, 2 & 3 bed apartments, accommodated in 4 no. blocks, all on a site area of 1.5ha. The site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (Ref's 2713/17 & 2737/19) and to the west by the Santry Avenue Industrial Estate.

Permission is sought for the demolition of the existing buildings on site (4,196.8m^2). Vehicular access to the proposed development will be via two proposed access points: (i) on Santry Avenue and (ii) off Swords Road, and as permitted under the adjoining development at Santry Place.

13.4. General Archaeological and Historical Summary

Prehistoric activity in the area around Santry is evidenced by a polished stone axe, flint tools, and copper objects found in the 1940s and 1960s and recorded in the topographical files. There are no known monuments in the area dating from the prehistoric period.

The early ecclesiastical establishment at Santry was reputedly founded by St. Pappan in the 6th century (Adams 1884). While it is impossible to prove who founded the church, the remains of the oval ecclesiastical enclosure on the First Edition Ordnance Survey map are typical of early medieval monastic sites and it is likely that the village of Santry later developed around the ecclesiastic site. The development site would have been situated in this medieval village of Santy.

During the first phase of the Scandinavian longphort of Dublin, Santry was part of an extensive rural area that was mostly under the political and economic control of the Vikings until their expulsion in 902 AD (Bradley 1988).

Following their return and the re-founding of Hiberno-Norse Dublin in 917, the hinterland took on an increasingly defined status and began to be referred to as fine gall ('*place of the foreigner*') by the Irish, and Dyflinarskiri by the Scandinavians. This area stretched as far north as the town as Skerries, west to Leixlip and south to Dalkey. Much of the area was subject to periodic control by local and provincial Irish kings and the situation changed constantly. Despite this, the town continued to exert control over the region up to the 12th century. (Murphy and Potterton 2010, 61-63).

The growing population of Dublin would have been dependent on the produce of an extensive agricultural hinterland for food and raw materials for industry and building (Murphy and Potterton 2010, 64-65). Santry and the lands around it were very likely dedicated to the production of cereal crops, cattle or managed hazel coppice during this time. Debate continues as to the ethnicity of the population of this hinterland, but it seems likely that it contained some Scandinavians, some Irish and many of mixed ethnicity. Place-name evidence is particularly convincing of the Scandinavian influence in many parts of what was then rural Dublin. Glasnevin and Finglas, for example, both of which are close to Santry, take their modern names from Scandinavian roots. Despite the place name evidence, however, the archaeological evidence for Scandinavian rural settlement in north Dublin is sparse. This contrasts with the situation in south Dublin, where archaeological evidence has demonstrated extensive Scandinavian influence, for example Cherrywood in south Co. Dublin (Ó Néill 2006). Overall, it is difficult to separate Irish settlement from Scandinavian settlement when the rural nature of each was probably quite similar (Murphy and Potterton 2010, 63- 71).

following the arrival of the Anglo-Normans in 1170, Scandinavian influence on Dublin and its hinterland ended abruptly. A considerable amount of land changed hands in the subsequent years, and under the terms of his 1172 grant from Henry II, Hugh de Lacy was permitted to make grants around Dublin. Santry was granted to one of his barons, Adam de Feypo (Murphy and Potterton 2010, 93). De Feypo set about imposing the Anglo-Norman manorial system of landholding, whereby the lord's residence and associated buildings were but a component of the medieval settlement and most of the manorial lands were populated and farmed by tenants (Murphy and Potterton 2010, 207).

The medieval manor of Santry consisted of a hall, chambers, stables, a bakery, 200 apple trees, 100 pear trees, 30,000 great ash trees and 1000 large alder trees (Calendar of the justiciary rolls, 1295-1303, no. 386). De Feypo allegedly built the 12th century church on the site of St. Pappan's 6th century church and granted it to St. Mary's Abbey (Adams 1881). All that remains today of de Feypo's church is the medieval font (RMP DU014-057003). The lands at Santry changed hands several times from the dissolution of the monasteries in the 1530s until c. 1620, when the Barry family took control of the 1,160 acre estate (Smyth 1992).

The Civil Survey (1654-6) makes note of a dwelling house of stone with a barn and stable within the demesne. The influence of the Barry's, and their descendants the Domvilles, on Santry was immense. In c. 1703 they built Santry Court on the site of de Feypo's manorial home and the new Protestant church, that still stands today, at the ruins of St. Pappan's in 1709 (Somerville-Woodward 2002, 8-9). The development site lies outside Santry Court Demense, but it would have been part of the earlier manor, as it faces Santry Avenue which led to the entrance to the demesne.

Lewis (1837) described the 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 items of fine arts.'* The demesne comprised more than 140 acres and was '*tastefully laid out in gardens and pleasuregrounds, richly embellished with timber, and commanding some beautiful scenery and some extensive mountain and sea views'* (Lewis 1837).

Sir Charles Compton William Domville embarked on a transformation of Santry Court in 1857; 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. (Stout, RMP file).

The Domvilles left Ireland following independence and the house and gardens eventually passed down to the Free State. It was occupied by the Irish air force during the *'Emergency'* and was destroyed by accidental fire in 1941. It lay derelict until its demolition in 1959. All that now remains of the house are the front steps and a walled garden. Plaster friezes survive in the rear walls of the entrance piers (Stout, RMP file).

Much like in medieval times, Santry's development since the mid-20th century has very much been a product of its proximity to Dublin city centre. St. Pappan's ecclesiastical site, the manor which was incorporated into Santry Demesne, Santry Avenue and the Swords Road are all that remain from the medieval period, as the once rural area has been replaced by housing, shopping complexes, industry and airport car parking.

13.4.7. Recorded Archaeological Monuments

There are several archaeological monuments in the vicinity of the development site. The majority of these are part of the St. Pappan's ecclesiastical complex, located across the Swords Road and to the east of the site, around which the medieval village of Santry is believed to have developed. The Santry Demesne and house to the northwest of the site were important to the later development of the area.

These monuments in the area are detailed below:

DU014-057001 – Church

The current St. Pappan's Church was built in 1709, reputedly on the site of a 12th century parish church erected by Adam de Feypo, who granted it to St Mary's Abbey (Adams 1881, 484). According to the Regal Visitations of 1615 the medieval church was already in ruins by that time. It had been built within an earlier ecclesiastical enclosure that in the 6th century was associated with St. Pappan. The remains of the enclosure and a holy well survive near the present church. A font that has been dated to the 14th century is the only medieval element within the present church (Stout, RMP file).

DU014-057002 – Ecclesiastical residence

The rectory of St. Pappan's is no longer part of the overall St. Pappan's property and is instead owned by the Dublin Life Christian Church. It too allegedly occupies the site of an earlier predecessor, in this case a 16th century building (Adams 1881, 484), however no visible remains of the earlier structure survive.

DU014-057003 – Font

As mentioned above, the font is the only medieval component within the present-day St Pappan's church. It is octagonal in plan and is set on its original plinth (Stout, RMP file).

DU014-057004 – Ritual site – holy well

McQuade (2003a) identified the exact location of the holy well during archaeological investigations (Licence number 03E0353) on a property adjacent to, and south of, St. Pappan's church. This had been a private garden in 1850 just outside of the church, and the well was accessed by a flight of stairs. Devotions no longer took place there by the 19th entury, though it was still known as a holy well (O'Danachair 1957-8). The well was very overgrown prior to McQuade's archaeological testing. It was uncovered below 400mm of topsoil and it had been backfilled with polythene and concrete. The well measured 3.2m in length from the northern property wall to its southern limestone limits. The stones contained a corroded iron spike which was probably the remains of a railing. The well measured 1.05m - 1.6m in width (McQuade 2003a). It was fenced off and protected during the 2003 construction works and McQuade (2003b) detailed proposals to repatriate the well to the church of St. Pappan's.

DU014-057005 – Ecclesiastical enclosure

The remains of a roughly-oval early enclosure around the present church is depicted on the Ordnance Survey First Edition 6" map (1837- 1842). It is apparent in the northern sector of the graveyard as a raised platform, 1.1m in height. It is interrupted by the 18th century Domville family tomb. The line of the enclosure continues in the eastern graveyard wall to the east and returns to the south-west (Stout, RMP file).

DU014-057006 – Graveyard

The graveyard stands in a walled oval area that likely respects the line of an earlier ecclesiastical enclosure (see above). There are 18th and 19th century memorials in the graveyard (Stout, RMP file).

DU014-030 – House

All that remains of Santry House (sometimes known as Santry Court) are the front steps that lead up to a platform where the house used to stand, and a walled garden. Plaster friezes based on the Parthenon survive in the rear of the walls of the entrance pier and are suggestive of forgotten splendour. Originally built in 1703 by the Barry family and splendidly renovated by their descendant Sir Charles Compton William Domville in 1857, it was destroyed by fire in 1941 whilst occupied by the Irish army. It remained derelict and was eventually demolished in 1959 (Stout, RMP file).

Topographical files

The topographical files of the NMI record acquisitions and their provenance made by the museum since the 19th century. The topographical files offer the only known evidence for prehistoric activity within Santy and the neighbouring townland of Santry Demesne.

1954:44

A clay pipe was found in the garden of a house named '*Coolfin*' that was formerly part of the grounds around the Royal Oak Inn.

1969:58-63

A flint scraper, a flint flake from a round pointed implement, a butt-trimmed Bann flake and two unornamented concave/convex copper objects were all found at a depth of 0.6m - 0.76m while digging foundations for a house in Santry.

1969:63:1-7

A copper object, gunflint, a bead, a lump of glass and a ring were also found in Santry and were all handed in with the above objects. The topographical files contain no other information for these objects.

1947:43

A polished stone axe head was found lying in gravel 0.46m below the surface while digging drainage within Santry Demense.

Archaeological Investigations

Several previous licensed archaeological investigations have occurred within 500m of the development site.

19E0069

A programme of archaeological monitoring is currently ongoing at the development to the south of the site. A cobbled lane running east-west with ditches running either side of it was revealed during removal of the concrete slab beneath the existing warehouse on the site. This corresponded to a laneway depicted on the First Edition Ordnance Survey maps from c. 1840. A second cobbled laneway was identified branching off to the northwest. The features were post-medieval in date. The original ground level was rising to the north and west with more truncation

relating to the previous construction on the site in those directions. There was also significant disturbance towards the road frontage along the Swords Road with no archaeology identified adjacent to the road (pers. comm. Giacometti and McGlade).

19E0317

Demolition and construction under archaeological monitoring to the east of the development site in 2019 uncovered partial wall foundations of one of the eleven Swiss cottages built by Lady Domville in 1840. A boundary wall and cobbled surface of a laneway associated with the cottages was also identified. All of the archaeological features were recorded prior to development on the site.

03E0353

The most significant archaeological discoveries in the area were also those closest to the development site. As noted above, the location of a holy well (DU014-057004) associated with St. Pappan's Church and medieval and postmedieval activity were identified in advance of the development of two blocks of student apartments on Schoolhouse Lane. McQuade (2003b, 2) interpreted medieval drainage channels and a possible field boundary as being associated with the cultivation of lands held by St. Mary's Abbey. The gullies had a sticky grey fill with sherds of locally manufactured ware with a green glaze and Leinster cooking ware dating from the late 12th to mid-14th centuries. These channels extended beyond the limits of excavation and were likely part of a wider field system that included the possible field boundary.

Post-medieval furrows and a drain highlighted the continuing use of the land for cultivation following the dissolution of the monasteries. Sherds of tin glazed-earthenware dating to the 17th-18th century were recovered from a furrow, garden soil and topsoil. Drains containing 18th -19th century red earthenware and a clay pipe stem indicated continuing cultivation. Two medicine bottles found in topsoil were almost certainly associated with the Dispensary marked on the First Edition Ordnance Survey map (McQuade 2003b).

09E066

Archaeological monitoring of groundwork relating to the construction of a detached dwelling adjacent to No. 19 Santry Villas did not reveal any features, deposits or finds of archaeological significance.

05E0039

There was no evidence for any archaeological deposits or features found during monitoring foundation works in advance of the construction of two houses in Coultry, Ballymun.

06E0436

Archaeological test trenching in advance of a three-storey residential block on the corner of Schoolhouse Lane and Magenta Crescent did not reveal any archaeological features or deposits.

17E0545

Archaeological testing of the foundations of a proposed new church to the rear of the ecclesiastical residence DU014-057002 did not uncover the earlier 16th century rectory that Adams (1884) alleged once stood on the site. Cultivation furrows were discovered, and these

were interpreted as the remains of garden cultivation. No other features of archaeological significance were identified (Kiely 2017).

Licence No.	Excavations Ref.	Location	Description	Director
19E0069	n/a	Swords Road, Santry	19th century field lane	A. Giacometti
19E0317	2019:510	Swords Rd., Santry	19th century building & boundaries	J. Hession
03E0353	n/a	Schoolhouse Lane, Santry	Holy well. Medieval boundaries	M. McQuade
09E0066	2010:293	Santry Villas, Santry	No archaeology	J. Carroll
05E0039	2005:388	Coultry Ave., Ballymun	No archaeology	H. Keogh
06E0436	2006:698	Schoolhouse Lane, Santry	No archaeology	K. Lohan
17E0545	2017:512	Schoolhouse Lane, Santry	Testing, no archaeology	J. Kiely

Table 13.1: Archaeological Investigations

Architectural Heritage

Protected Structures

There are no Protected Structures within the Study Area, however St Pappan's church and holy well to the east are listed as RPS No. 1543 in the Record of Protected Structures associated with the most recent Dublin City Development Plan, 2016-2022.

National Inventory of Architectural Heritage (NIAH)

There are no sites listed in the NIAH within the Study Area, however a number are listed to the east in the vicinity of St Pappan's Church. These include the Domville Monument (NIAH Reg. No. 50130322), a limestone tomb dating to 1855-1860 of Compton Domville, an important landowner in County Dublin, who resided at Santry House in the 19th century.

A freestanding mausoleum to Henry LeFroy, vicar of Santry, dating to c. 1876 (NIAH Reg. No. 50130320) is also located within the graveyard of the church. It comprises a gable-fronted structure with pitched roof of granite construction.

St Pappan's Church is also listed (NIAH Reg. No. 50130115) and is recorded as a freestanding Church of Ireland church dating to 1709 and modified in the late 19th century. It has a three-bay nave with a vestry to the north and porch to the west. The record also notes that the existing building is set within an historic graveyard on the site of an early Christian foundation.

St Pappan's rectory is the last entry in the vicinity of the church (NIAH Reg. No. 50130116), which is described as a detached three-bay two-storey square plan former rectory and schoolhouse, build c. 1810.

Industrial Archaeology

Dublin City Industrial Heritage Record (DCIHR)

The Dublin City Industrial Heritage Record survey makes recommendations for sites to be added to the list of Protected Structures within Dublin City. There is one record listed in the DCIHR that is close to the development site.

14 12 004 – Smithy

The smithy is marked on both the First Edition and Second Edition Ordnance Survey maps on

the corner of the Swords Road and the entrance lane to St. Pappan's church, also known as Church Lane. There are no upstanding remains of the smithy and the site is currently occupied by a large warehouse.

13.5. Cultural Heritage Impacts

13.5.1. Site Survey

A site inspection was carried out on Tuesday the 18th March 2021.

The site is sub-rectangular in shape and is accessed via Santry Avenue to the north. It is bounded to the north by Santry Avenue and to the east by the Swords Road. The access road for the earlier phase of apartments to the south lies to the west, with Santry Avenue Industrial Estate beyond it. To the south it is bounded by apartments that were constructed over the last three years on the site of the former bonded warehouse of Edward Dillon. It is occupied by Chadwick's (formerly Heiton Buckley) Builders' Merchants, which is still a going concern. The large warehouse is still standing and is in use.

The remainder of the plot is a concreted yard, car park and storage space, with the main builders' supply store to the south. The entire plot is level and there is no suggestion of any pre-existing features surviving above the ground. The boundary is formed by an iron security fence, which encircles the entire site.

13.5.2. Recorded Monuments

The proposed development will not impact directly or indirectly upon any previously recorded site or monument listed in the RMP or the RPS. The closest Recorded Monument, St Pappan's church, graveyard and ecclesiastic enclosure is over 100m away, and the constraint zone surrounding the monuments is 58m to the east of the Study Area.

The desktop assessment did not identify any features of archaeological potential within the boundary of the Study Area. A pump is depicted in the southeast corner of the Study Area on the 1910s Ordnance Survey map, however it is no longer present.

13.5.3. Cartographic Evidence

Down Surveys c.1650s

The Down Survey Barony map of Coolock Barony (Map to the left in Fig. 13.7 in Appendices) does not show any detail in the vicinity of the Study Area**.** It is located within a parcel of land labelled *'Hoolywood'*.

The parish map for Santry parish (Map to the bottom centre of Fig. 13.7 in Appendices) shows the Study Area in a parcel of land labelled *'Hollywood land with Loghill'*. the accompanying terrier lists Nicholas Hollywood of Artane and Thomas Fleming, an Irish papist, as the proprietors of the lands at this time. The name at this time presumably derived from the Hollywoods, an Anglo-Norman family who were in possession of Artane Castle from c. 1360.

Hiberniae Delineato (Petty's Atlas) 1685

William Petty, the Surveyor General responsible for the Down Survey, published the first atlas of

Ireland in 1685 although it is believed that the engravings for the publication were created over a decade earlier, c. 1671. *'Holliwood Santry'* is shown at the southern end of Santry parish (Map to the right of Fig. 13.7 in Appendices)

John Rocque's Map of 1757

Rocque's maps (Fig. 13.8 in Appendices) in the mid18th century show a lot more detail in the vicinity of the Study Area. The linear settlement along the Swords Road is labelled Santry, though the housing is mainly depicted to the east. The Study Area is depicted as agricultural fields west of the Swords Road and south of the treelined Santry Avenue. The church is depicted and labelled to the east set back from the road, while Santry House is depicted in substantial gardens to the northwest. A turnpike is depicted and labelled along the Swords Road just north of the junction with Santry Avenue.

First edition OS Map, 1837-42

The First Edition Ordnance Survey map, c. 1837-42 (Fig.13.9 in Appendices), show the Study Area as being part of a large agricultural field southwest of the junction of Santry Avenue and Swords Road. The section of Swords Road east of the Study Area is depicted as being tre-lineds, as is Santry Avenue to the north. A horseshoe symbol indicting a smithy or forge is depicted on the corner across from the Study Area to the east. A dispensary, parochial school, glebe house and the church are also labelled to the east, while Santry House is labelled to the northwest.

Ordnance Survey Map, c.1910

The 1910s edition of the Ordnance Survey map (Fig.13.10 in Appendices) shows no change within the Study Area, though a pump, labelled with a *'P.'* symbol, is depicted directly to the southeast. A smithy, rectory, school and St Pappan's Church are labelled to the east of the Study Area and to the northwest Santry House has been renamed Santry Court.

OS Cassini 6inch maps, c. 1950s

The Cassini maps (Fig.13.11 in Appendices) are so called because they used a system for surveying developed by the Cassini family of cartographers in the eighteenth century in France. The Study Area is again depicted as undeveloped agricultural land. Further development has taken place to the east of the Swords Road, with a G.P., post office and rectory labelled along with St Pappan's Church. The wooded grounds of Santry Court are depicted to the northwest.

13.6. Cultural Heritage Potential

13.6.1. Archaeological Potential

There are no above-ground archaeological or cultural heritage features or materials within the development site. Given the fact that the site has been previously levelled and concreted over, the potential for anything other than deep cutting archaeological features surviving on the site is low. Nevertheless, the location of the development site within what was once Viking controlled Fingal and between the Santry Demense on Santry Avenue and St. Pappan's Church on the Swords Road, is significant.

Prehistoric

There are no known prehistoric monuments or excavation evidence from the surrounding area. Some prehistoric activity in the area is apparent from the several flint finds held in the NMI but the potential for prehistoric features to survive on the development site is extremely low.

Early Medieval

The development site's proximity to the early medieval enclosure at St. Pappan's church means that the site was likely utilised by the monastic community, and most probably for agricultural purposes. The early medieval environment has largely been reconstructed on the basis of pollen evidence but excavated evidence for animal bone, plant remains, charcoal and proxy indicators have helped to increase our knowledge (Harney, Kerr, McCormick and O'Sullivan 2008, 191). The early documentary sources provide a wealth of information on the cultivation of cereals, vegetables, fruit and herbs (Kelly 1997, 219- 271). The archaeological evidence has yet to define a clear difference between the arable agriculture of ecclesiastical and secular settlements, but the documentary evidence implies an emphasis on arable farming on church-controlled lands. The excavated evidence of grain drying kilns, water mills and horizontal mills on church sites seem to support this emphasis, thought they have also been found on secular sites. Faunal evidence from excavated monastic sites may also support an emphasis on arable activity, where the presence of wild species of animals and older slaughtered animals suggest that meat was being consumed, but not produced (Harney, Kerr, McCormick and O'Sullivan 2008, 195).

The curvilinear enclosure, some of which survives at St. Pappan's, of early medieval church sites would have been unsuitable to contain crop cultivation (Harney, Kerr, McCormick and O'Sullivan 2008, 196). Arable agriculture, therefore, can be expected to have taken place outside of the enclosure. It is quite likely that the development site was used for such purpose. The potential for early medieval cultivation ridges and furrows is low, given that the site has been previously scarped. Evidence for deeper field boundaries may exist throughout the site.

A route along the present-day Swords Road was likely in existence at the time of the original St. Pappan's church, linking Santry to the ecclesiastical settlements at Swords and beyond to Lusk, Rush and Skerries. Though unlikely, evidence of this early medieval routeway may still survive on the eastern part of the development site. Adams (1881) alleged that the village of Santry developed around the church of St. Pappan's, and it is possible that the development site was subject to some form of settlement at this time, again most probably in the eastern portion, facing the road.

Santry was within the larger Viking-controlled rural area of Fingal during the early Viking Age and its location between the Scandinavian placenames of Finglas, Swords and Howth make it extremely likely to have been directly involved in supplying Hiberno-Norse Dublin with agricultural and industrial supplies. It is less likely that evidence of the exact land use will survive on the development site, though the presence of associated agricultural features cannot be fully precluded.

Since the area was now being used to directly supply the growing town of Dublin, the importance of the Swords Road as a trade route may have led to improvements being made to the road. These improvements could have taken the form of a metalled or cobbled surface and/or improved drainage, the remnants of which could potentially survive towards the eastern part of the development site.

Late Medieval

The late medieval period was significant for the development of Santry. The establishment of the

Anglo-Norman Santry manor would have introduced new settlement types and farming methods to the area. It could be expected that long burgage plots dedicated to tillage farming, with its distinctive '*S*' shaped ridge and furrow ploughing technique, were to be found on both the Swords Road and Santry Avenue leading to the manorial home. For the development site, the likelihood of later medieval structures surviving on the site is stronger on the eastern portion of the site, where the burgage plots would have fronted onto the Swords Road. That is not to rule out the possibility of cultivation features or agricultural structures such as stables or sheds surviving towards the western part of the site. Also, given the contemporary description of the many trees on the de Feypo manor, it is not improbable to suggest that the development site could have been woodland at the time.

The re-building of a church at St. Pappan's and its subsequent granting to St. Mary's Abbey by de Feypo would also have been hugely influential on the development of Santry. It is possible that the development site at that time may have been part of the lands directly controlled by the Abbey, rather than by the manor. Given its proximity to St. Pappan's church and its location on the Swords Road, the development site could have formed part of a proto-urban settlement focused on the abbey grounds. McQuade's (2003b) discovery of drainage features associated with 12th century cultivation just southwest of the church and c. 100m east of the development site suggests a still largely rural element to the area and is also indicative of the potential for medieval features to survive on the site.

Fig.13.1: Summary of archaeological potential within the Study Area

Post-Medieval

Santry in the post-medieval period came to be under the control of the Barry family whose descendants remained as landlords in the area until the foundation of the Free State in 1922. While their development of Santry Court has already been discussed, the change of the landholding system from one of burgage plots to small tenant farms would also have taken place under their supervision. It is known from Rocque's (1860) map that the area around Santry, including the development site, had been subdivided by field boundaries. This likely happened during the Anglo-Norman period, if not earlier (Stout 2005, 145), but the long burgage plots associated with the Anglo-Norman manorial system would have long since disappeared. The development site was outside of the demesne and its current western and southern boundaries were at that time defined by field boundaries. The Santry Turnpike is mapped on the Swords

Road at the junction with Santry Avenue, and on the other side of the Avenue to the Study Area. The existence of the turnpike is suggestive of investment and improvement being made in the road.

The precise location of the development site is more clearly defined on the First Edition Ordnance Survey map, where despite the lack of its current southern boundary, its present shape is visible in the tree-lined eastern boundary with the Swords Road, and the treelined Santry Avenue to the north. There were no buildings recorded on the development site at that time. The site was still largely undeveloped by the time of the 25" Ordnance Survey map.

13.7 Impact on the Cultural Heritage Landscape

Consideration of the characteristics of the proposed development allows for a projection of the '*level of impact'* on any particular aspect of the proposed environment that could arise. For this section, the potential impact on cultural heritage is discussed.

The subject site forms part of the Applicant's wider landholding to the south, with a total area for the two sites of c. 3.2 Ha. The lands form a sub-rectangular area to the southwest of the junction between the Swords Road and Santry Avenue.

The lands lie within the boundary of Dublin City Council, with Santry Avenue forming the northern boundary of the lands under DCC control. The most recent County Development Plan, 2016-2022 has zoned the entire of the Chadwick's (formerly Heiton Buckley) portion of the lands and the eastern portion of the site already under construction as Zone Z3, which has an aim to provide and improve neighbourhood facilities. The western portion of the site currently under construction is zoned as Zone Z6, which has an aim to provide for the creation and protection of enterprise and facilitate opportunities for employment creation.

The proposed development within the Study Area is for a Strategic Housing Development (SHD) consisting of c. 350 no. apartments on the site of Chadwick's (formerly Heiton Buckley) Builders Providers. The development will provide underground car parking, communal open spaces and retail / commercial units in addition to the c. 350 no. apartments. The present building of Chadwick's (formerly Heiton Buckley) Builders Providers, covering an area of 4196.8m², will be demolished as part of the development.

The development to the south consisted of the demolition of an existing eight-bay warehouse building measuring 10,000m^2 on a 1.89 Ha. site, and the construction of five blocks of mixed-use office, commercial and residential units over a partial basement carpark and all ancillary and associated site development works, including piled foundations under each of the blocks and the basement area. Construction is nearing completion on this site. The development was granted planning permission in 2018 (DCC Planning Ref. 2713/17), with Condition 14 relating to archaeology. This required an archaeological assessment, which was carried out by Archaeology Plan in 2018 (Giacometti 2018). Following on from the archaeological assessment a programme of archaeological monitoring was carried out on the site under Licence No. 19E0069. A report on the findings of the monitoring programme has yet to be finalised as the western portion of the site is not yet complete.

Construction Stage

The removal of topsoil, the digging of foundation trenches for proposed apartments, the insertion of services and the movement of construction machinery across the proposed development will

have a profound, permanent negative effect on potential subsurface archaeological features and/or deposits without the correct mitigation measures. With the correct mitigation measures, the proposed development can have a significant, positive effect for any potential archaeological features and/or deposits.

Operational Stage

Once construction of the proposed development is complete, and the residential development comes into full operation, it is envisaged that there will an imperceptible neutral effect upon any potential surviving archaeological features and/or deposits.

13.7.1 Cumulative Impact of the Proposed Development

The Cumulative Development of the two sites off Santry Avenue is for the construction of 555 residential units with retail / commercial units, five office units and a creche, along with all associated site works. Both sites were brownfield sites with existing warehouses on them.

Construction Stage

The construction stage of the Cumulative Development involves the demolition of existing warehouses, the removal of existing hard surfaces prior to the construction of the new buildings on the sites. Due to the presence of the existing buildings and hard surfaces it is not possible to assess for the survival of subsurface archaeological remains prior to the demolition of the buildings.

In the southern portion of the site it was found that testing was also difficult after the demolition of the upstanding building due to the thickness of the concrete floor of the existing building. Monitoring of the removal of the existing floor and subsurface works below the floor and above the natural subsoil proved to be the best methodology for the assessment of the survival of archaeology within the site. Within the southern site an east-west orientated 19th century road flanked by two road-side ditches was identified, which was depicted on the First Edition of the Ordnance Survey maps. A second metalled surface was also identified, branching off the first and running to the northwest, which overlay the northern road-side ditch. The road was a field access land, with the second feature being a later field access. Some plough furrows were also recorded in the undisturbed portions of the site, while other areas had been profoundly impacted by the previous construction and service laying on the site, with nothing surviving between the
concrete and the natural subsoil below.

During the construction phase for the site to the south, the archaeological monitoring and recording of the archaeological features encountered had a permanent, significant positive effect for our knowledge of the agricultural layout of the lands within the bounds of the site in the 19th century.

Within the proposed development to the north it is likely the same obstacles to early archaeological investigations will be present. During the construction phase a similar approach involving monitoring of the groundworks following the demolition of the existing building at the time of the removal of the existing concrete pad and prior to any further sub-surface works will allow for the recording and preservation by record of any previously unknown archaeology within the bounds of the site. This will give a similar permanent, significant positive effect to our understanding of the potential archaeology within the site.

Operational Stage

No further groundworks are associated with the operational stage of the Cumulative Development. Therefore, the operational stage of the Cumulative Development continues to have a long-term positive effect for the preservation by record of the agricultural features present on the site.

13.7.2 Potential Impact of the Proposed Development

This section provides a description of the specific, direct and indirect, impacts that the proposed development may have during both the construction and operational phases of the infrastructural elements of the proposed project. This is provided with reference to the Characteristics of the Receiving Baseline Environment and Characteristics of the Proposed Development sections.

The following impact assessment is based on the results of the preceding sections (desktop study, site inspection and previous investigations). The Impact Assessment is divided both into three sections, and is summarised below:

• Impact on Recorded Monuments (RMP)	None
• Impact on known archaeology	None
• Impact on potential/unknown archaeology	Profound

Table 13.1: Impact Assessment

Impacts on Recorded Monuments and Protected Structures

The proposed development will not impact directly or indirectly upon any previously recorded site or monument listed in the RMP or the RPS. The closest Recorded Monument, St Pappan's church, graveyard and ecclesiastic enclosure is over 100m away, and the constraint zone surrounding the monuments is 58m to the east of the Study Area.

The desktop assessment did not identify any features of archaeological potential within the boundary of the Study Area. A pump is depicted in the southeast corner of the Study Area on the 1910s Ordnance Survey map, however it is no longer present.

Impacts on Unknown / Potential Archaeological Sites

The proposed development will have a widespread profound permanent negative impact on any previously unidentified subsurface archaeological remains that may survive on the development site.

The western portion of the proposed development is of low archaeological potential. The eastern portion of the proposed development has a moderate archaeological potential. This is due to it fronting onto the Swords Road and proximity to the medieval boundaries and drainage channels uncovered on the opposite site of the road to the south of St Pappan's Church in 2003, along with its closer proximity to the ecclesiastic foundation itself. The location of the existing building, set back from the road frontage, increases the likelihood that any belowground archaeological features located within this part of the site would survive. It should be noted that no archaeological remains were identified fronting onto the Swords Road in the monitoring works for the site to the south in 2019 and that the area is depicted as agricultural fields throughout the post-medieval period.

Construction Stage

The Construction Stage (without appropriate ameliorative measures) will have no impact on known archaeological features and deposits within the proposed development.

The Construction Stage, without appropriate ameliorative measures, will have a profound permanent negative impact on unknown archaeological features and deposits within the footprint of the proposed development.

Operational Stage

As there are no known archaeological features within the proposed development, the Operational Stage of the residential development would have no impact on known archaeology.

It is envisaged that any unknown potential archaeological features within the proposed development would not survive the Construction Stage, without appropriate ameliorative measures. Nevertheless, the Operational Stage of the residential development would have an imperceptible long-term neutral effect on any remnants of the known archaeology.

Furthermore, there is a possibility for an imperceptible long-term positive effect of preservation in situ for unknown archaeological features and/or deposits that potentially survive within the proposed green areas of the development.

13.8 Mitigation

Based on the results of the desktop assessment there is some potential for medieval agricultural features relating to St Pappan's Church to the east or to the manor of Santry, which was located to the north, however these were not identified within the site directly to the south where only 19th century agricultural features were identified.

It is therefore recommended that archaeological monitoring be carried out under licence after the demolition of the existing building during the removal of the concrete layer. Any features encountered during the monitoring programme should be tested, and if archaeological fully excavated by hand to preserve them by record.

In the unlikely event that significant archaeology is uncovered a revised mitigation plan may be necessary, which will be agreed upon in discussion with the City Archaeologist and The National Monuments Service.

Time should be allowed between the monitoring works and any construction or service laying in case archaeological features are uncovered.

A report on the results of the monitoring programme should be submitted to the City Archaeologist and the National Monuments Service following the completion of the works.

This recommendation is subject to the approval of the City Archaeologist and the National Monuments Service.

Fig.13.2: Summary of the findings of the assessment and recommendation for monitoring of concrete slab removal within the entire footprint of the site (highlighted in blue)

13.9 Residual Impacts

There will be no residual impacts on the cultural heritage resource as a result of this development proceeding as planned.

13.10 *'Do Nothing'* Scenario'

If the proposed development were not to proceed there would be a neutral impact on the cultural heritage resource as the works will, have no impact on the cultural heritage section.

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Appendix 13.1: Figures

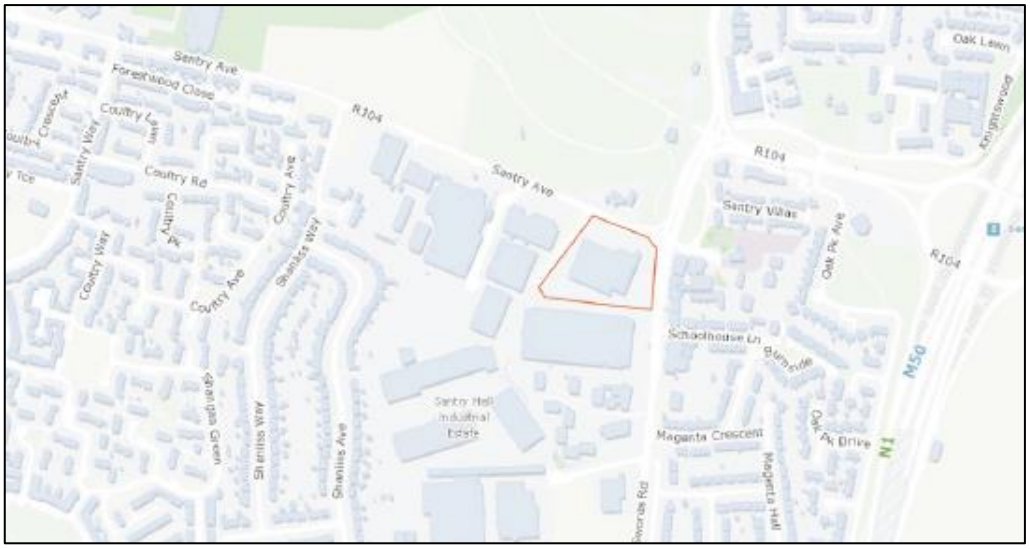

Figure 13.2a: Location of the site

Figure 13.3: Recorded Monuments in the vicinity of the Study Area

Figure 13.4: Excavations in the vicinity of the Study Area

Figure 13.5: Detail from Rocque's Map of 1757 showing the turn pike to the northeast of the Study Area

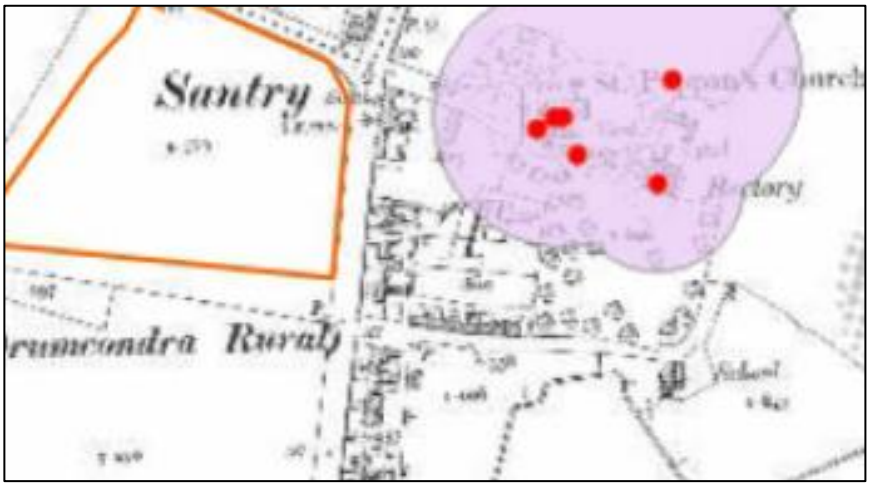

Figure 13.6: Detail of the 1910s edition of the Ordnance Survey showing a pump, marked by a *'P.'* symbol, to the southeast of the Study Area

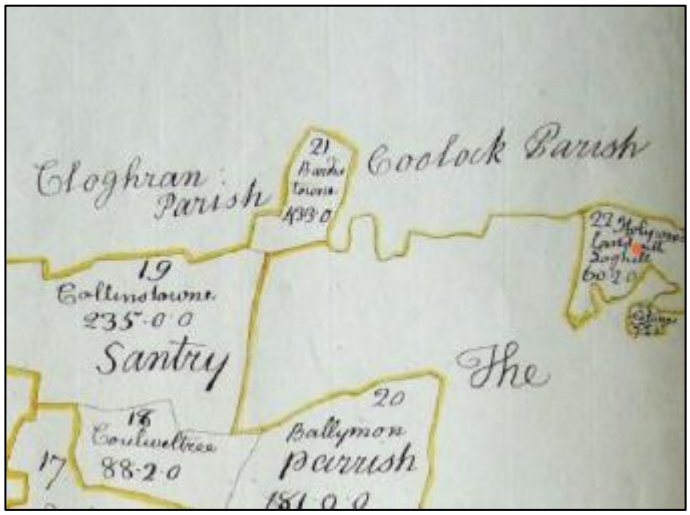

Figure 13.7: Down Survey 1650s

The Down Survey Barony map of Coolock Barony (top left) does not show any detail in the vicinity of the Study Area. It is located within a parcel of land labelled *'Hoolywood'*. The parish map for Santry parish (bottom left) shows the Study Area in a parcel of land labelled *'Hollywood land with Loghill'*. the accompanying terrier lists Nicholas Hollywood of Artane and Thomas Fleming, an Irish papist, as the proprietors of the lands at this time. The name at this time presumably derived from the Hollywoods, an AngloNorman family who were in possession of Artane Castle from c. 1360.

Hiberniae Delineato (Petty's Atlas) 1685 William Petty, the Surveyor General responsible for the Down Survey, published the first atlas of Ireland in 1685 although it is believed that the engravings for the publication were created over a decade earlier, c. 1671. *'Holliwood Santry'* is shown at the southern end of Santry parish (right)

Figure 13.8: John Rocque's map of 1757

Rocque's maps in the mid18th century show a lot more detail in the vicinity of the Study Area. The linear settlement along the Swords Road is labelled Santry, though the housing is mainly depicted to the east. The Study Area is depicted as agricultural fields west of the Swords Road and south of the treelined Santry Avenue. The church is depicted and labelled to the east set back from the road, while Santry House is depicted in substantial gardens to the northwest. A turnpike is depicted and labelled along the Swords Road just north of the junction with Santry Avenue.

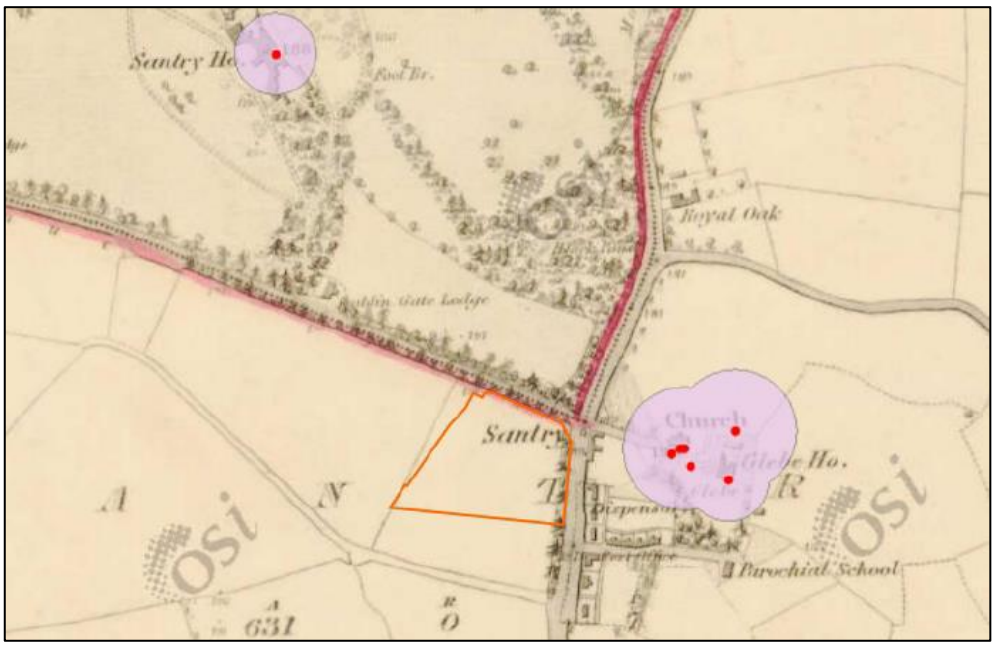

Figure 13.9: First edition OS map with the development marked, c 1837-42

The First Edition Ordnance Survey map, c. 1837- 42 (above), show the Study Area as being part of a large agricultural field southwest of the junction of Santry Avenue and Swords Road. The section of Swords Road east of the Study Area is depicted as being tre-lineds, as is Santry Avenue to the north. A horseshoe symbol indicting a smithy or forge is depicted on the corner across from the Study Area to the east. A

dispensary, parochial school, glebe house and the church are also labelled to the east, while Santry House is labelled to the northwest.

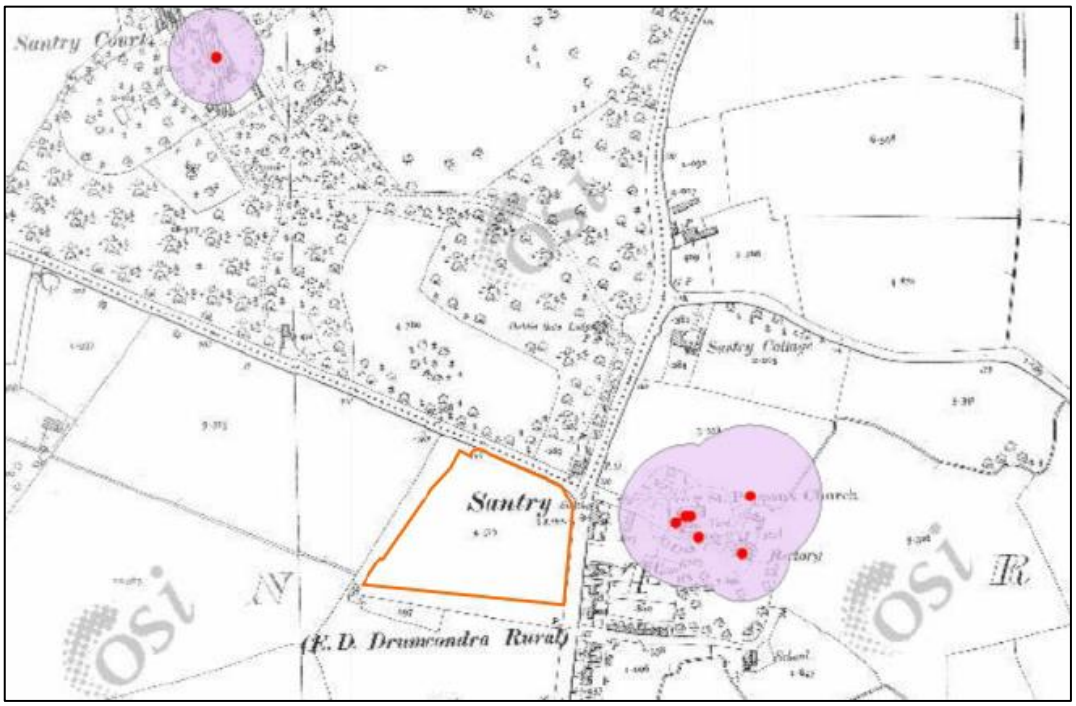

Figure 13.10: OS Map (1910) with the location marked

The 1910s edition of the Ordnance Survey map (above) shows no change within the Study Area, though a pump, labelled with a *'P.'* symbol, is depicted directly to the southeast. A smithy, rectory, school and St Pappan's Church are labelled to the east of the Study Area and to the northwest Santry House has been renamed Santry Court.

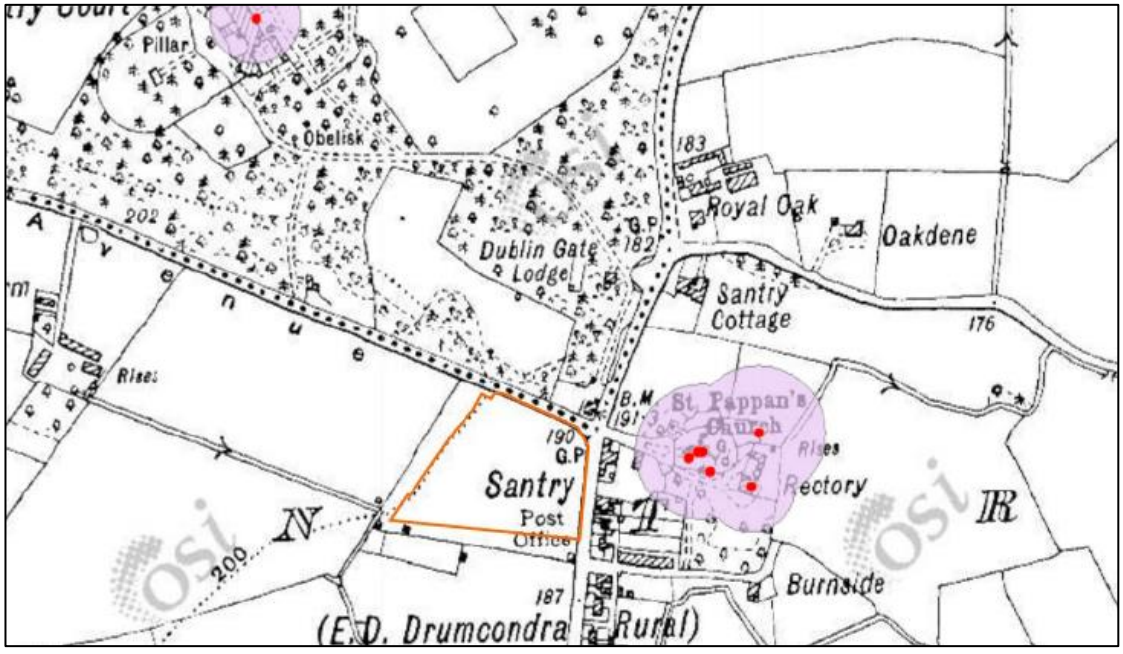

Figure 13.11: OS Cassini 6inch maps, c. 1950s

The Cassini maps (top) are so called because they used a system for surveying developed by the Cassini family of cartographers in the eighteenth century in France. The Study Area is again depicted as undeveloped agricultural land. Further development has taken polace to the east of the Swords Road, with a G.P., post office and rectory labelled along with St Pappan's Church. The wooded grounds of Santry Court are depicted to the northwest.

Figure 13.12: Aerial imagery

The earliest aerial photo of the Study Area is an ortho photograph from 1995 (top) by the Ordnance Survey, which shows the current warehouse on the site was already in place. The most recent aerial image from the Ordnance Survey (centre) shows little change within the Study Area, while an image from Google Earth dated to April 2020 (bottom) shows construction underway within the site to the south.

Fig 13.13: Landscape Masterplan.

Appendix 13.2: Site Inspection Photos

Oblique overview of eastern end of the Study Area from the new development to the south, looking northeast with St Pappan's church in the background

Oblique overview of the central part of the Study Area from the new development to the south, looking north

Oblique overview of the western part of the Study Area
from the new development to the south, looking north-west

View of front facade of the existing Heiton Buckley
Builders Providers building, looking south-east

View of the eastern end of the Study Area, looking south. There has been no construction in this part of the Study Area shown on the maps or aerial images of the site and if there is archaeology present within the Study Area this may be the most promising location for its survival

Western boundary of the Study Area with security fence forming the boundary, looking north-east

Southern boundary of the Study Area with security fence and stores present along the boundary, looking north-west

View across the Study Area towards the three completed blocks within the development to the south, looking south-east

14.0 The Landscape

14.1 Introduction

This chapter of the EIAR was prepared by Julie Sammiller B.Sc. Land Arch and Luke Byrne B.Agr.Sc. Land Arch, MLI, of Dermot Foley Landscape Architects. This Landscape and Visual Impact Assessment (hereafter LVIA) describes the existing receiving environment, contiguous landscape and the methodology utilised to assess the impacts. It assesses the visual extent of the proposed development and its visual effects on key views throughout the study area. It describes the landscape character of the application site and hinterland, together with the visibility of the site from significant viewpoints in the locality. The report summarises the impact of the proposed development on the visual and landscape amenity of the application site and contiguous area.

The following visual receptors are addressed in this assessment:

- Any designated protected views and views/scenic routes protected through development objectives in the Dublin City Development Plan (2016-2022) and the Fingal County Development Plan (2017-2023);
- Local Amenity and Heritage Features;
- Local community views to assess the landscape and visual impact of the proposals on those who live and work in proximity to the Proposed Development as well as those utilising local amenities;
- Relevant local settlement nodes; and
- Major routes adjacent to the site.

14.1.1 Photomontage Report

This report should be read in conjunction with the Photomontage Report produced by 3D Design Bureau, see Appendix 14 B.

14.2 Assessment Methodology

Landscape and visual impact assessments are two separate but closely related topics. The assessment of visual impact focuses on the extent to which new developments can be seen. Visual analysis forms one part of a Visual Impact Assessment (VIA), the process by which the potential significant effects of a proposed development on the visual resource of an area are methodically assessed. In turn, VIA forms just one part of a Landscape and Visual Impact Assessment (LVIA). Landscape assessment focuses on the character of the landscape, examining responses which are felt towards the combined effects of the new development.

14.2.1 Desktop Study

A site assessment was undertaken in August 2020. Desktop studies were carried out to evaluate the existing site conditions such as topography, vegetation, settlement patterns, contiguous land use, drainage, landscape character as well as overall visibility of the site from surrounding areas. Information was also collated on protected views, scenic routes, special and protected landscapes, etc.

The following documents and web resources were consulted for the desktop study:

- Dublin City Development Plan (2016-202)2
- Fingal County Development Plan (2017-2023)
- National Parks and Wildlife Service – Interactive Mapping and Aerial Photography – www.npws.ie;
- Ordnance Survey Ireland – Interactive Mapping and Aerial Photography – www.osi.ie;
- The National Monuments (Amendment) Act 1994, Section 12; and
- http://webgis.archaeology.ie/NationalMonuments/FlexViewer/.

This LVIA has been prepared utilising the following guidance documents:

- Landscape and Landscape Assessment Draft Guidelines, Department of Environment, Heritage and Local Government (DoEHLG) 2000;
- *A Handbook on Environmental Impact Assessment – Guidance on the Environmental Impact*, Scottish Natural Heritage (SHN) - Assessment 2009. Appendix 1: Landscape and Visual Impact Assessment;
- Guidelines for Landscape and Visual Impact Assessment, The Institute of Environmental Assessment / Landscape Institute (2nd & 3rd Ed 2002, 2013).
- Guidelines on the Information to be contained in Environmental Impact Statements Environmental Protection Agency, Environmental Protection Agency, 2002;
- Revised Guidelines on the Information to be contained in Environmental Impact Statements. Draft 2015;
- Advice notes on current practices (in the preparation of an Environmental Impact Statement), Environmental Protection Agency, 2003;
- Advice notes for Preparing Environmental Impact Statements. Draft. Environmental Protection Agency, 2015;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency, Draft August 2017.

14.2.2 Impact Significance Criteria

The impact significance and rating criteria used are those outlined in the EPA guidelines for preparing an EIS when quantifying the duration and magnitude of impacts. The quality of the impact is described as *'negative', 'neutral'* or *'positive*'.

		Existing Environment: Significance / Sensitivity			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	Profound	Very Significant	Significant / Moderate	Moderate / Slight
	Medium	Very Significant / Significant	Significant / Moderate	Moderate	Slight / Not Significant
	Low	Significant / Moderate	Moderate / Slight	Slight / Not Significant	Not Significant / Imperceptible
	Negligible	Slight / Not Significant	Not Significant	Not Significant / Imperceptible	Imperceptible

Table 14.1: Classification of Impacts

The significance of landscape impacts are described as follows:

- **Imperceptible:** A effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.
- **Not significant:** An impact which causes noticeable changes in the character of the environment but without noticeable consequences. The proposal is adequately screened due to the existing landform, vegetation or constructed features.
- **Slight**: An impact which causes noticeable changes in the character of the environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
- **Moderate**: An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
- **Significant**: An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
- **Very Significant**: An impact which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment. The proposal affects the majority of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
- **Profound**: An effect which obliterates sensitive characteristics. The view is entirely altered, obscured or affected.

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- **Very Significant**: An impact which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment. The proposal affects the majority of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
- **Profound**: An effect which obliterates sensitive characteristics. The view is entirely altered, obscured or affected.

In terms of duration, impacts are considered as follows:

- **Brief**: lasting up to one day
- **Temporary**: lasting up to one year
- **Short-term**: lasting one to seven years
- **Medium-term**: lasting seven to fifteen years
- **Long-term**: lasting fifteen to sixty years
- **Permanent**: lasting over sixty years

Impacts are considered at both the construction and operation stage and further aspects including do-nothing, worse-case, cumulative, interactive, indirect and residual impacts are also considered, where appropriate, in the assessment.

14.2.3 Definition of Visual Impacts

The following terminology, used in this visual assessment, is defined as follows:

Visual Intrusion: where a Proposed Development will feature in an existing view but without obstructing the view.

Visual Obstruction: where a Proposed Development will partly or completely obscure an existing view.

Sensitivity and Significance: The significance of impacts on the perceived environment will depend partly on the number of people affected, but also on value judgments about how much the changes will matter. In this respect, it is important to identify actual visual and physical connections between the site, its adjacent occupiers/land owners and those who interact with it from further afield, in the context of the existing and the proposed situations.

While our visual sense is generally acknowledged to represent the dominant contribution to our perception of place and its context, other factors also contribute. Hearing/sound, smell and a variety of social/cultural factors relating to the land-use, function or business conducted on the land (or indeed, memory) can sometimes over-rule or outweigh the visual aspects and lead to individual perceptions which could be described as relatively subjective. The purpose of this report is to objectively examine and assess the nature and extent of the visual impact created as a result of the development proposal.

14.2.4 Choice of Views

The views were chosen to accurately represent the likely visual impact from all directions. Views are from the public domain, particularly those from main roads and access routes. The views submitted are considered to be the most important and representative, having regard to the requirement to examine the greatest likely impacts

14.2.5 Photomontage Methodology

The methodology for preparation of photomontages is included with the Photomontage Report produced by 3D Design Bureau and is included separately as part of this planning application.

14.3 Description of Receiving Environment

14.3.1 Site Description and Context

The subject site is located on the lands which previously operated as a large scale hardware and building supplies outlet (Chadwicks, formerly Heiton Buckley) in Santry, Dublin. The site is located at the south west junction of Swords Road (north-south, R132) and Santry Avenue (east-west, R104), approximately 400m due west of the Coolock/Santry junction of the M50 motorway.

Figure 14.1: Satellite image of site with red line boundary showing surrounding context

The subject site is located immediately south of Santry Demesne/Park, a regional park owned and managed by Fingal County Council, and separated from the site by Santry Avenue. A private lane forms the western boundary and separates the site from the IDA industrial estate to the west. A new mixed-use development is being constructed to the south. The eastern boundary is formed by a row of trees which edge the Swords Road. Commercial units line the Swords Road to the east of the site.

The site is dominated by 1 no. double-height, large scale building, punctuated with loading bays. Car parking, vehicle access zones and external storage bays occupy the space between the building and the site boundary.

A low brick wall, topped with steel railing exists on the northern, western and eastern boundary of the site, while a metal palisade fence runs along the full length of the southern boundary. A small number of shrubs planted in planters on the northern boundary and a small number of trees, planted at the north-western boundary appear to be the only vegetation within the site and constitute little value due to their size and condition.

14.3.2 Topography and Drainage

The site is located immediately south of Santry Avenue, which is generally located at approximately +55 OD. The topography of Santry slopes gently down from west to east.

The site itself is relatively flat and dominated by hardstanding.

14.3.3 Vegetation

The wider context is mixed. To the north of the site, vegetation is abundant in Santry Park, with a number of woodlands, copses, a community garden within a historical walled garden, a number of natural grass playing pitches and large tracts of open, maintained, grassed areas.

To the east, open space is predominantly made up of tarmacadamed or concrete surfacing in the commercial units lining the road. Vegetation is present in low density residential developments

with small to medium sized open space mostly in grass with mature trees, while private front and back gardens add to the vegetation matrix. The grounds of St. Pappan's church has a number of large trees and shrubs, and an island of significant sized trees and shrubbery separates Swords Road from Santry Villas, north of the Santry Avenue/Swords Road junction. Further east, open green space comprised of maintained grass and considered tree planting exists at the rear of the Chapel of Margaret Bell and is bound by Oak Park Avenue to the west and the M50 motorway to the east.

To the south of the site, Avista Office Park has a number of large trees within a grassed area at its southern entrance with mixed trees and shrubbery planted in verges in carpark areas. The long back gardens of Shanliss Avenue and the open space connected to Greenfield Park Community Field to the west of the subject site, contribute to the vegetation in this area. Boundary planting around the Aldi carpark, due west of the site is made up of a mix of small ornamental trees and shrubbery.

Vegetation within the site is negligible. Tree and hedge specimens are located beside and mostly just outside, the boundaries of the subject site.

A total of 5 no tree groups/hedges and 55 no. individual trees were categorised as part of the Arboricultural Report (carried out by The Tree File Ltd. and included separately within the planning submission). Most of the trees can be described as young with great variance in quality. Of the trees surveyed, none were found to be of Category A standard; 20 no. were found to be of Category B standard; 29 no. were found to be of Category C standard; and, 11 no. were found to be of Category U standard.

To the east of the site, adjacent to the Swords Road and running in a north-south alignment, are 2 no. tree lines consisting of a total of 18 no.*Tilia europea* (Lime trees) and 2 no. hedges comprised of *Fagus sylvatica* (Beech). Within the tree alignments, 1 no. tree has been given Category U status, 1 no. tree has been given Category C status and the remaining 16 are categorised B. The two hedges are both Category B.

To the north west of the site, outside the western boundary, 2 no. *Acer platanoides* (Norway Maple) are stated as Category B value trees. The remainder of the alignment outside the western boundary is of mixed status, with 20 no. having Category C status, and 11 no. having Category U status. A treeline consisting of *Chamaecyparis lawsoniana* (Lawson cypress) is part of the alignment along this boundary, while the remainder of the alignment is made of mixed species, including: *Fraxinus excelsior* (Ash), *Acer pseudoplatanus* (Sycamore), and *Sambucus nigra* (Elder).

To the south of the site, and outside the boundary, one hedge and tree line are identified. The hedge has been given Category B status and consists of a mix of species including: *Hedera helix* (Ivy); *Prunus subhirtella "Autumnalis"* (Winter Flowering Cherry); *Escallonia Sp*. (Escallonia); *Ulex europaeus* (Gorse); *Rubus fruticosus* (Bramble); *Cotoneaster Sp*. (Pyrocantha cotoneaster); *Viburnum Sp*. (Viburnum). The tree line has been given Category C status and is a short alignment consisting of *Cupressocyparis leylandii* (Leyland Cypress).

14.3.4 Contiguous Land Use

The contiguous lands uses adjacent to the subject site are mixed. To the north, lies the R104 Santry Avenue with the recreational amenities offered by Santry Park north of the road. The eastern boundary is made up of Swords Road, and associated front curtilage and car parking of commercial units. To the south, a historical warehouse is the site of a new residential development, beyond which is an established office park, made up of low rise buildings separated

by car park zones. To the west, and separated from the site by an access lane, is an industrial estate comprising of low-rise, warehouse style buildings surrounded by loading bays and car parking zones.

14.3.5 Visual Analysis

The built fabric is concentrated in the centre of the subject site. Existing built structures include the brick boundary wall, traffic barriers, the hardstanding ground structure and commercial warehouse style building in the centre of the site.

Views into the site are possible from the south east entrance to Santry Park.

Figure 14.2: Photograph taken at Santry Park entrance, immediately north of subject site

The site is not visible from all areas within Santry Park, as it is predominantly screened by mature tree lines/tree groups on the south boundary of the park.

Figure 14.3: Photograph taken from north of Santry Park playground looking south east towards subject site

There are medium and short distance views into the site from the Swords Road, with part of the site being screened by the mature trees on the eastern boundary of Santry Park.

Figure 14.4: Photograph taken from junction of Swords Road with R104, looking south towards subject site

Views into the site are possible immediately north from Santry Avenue (at the green island in front of Santry Villas, north east of subject site). The subject is partially screened by the mature trees on the green.

Figure 14.5: Photograph taken from green island at Santry Villas, looking south west towards subject site

From the east, short distance to medium distance views are possible from Church Lane, however, these are restricted by the commercial unit on the south side of Church Lane and the mature trees planted on the green area in front of Santry Villas.

Figure 14.6: Photograph taken from Church Lane, looking west towards subject site

Short distance views are possible from the retail units on Swords Road through gaps in the canopies of trees planted on the west side of Swords Road.

Figure 14.7: Photograph taken from front of commercial unit on Swords Road, looking west towards subject site

Views to the site, from Swords Road south of the site, looking north are restricted by the new development south of the site and the line of trees on the west side of Swords Road.

Figure 14.8: Photograph taken from Swords Road, south of site looking north towards subject site

The residential area to the south west of the subject site consists of low rise, mostly two-storey houses and a community centre with an open, grassed 'field'. Views to the subject site from the roads are restricted by the houses and trees in both front and rear gardens and by boundary walls at community centre.

Figure 14.9: Photograph taken from junction of Shanliss Way and Shanliss Avenue, looking east towards subject site

Figure 14.10: Photograph taken from entrance of Greenfield Park Community Club on Shanliss Avenue, looking north east towards subject site

From the west, the subject site is partially visible from Santry Avenue at the Shanliss Way junction, however the fence-line and boundary planting at the front of the IDA industrial estate on Santry Avenue limits long distance views on this road.

Figure 14.11: Photograph taken from entrance of Aldi near Shanliss Way junction with Santry Avenue, looking east towards subject site

14.3.6 Planning Context

Landscape Planning Policy for the area is laid out in the Dublin City Development Plan (2016-2022) and the Fingal County Development Plan (2017-2023). The eastern boundary of the Ballymun Local Area Plan (2017) is 350m west of the western boundary of the site.

The Dublin City Development Plan 2016-2022 shows the site as being zoned Z3, '*to provide for and improve neighbourhood facilities'*, with adjoining areas zoned Z6 *'to provide for the creation and protection of enterprise and facilitate opportunities for employment creation'.*

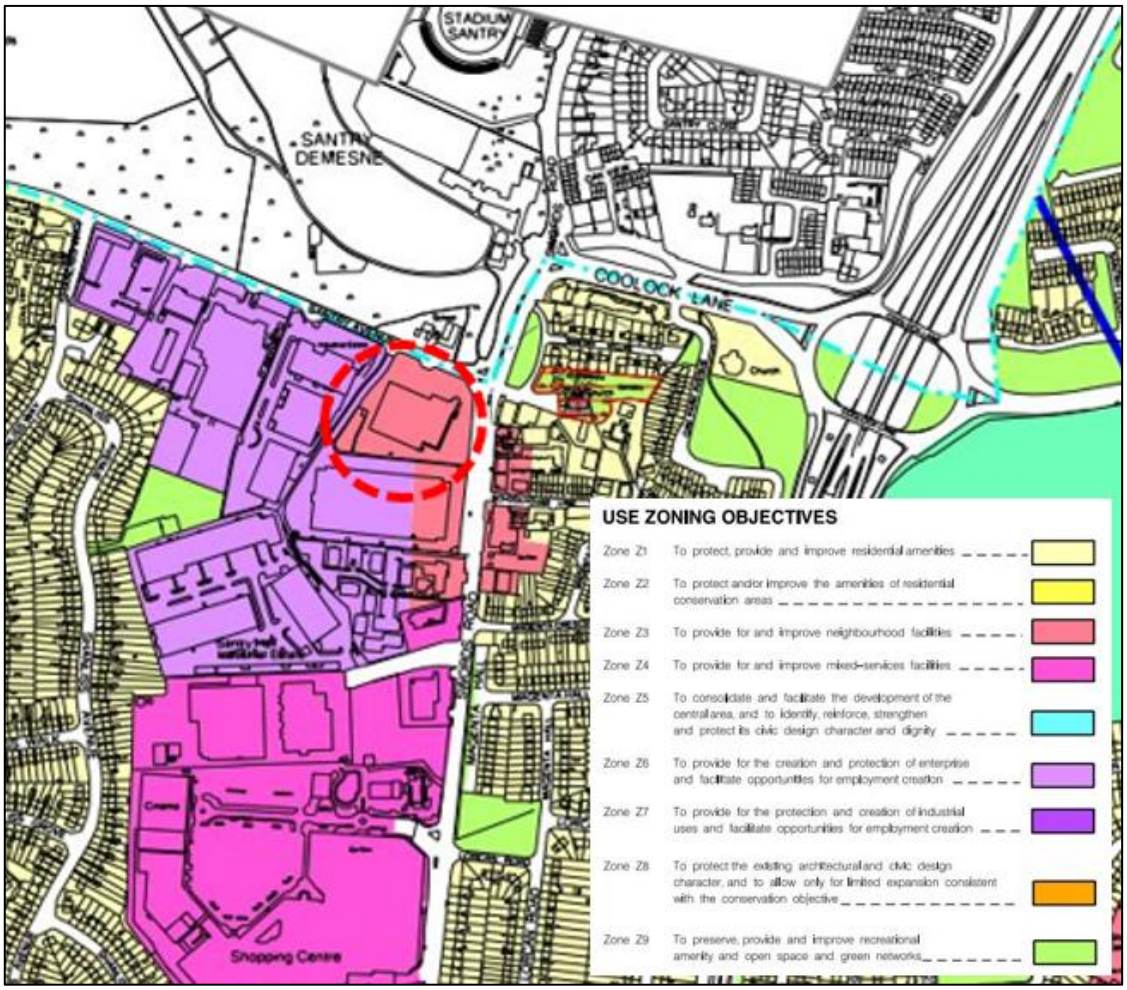

Figure 14.12: Image of extract of Map B, Dublin City Development Plan (2016-2022), showing site circled in red and accompanying zoning key

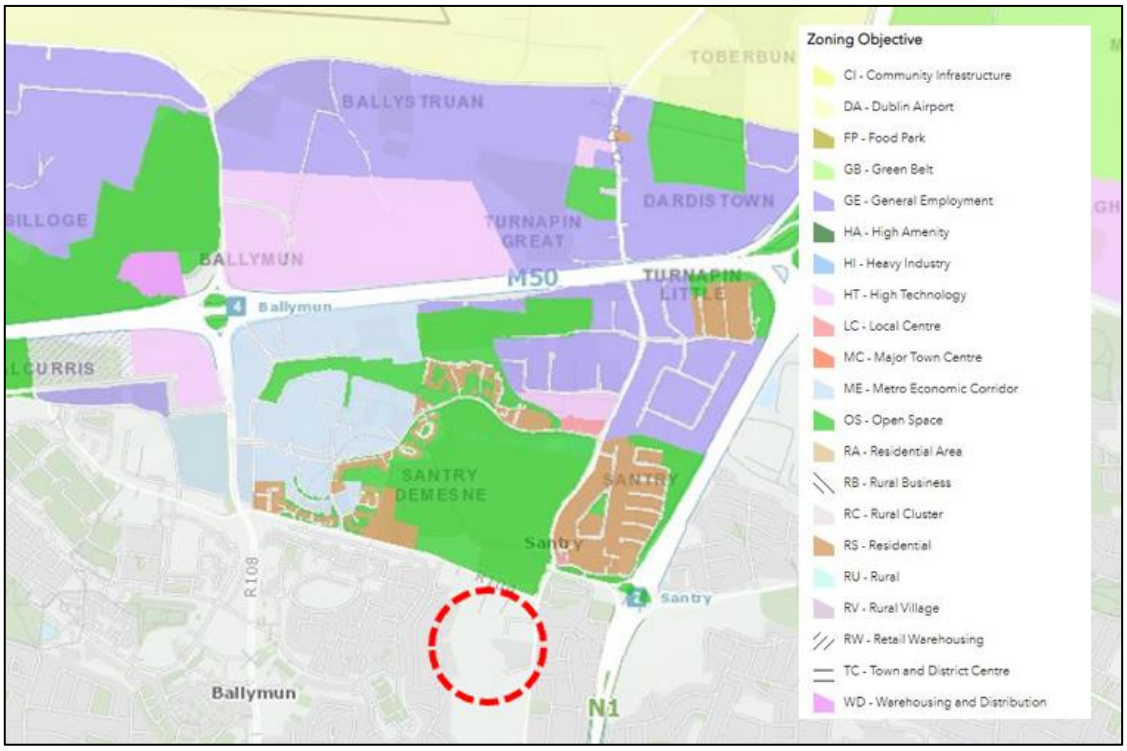

Figure 14.13: Image of extract of map viewer, Fingal County Development Plan (2017-2023), showing site circled in red and accompanying zoning key

14.3.6.1 Landscape Character

There are no Landscape Character Areas (LCA's) identified in the Dublin City Development Plan (2016-2022). Objective GI06 (Dublin City Development Plan, page 168) states:

"It is an objective of Dublin City Council… To prepare a Landscape Character Assessment (LCA) for Dublin city during the lifetime of the plan in accordance with the National Landscape Strategy and forthcoming national methodology."

The Ballymun Local Area Plan (2017) is described as "mostly residential in nature with parks, local retail and community/sporting facilities defining the different character areas". Parks and Open Space Areas are noted as being a key element in the physical regeneration of Ballymun. However, it should be noted that the subject site "Chadwicks" (formerly Heiton Buckley) builders providers is not within the Ballymun LAP boundary.

There are 6 no. Landscape Character Types identified in the Fingal County Development Plan (2017-2023) which are described as *'representing generic areas of distinctive character that makes one landscape different from another'.*

Figure 14.14: Image of extract of Map 14, Fingal County Development Plan (2017-2023), showing Landscape Character Types.

The subject site is proximate to Santry Demesne Park which has a Landscape Character Type designation of '*Low lying agricultural'* and a landscape value of '*modest'*. Fingal County Development Plan 2017-2023 rates landscapes with a sensitivity rating on a scale between low and high and describes sensitivity rating as *'the ability of a landscape to sustain its character in the face of change'*, and states that '*where a wide range of developments would sit comfortably in a particular landscape and would not interfere with a character or interfere or eliminate a value, such a landscape is deemed to be of low to medium sensitivity'*. The landscape sensitivity rating of a '*low lying agricultural'* landscape character area is categorised as *low sensitivity*.

14.3.6.2 Landscape Sensitivity

The sensitivity of the site is a function of its lands use, landscape patterns and scale, visual enclosure, distribution of visual receptors, and the value place on the landscape. Trends of change in the landscape and relevant policy are also taken into account.

The sensitivity of the site and receiving environment is classified as medium (definition derived from the GLVIA and EPA Guidelines: "*Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The landscape character is such that there is some capacity for change in the form of development. These areas*

may be recognised in landscape policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change".

Sensitivity	Description
Very high	Areas where the landscape exhibits very strong, positive character with valued elements, features and characteristics that combine to give an experience of unity, richness and harmony. The landscape character is such that its capacity to accommodate change in the form of development is very low. These attributes are recognised in landscape policy or designations as being of national or international value and the principle management objective for the area is protection of the existing character from change
High	Areas where the landscape exhibits strong, positive character with valued elements, features and characteristics The landscape character is such that it has limited/low capacity to accommodate change in the form of development. These attributes are recognised in landscape policy or designations as being of national, regional or county value and the principle management objective for the area is the conservation of existing character.
Medium	Areas where the landscape has certain valued elements, features or characteristics but where the character is mixed or not particularly strong, or has evidence of alteration, degradation or erosion of elements and characteristics. The landscape character is such that there is some capacity for change in the form of development. These areas may be recognised in landscape policy at local or county level and the principle management objective may be to consolidate landscape character or facilitate appropriate, necessary change.
Low	Areas where the landscape has few valued elements, features or characteristics and the character is weak. The character is such that it has capacity for change; where development would make no significant change or would make a positive change. Such landscapes are generally unrecognised in policy and the principle management objective may be to facilitate change through development, repair, restoration or enhancement.
Negligible	Areas where the landscape exhibits negative character, with no valued elements, features or characteristics. The landscape character is such that its capacity to accommodate change is high; where development would make no significant change or would make a positive change. Such landscapes include derelict industrial lands or extraction sites, as well as sites or areas that are designated for a particular type of development. The principle management objective for the area is to facilitate change in the landscape through development, repair or restoration.

Table 14.2: Classification of Impacts

	Extent of Visual Effect
Imperceptible Effects	There are no changes to views in the visual landscape.
Not Significant	An effect which causes noticeable changes in the character of the visual environment but without noticeable consequences. The proposal is adequately screened due to the existing landform, vegetation or constructed features.
Slight Effects	An effect which causes noticeable changes in the character of the visual environment without affecting its sensitivities. The affected view forms only a small element in the overall visual composition or changes the view in a marginal manner.
Moderate Effects	An effect that alters the character of the visual environment in a manner that is consistent with existing and emerging trends. The proposal affects an appreciable segment of the overall visual composition, or there is an intrusion in the foreground of a view.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the visual environment. The proposal affects a large proportion of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the visual environment. The proposal affects the majority of the overall visual composition, or views are so affected that they form a new element in the physical landscape.
Profound Effects	An effect which obliterates sensitive characteristics. The view is entirely altered, obscured or affected.

Table 14.3: Extent of Visual Effect

	Duration of Impact
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years

Table 14.4: Duration of the Landscape and Visual Impact

14.3.6.3 Natural Heritage – Environmental Designations

This section outlines the closest areas to the site with environmental designations.

Site No. / Designation	Name	Distance to site
SPA		
Site No. 004006	North Bull Island SPA	7.01km east of the site
Site No. 004025	Malahide Estuary SPA	7.93kms east of the site
Site No. 004024	South Dublin Bay and River Tolka Estuary SPA	6.39kms east of the site
Site No.000199	Baldoyle Bay SPA	6.95kms east of the site
Site No. 004006	North Dublin Bay SPA	6.39km east of the site
SAC		
Site No. 000199	Balydoyle Bay SAC	6.95kms east of the site
Site No. 000206	North Dublin Bay SAC	6.39km east of the site
Site No. 000205	Malahide Estuary SAC	7.93kms east of the site

pNHA		
Site No. 00	North Dublin Bay pNHA	6.39km east of the site
Site No. 001205	Balydoyle Bay pNHA	6.95km east of the site
Site No. 001207	Malahide Estuary pNHA	7.93kms east of the site
Site No. 001206	Feltrim Hill pNHA	5.36km north of the site
Site No. 002103	Royal Canal pNHA	4.07kms south of the site
Site No. 001211	Santry Demesne pNHA	0.08km north of the site
Site No. 001763	Sluice River Marsh pNHA	6.83kms north east of the site

Table 14.5: Sites with environmental designation, as noted in National Parks and Wildlife Services, Data and Mapping, Designations Viewer

The closest area to the site with environmental designation is Santry Demesne, 0.03km to the north of the site. Existing developments on the boundaries of Santry Demesne are mixed in nature. Blocks of residential and commercial developments on Northwood Avenue and Santry Avenue are visible through and above the tree lines, from within the parkland of Santry Demesne. The uses of the Demesne lands itself are varied and incorporate community gardens, playground, sports facilities and woodland.

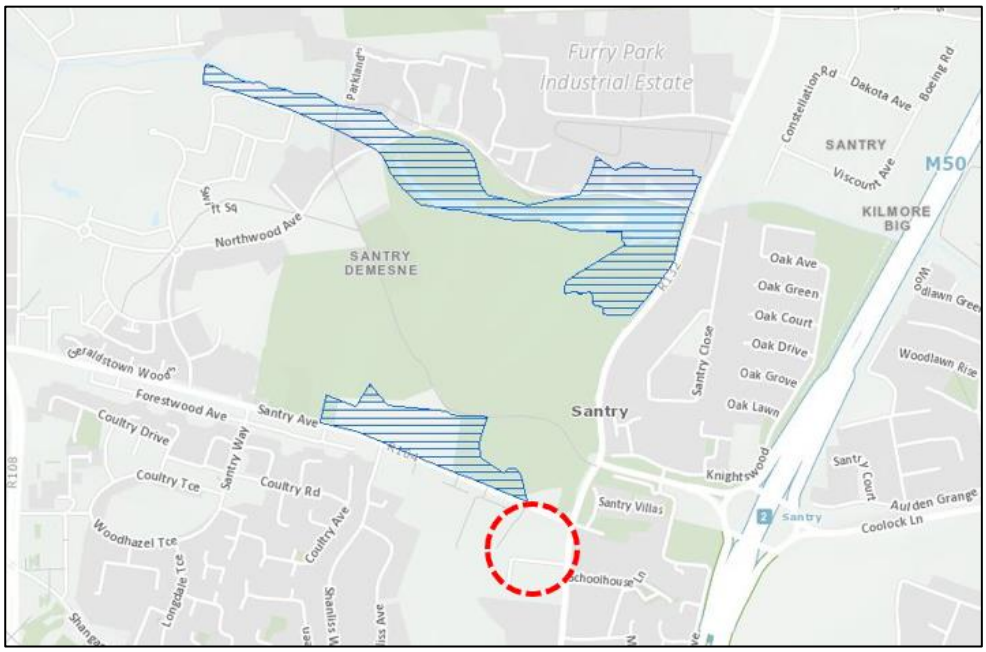

Figure 14.15: Image of extract from National Parks and Wildlife Service online map viewer, showing proposed Natural Heritage Area (pNHA) areas of Santry Demesne (woodland and riparian zones) in blue hatch, and subject site circled in red

Figure 14.16: View from obelisk in Santry Demesne looking north to Northwood Avenue apartments and Crown Plaza Hotel

Figure 14.17: View from path at east of walled garden in Santry Demesne looking north west to The Elms apartments

Existing developments on the boundaries of Santry Demesne are of a mixed nature. Blocks of residential and commercial developments on Northwood Avenue and Santry Avenue are visible through and above the tree lines, from within the parkland of Santry Demesne.

14.3.6.4 Protected Views and Prospects

There are no specific protected views relevant to the site identified in the Dublin City Development Plan (2016-2022) and no specific protected views identified in the Fingal County Development Plan (2017-2023).

14.3.6.5 Architectural Conservation Areas

The Dublin Development Plan (2016-2022) designates no Architectural Conservation Areas (ACAs) relevant to the subject site. The closest ACA is situated at Prospect Square in Glasnevin, 3.56kms south west of the site.

The Fingal County Development Plan (2017-2023) has designated 32 no. Architectural Conservation Areas. The closest ACA in the Fingal County Development Plan (2017-2023) to the site is situated at Abbeville Demesne, 5.24km to the north east of the site.

14.3.6.6 Protected Structures

The Record of Protected Structures as set out in the Dublin City Development Plan (2016-2022) defines 'Protected Structures' as:

> *"structures, or parts of structures, which form part of the architectural heritage and which are of special architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest"*

Dublin City Development Plan 2016-2022, (Section 11.1.5.1)

There is one protected structure relevant to the site (St. Pappin's Church and Holy Well) and a number of other structures in the wider vicinity of the site:

RPS Ref No.	Name	Distance to site
1543	St Pappins Church and Holy Well	115m east of the site
8740	Whitehall Grand Cinema	1.68kms south east of the site
2042	Larch Hill House	1.12km east of the site

Table 14.6: Sites listed in the RPS, Dublin City Development Plan (2016-2022)

Map 3 of the Dublin City Development Plan (2016-2022) marks out '*conservation areas'* including the Santry River Greenway, located 1km north east of the subject site; and, St. Pappan's Church environs, located 115m east of the subject site.

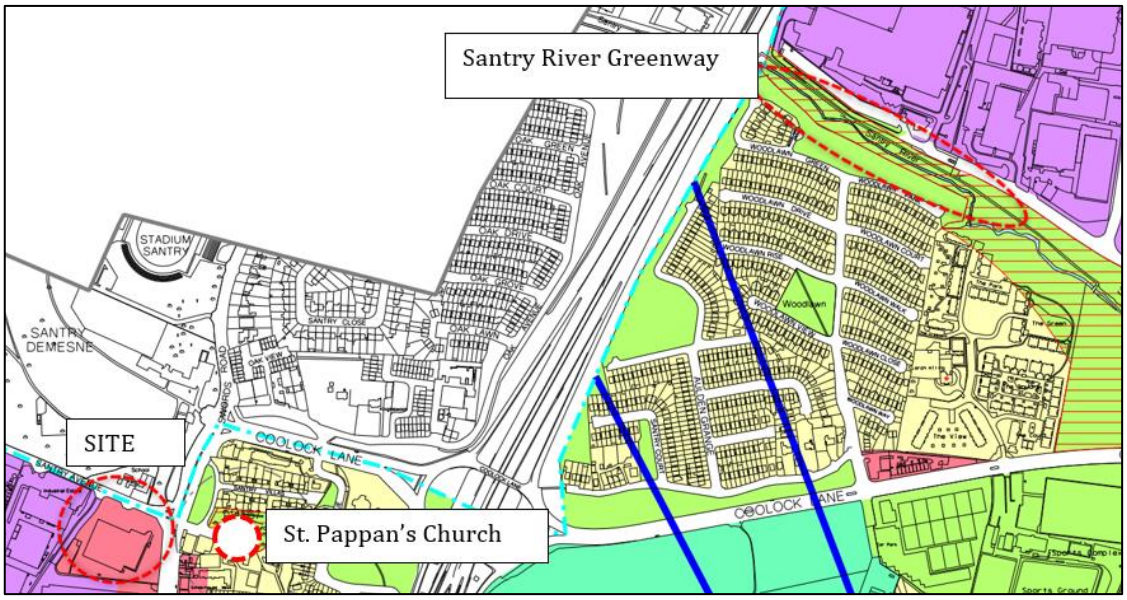

Figure 14.18: Image of Map 3, Dublin City Development Plan (2016-2022), showing Santry River Greenway conservation area in relation to subject site.

The closest protected structure to the site, noted in the Fingal County Development Plan (2017-2023) is a thatched cottage RPS 604, situated 2.15km north of the site on Swords Road.

14.3.6.7 Tree Preservation Orders

While no Tree Preservation Orders are proximate to the subject site, the Dublin City Development Plan (2016-2022) lists 3No. current Tree Preservation Orders. The closest to the subject site is at Whitemill Road, Raheny, 5.38km south east of the site.

The Forest of Fingal, A Tree Strategy for Fingal is a draft document **undergoing a non-statutory public consultation process by** Fingal County Council **and is therefore not yet valid for referencing. Map 11 of the Fingal County Development Plan (2017-2023) notes areas in Santry Demesne to *'protect and preserve trees, woodlands and hedgerows'*. The closest area to the site with this designation is 35m to the north of the site.**

14.4 Characteristics of the Proposed Development

The design for the Chadwicks site, the subject of this assessment, consists of a mixed-use development on lands at the junction of Santry Avenue and Swords Road, Santry, Dublin 9. The proposed development provides for 350 no. apartments, accommodated in 4 no. blocks, on a site area of c.1.5ha. The proposed development also provides for 5 no. commercial / retail units at ground floor level facing onto Santry Avenue and Swords Road; and a community use unit and residential amenity unit at ground floor level between Blocks A / B and C / D. The development includes for a basement level car park accommodating 173 no. car parking spaces and 719 no. cycle parking spaces. 36 no. surface level car parking spaces are also catered for along with 86 no. surface level bicycle parking spaces.

The site is bounded to the north by Santry Avenue, to the east by Swords Road, to the south by the permitted Santry Place development (granted under Dublin City council Ref's 2713/17 & 2737/19) and to the west by the Santry Avenue Industrial Estate.

The proposed development provides for open space and communal open space, hard and soft landscaping & boundary treatments. Private open spaces are provided as terraces at ground floor level of each block and balconies at all upper levels. Car parking is to be provided in the form of 36 no. surface car parking and 173 no. basement car parks. Bicycle parking is to be provided in the form of 86 no. surface level bicycle parking spaces and 719 no. basement level bicycle parking spaces.

14.5 Potential Impact of the Proposed Development

The potential impacts are the effects that the development could have without consideration of landscape and/or public realm mitigation or amelioration – i.e. without landscape works. These effects have been compiled to identify any areas where the proposed development may be injurious to the visual character of the area and represent the potential impact rather than the eventual long-term effect. For this section, it is assumed that no specific landscape works are carried out with the construction of the development. This enables recognition of potential, rather than actual, effects which facilitate the identification of suitable landscape mitigation measures.

14.5.1 Potential Impact on Existing Vegetation

14.5.1.1 Construction Phase

The extent and nature of the proposed works and the degree of disturbance as may be caused to trees adjoining the boundary of the site, is the greatest issue potentially affecting trees. The tree loss breakdown for the proposed development will be 8 no. Category U items and 1 no. Category B item (Hedge 2). For further details refer to the Arboricultural Report, see Appendix 14A.

The construction works will require removal of all vegetation existing on the subject site to facilitate the works. The Arborist has noted there is potential for partial conflict for existing trees outside the site boundary where the '*Root Protection Area'* is encroached upon by works or ground amendments which cannot be preserved/protected in full. Site hoarding, construction traffic, ground disturbance and temporary structures required for construction will have a *negative, moderate and short-term impact*.

The impact on existing trees will be *negative, moderate and permanent.*

14.5.1.2 Operational Phase

There are no predicted impacts on the existing vegetation in the operational phase.

14.5.2 Potential Impact on Landscape Character

14.5.2.1 Construction Phase

Site hoarding, construction traffic, ground disturbance and temporary structures required for construction will have a *negative, moderate and short-term impact*.

14.5.2.2 Operational Phase

The proposed landscape design and will likely have a *positive, moderate and permanent impact*, due to the conversion from a vacant site to usable high quality public ream and amenity spaces,

allowing for permeability through the site and significant new planting throughout the site.

14.5.3 Potential Impact on Views

14.5.3.1 Construction Phase

Site hoarding and temporary structures required for construction will have a negative, moderate and short-term impact on views

14.5.3.2 Operational Phase

Fourteen key views were chosen to illustrate the visual impact of the proposed development – refer to the Photomontage Report produced by 3D Design Bureau. The Photomontage Report includes a view location plan showing the points the views were taken from. Each view is illustrated as existing and proposed and the views are numbered 1 to 14. The views include long, mid and short-distant views.

Each Photomontage view includes the following versions:

- '***Existing'*** view
- **Proposed'** view showing the Proposed Development
- ***'Proposed and Permitted'*** view showing the Proposed Development and the adjacent development permitted under An Bord Pleanála, Reg. Ref. No. 307011-20, which is located approximately 250 metres south of the subject site.

View 14.1: From junction of Shanliss Way and Shanliss Avenue looking east towards the subject site

The proposed development will be blocked by existing residential units on Shanliss Avenue. The impact will be imperceptible, *neutral, and permanent.*

View 14.2: From Santry Avenue, looking east towards the subject site

The proposed development will be predominantly blocked by existing trees and buildings associated with the IDA estate. However, the taller element of the proposed development will be visible as it meets Santry Avenue. The development will also be partially visible above the existing fence line in the centre of the view. The character and composition of the view is altered, however, not inappropriately and is consistent with emerging trends. The impact will be *moderate, neutral and permanent.*

View 14.3: From Santry Demesne, looking south east towards the subject site

The proposed development will be predominantly screened by the existing trees along Santry Road and Santry Demesne boundary. However, the upper floors of the proposed development will create a visual intrusion about the existing tree line. The character and the composition of the view would be altered, however, it is consistent with other existing boundary views elsewhere in Santry Demesne. The valued features of the view would remain. The impact is considered to be *moderate, negative and long term.* The duration is considered long term (fifteen to sixty years) as when the existing tree planting within Santry Demesne in the middleground of view matures it will provide further screening of the development.

View 14.4: From Santry Demesne, looking south towards the subject site

The proposed development will be screened at the lower levels by the existing trees along Santry Road and Santry Demesne boundary. However, the upper floors of the proposed development will create a visual intrusion about the existing tree line. The character and the composition of the view would be altered, however, it is consistent with other existing boundary views elsewhere in Santry Demesne and with emerging trends. The impact is considered to be *moderate, negative and long term.* The duration is considered long term (fifteen to sixty years) as when the existing tree planting within Santry Demesne in the middleground of view matures it will provide further screening of the development.

View 14.5: From Swords Road (R104), looking south towards the subject site

The proposed development will be predominantly blocked by existing vegetation and stone wall associated with the boundary of Santry Demesne. There will be a slight visual intrusion through and above the tree line. The character and composition of the view would be altered, but not inappropriately and the valued features of the view would remain. The impact will be *slight, negative and permanent.*

View 14.6: From Swords Road (R104), looking south towards the subject site

The proposed development will be visible due to the open character of this section of the Swords Road (R104). There will be partial screening of the proposed development by existing trees associated with the south east of Santry Demesne and existing trees associated with the open space in front of Santry Villas. The character and the composition of the view would be altered slightly, however, it is consistent with emerging trends. The impact will be *moderate, negative and permanent.*

View 14.7: From Coolock Lane, looking west towards the subject site

The proposed development will be partially blocked by the existing residential units in Santry Villas estate and existing trees associated with Oak Park Avenue. However, the upper floors of proposed development will be partially visible in the background and above the existing tree line. The character of view remains unchanged. The composition is altered slightly, but not inappropriately. The impact will be *slight, neutral and long term.* The duration is considered long term (fifteen to sixty years) as when the existing tree planting in the middleground of view matures it will provide further screening of the development.

View 14.8: From Coolock Lane, looking west towards the subject site

The proposed development will be predominantly blocked by the tree line associated with M50 motorway planting. However, the upper levels of some of the blocks will be visible in the background and breaks the sky line. The impact will be *slight, neutral and long term.* The duration is considered long term (fifteen to sixty years) as when the existing tree planting in the middleground of view matures it will provide screening of the development almost in its entirety.

View 14.9: From Santry Villas, looking west towards the subject site

The proposed development will be blocked to some degree by existing warehouse buildings on Santry Villas, on the left of the view. The northern frontage of the proposed development to Santry Road will be largely visible in the view. The eastern frontage of the proposed development to Swords Road (R104) will be partially visible. The character and composition of the view is altered, but is consistent with existing and emerging trends in the area. The impact is considered *moderate, negative and permanent.*

View 14.10: From Swords Road (R104), looking north towards the subject site

The proposed development will be predominantly blocked by existing development in the middleground of the view and trees on Swords Road (R104). However, the upper levels of the proposed development will be visible in the long distance, where the proposed development is located at the junction of Santry Road and Swords Road. The impact will be *moderate, neutral and permanent.*

View 14.11: From Burnside estate, looking west towards the subject site

The proposed development will be completely screened by existing trees associated with open space in Burnside estate. The impact is considered imperceptible, neutral and permanent.

View 14.12: From Swords Road (R104), looking north towards the subject site, at Lorcan Road junction

The proposed development will be blocked to some degree by existing commercial units in the Santry Hall Industrial Estate and existing trees on the access road of the industrial estate. However, the upper levels of the proposed development will be visible in the long distance, where the proposed development is located at the junction of Santry Road and Swords Road. The composition and character of the view remains unchanged. The impact will be *slight, neutral and permanent.*

View 14.13: From Swords Road (R104), looking north towards the subject site

The proposed development will not be visible due to the rising topography and curvature of the Swords Road. Existing housing and vegetation associated with housing completely block the views of the development. There will be *no impact.*

View 14.14: From Santry Demesne, looking south east towards the subject site

The development will be mostly screened by the existing trees which form part of the southern boundary of Santry Demesne. The upper storeys of some of the blocks will be partially visible through the tree canopies. The character of the park is unchanged. The composition of the view is altered slightly, however is consistent with other boundary views from within Santry Demesne. The impact will be *slight, negative and long term.* The duration is considered long term (fifteen to sixty years) as when the existing tree planting in the middleground of view matures it will provide further screening of the development.

14.6 Potential Cumulative Impacts

Identified impacts can also act cumulatively with other impacts from developments in the locality. There are a number of permitted developments in the vicinity of the subject site. Of relevance to the current application is the planning history of the lands immediately to the south. This history is detailed below:

- **Reg. Ref. 2713/17** - Carnamadra Ltd. received a final grant of permission on 23rd April 2018 for a mixed use development located at Santry Avenue and Swords Road, Santry, Dublin 9. The development included for the partial demolition of existing buildings and the construction of 137 no. residential dwellings, 3 no. retail/commercial units, commercial office uses and a creche in 5 no. four and five storey blocks (Blocks A-E). The development also included for new vehicular and pedestrian accesses via Swords Road, environmental improvements along the Swords Road frontage, basement level car parking, and all ancillary and associated site development works on a site of c. 1.9 hectares.

- This site was subsequently sold and under consent of the owner, Dwyer Nolan Developments Ltd. began constructing the aforementioned development, known as Santry Place, and subsequently Dwyer Nolan Developments Ltd. submitted an

application for modifications to the permitted development to Dublin City Council in April 2019. The details of same can be found below:

- **Reg. Ref. 2737/19 -** Dwyer Nolan Developments received a final grant of permission on 1st October 2019 for modifications to the development permitted under Reg. Ref. 2713/17. This permission increased the heights of the permitted Blocks A, B & C from 5 storeys to 7 storeys, and included for a change in unit type and increase in number of apartments (68 no. apartments after design changes at Additional Information stage). The permission included for the provision of balconies and roof terraces (i.e. 240sq.m. each) to Blocks A, B & C.

Additionally, the following developments are noted in the vicinity of the subject site which have been recently permitted and /or are under construction:

- **ABP-306987-20 -** Permission for the development of 120 no. apartments and associated site development works on the former Swiss Cottage lands, Swords Road, Santry, Dublin 9. The development included for building heights of 3 no. storeys to 7 no. storeys and caters for a density of c. 250 no. dwellings per hectare. The development supersedes and amended the previously permitted development granted under ABP-303358-19. The site is located approximately 100 meters to the south-east of the subject application site.

- **ABP-307011-20 -** Permission for the development 324 no. apartments, a creche and associated site development works on lands to the northeast of Omni Park Shopping Centre, Swords Road, Santry, Dublin 9. The development included for building heights of 5 no. storeys to 12 no. storeys and caters for a density of c. 250 no. dwellings per hectare. The site is located approximately 250 meters to the south of the subject application site.

The likely cumulative impacts on the landscape include the further loss of existing trees and vegetation through the construction of the permitted developments. However, overall the biodiversity and tree planting in the area should increase in the medium to long term as the plantings in the new developments matures. The proposed network of open spaces and public realm should make a positive contribution to the emerging townscape of the area, in the context of the proposed and permitted developments.

The future developments will also have a cumulative impact on views. The permitted and proposed developments are for residential and commercial development. The height of the blocks which are proposed as part of the developments will be visible from public routes in the immediate context including Swords Road and Santry Avenue. Medium distance views may be impacted upon slightly, particularly from the north and south. It is expected that views from the east and west would be slightly restricted due to the built fabric and existing mature trees of the surrounding environment. The developments may be partially visible from within Santry Demesne Park to the north.

14.7 '*Do Nothing*' Impact

The lands are in brownfield condition at present and in the event that the Proposed Development does not proceed, the site will likely remain in its current state. Therefore, in the do-nothing scenario, it is considered most likely that some form of broadly similar development to that currently propsoed will take place on these lands at some stage in the foreseeable future. Any such development will likely have a broadly similar range of landscape and visual effects and

opportunities. If development was not to proceed on these lands, the lands would remain occupied by the existing building and yard, i.e. there would be no change to the lands.

14.8 Avoidance Remedial and Mitigation Measures

14.8.1 Mitigation Measures - Existing Vegetation

14.8.1.1 Construction Phase

Existing vegetation on the site is limited and the value of the vegetation that does exist is minimal.

The following mitigation measures are proposed:

- Protect trees to be retained, fell adjacent trees to be removed and grind out stumps in accordance with BS5837:2012;
- Implement tree protection measures for trees to be retained in accordance with BS5837:2012 before any demolition or construction works proceed;
- Where required strip and store topsoil in accordance with BS4428:1989 and BS3882:2007;
- Install proposed tree, hedge, groundcover, and lawn areas in accordance with drawing 201 *Landscape Plan* by Dermot Foley Landscape Architects.

14.8.1.2 Operational Phase

The following mitigation measures are proposed:

- Install replacement planting for any plants that fail during the 18-month maintenance and defects liability period;
- Site to be monitored regularly for signs of invasive species.

14.8.2 Mitigation Measures - Landscape Character

14.8.2.1 Construction Phase

The following mitigation measures are proposed:

- Creation of a new character of the site by installing proposed landscape design and planting in accordance with the proposed landscape plans;
- Construct the proposed landscape design so that the site integrates into surrounding context and acts as an appropriate transition point into Santry Demesne

14.8.2.2 Operational Phase

The following mitigation measures are proposed:

- Maintain and manage all proposed vegetation to ensure the creation and definition of a new landscape character for the site and to ensure the significant increase in habitat and biodiversity associated with the proposed development and groundcover planting as shown on the landscape plans.
- Site to be monitored regularly for signs of invasive species.

14.8.3 Mitigation Measures - Views

14.8.3.1 Construction Phase

The following mitigation measures are proposed:

- Restrict hours of construction activity in accordance with local authority guidance
- Extend hoarding to restrict views of the site during construction
- Construct changes to topography and retaining elements in accordance with the proposed landscape plan to ensure that sight lines are retained across the site where required e.g. pedestrian route along the northern boundary.
- Plant tree species and sizes as per the proposed landscape plan in order to screen the development and create an appropriate landscape at ground level
- There are communal roof terraces included for residents which will be visible from the surrounding neighbourhood. The terraces will include tree, hedge and herbaceous planting.

14.8.3.2 Operational Phase

The following mitigation measures are proposed:

- Maintain all proposed vegetation to ensure that sight lines are retained across the site where required e.g. pedestrian route along the northern boundary;
- Maintain and manage proposed tree planting to ensure that it matures in accordance with industry best practice

14.9 Predicted Impact of the Proposed Development

The predicted impacts are the impacts that the development is most likely to have on the receiving environment, having regard to the mitigation measures.

It is considered that the initial development will have a moderate effect on the existing brownfield character of the site. The landscape and visual change will be most pronounced during the mobilisation and construction stage, when activity is unfamiliar and when the existing character of the lands is altered by demolition and the removal of existing trees and vegetation. The changes arising from the initial site development and construction works will have slight, negative landscape and visual effects.

In the medium to long term, the landscape effects (both on vegetation and character) would be moderate and positive, due to the conversion of the site from a vacant and industrial site to a considered high quality public realm and sequence of landscape spaces, both communal spaces and public open spaces. The landscape design provides for a detailed, permeable and site-specific response to the provision of high-quality public open spaces. The open space network

provides for an attractive and diverse range of amenity and recreational opportunities. Equally the open space network enhances the strong urban design framework for the site.

There will be a negative impact from views 14.3, 14.4, 14.5, 14.6, 14.9, and 14.14 in the medium-term, until adjacent developments, permitted and proposed are developed. The visual impacts are likely to change as a result of this future development. It is also considered that the existing trees retained along Swords Road and the proposed trees planted as part of the mitigation measures will mature in the long-term and reduce the visual impact from these views. Furthermore, as the existing tree plantings within Santry Park mature in the long term they will further screen the development from the north.

The planting of substantial numbers of new trees and plantings will enhance the overall appearance and experience of the proposed development. There will be a positive impact from the increase in habitat and biodiversity associated with this planting.

Cumulatively, in the context of other proposed and permitted developments, there may be impacts on medium distance views, however, the proposed development will make a significant and positive contribution to the new emerging townscape of wider area and the future context of the surrounding lands. Likewise, the proposed network of open spaces will make a significant and positive contribution to the emerging landscape character, biodiversity, amenity and recreational opportunities of the area.

14.10 Monitoring

The landscape design will be subject to a detailed design and construction process supervised by a qualified Landscape Architect to ensure that the design is implemented in accordance with best practice. A suitably qualified Arborist should be retained to supervise the implantation of tree protection measures in accordance with best practice.

Monitoring of the completed landscape works will be undertaken on a regular basis post completion. The proposed plantings will be subject to a defects and maintenance period for initial establishment and if any replacement trees or plantings are required these works shall be carried out during this period.

14.11 Reinstatement

Reinstatement will be limited to removal of hoarding and any temporary structures required for construction and will have a negative slight and temporary impact.

14.12 Interactions

14.12.1 Biodiversity

Proposed planting, including native species, is shown in the landscape plans by Dermot Foley Landscape Architects, will have a long-term positive effect on the biodiversity of the area.

14.12.2 Land, Soils & Geology

There is a potential for importation of soil to the subject site to impact on the land in terms of quality of soil however suitable mitigation measures, i.e. working in accordance with the industry best practice BS4428:1989 and BS3882:2007, will avoid this impact.

14.12.3 Air, Dust and Climatic Factors

Proposed trees and vegetation, illustrated in the proposed Landscape Plans by Dermot Foley Landscape Architects, included as Appendices will likely have a positive impact on the air quality and climate in the surrounding area.

14.12.4 Cultural Heritage & Archaeology

The development will be visible and have a moderately negative impact from protected structure St Pappins Church, shown in View 14.9 and as outlined in this document

14.13 Difficulties Encountered in Compiling

No significant difficulties were encountered in the preparation of this assessment.

14.14 References

Dublin City Development Plan 2016-2022

Fingal County Development Plan 2017-2023

National Parks and Wildlife Service – Interactive Mapping and Aerial Photography - www.npws.ie;

Ordnance Survey Ireland – Interactive Mapping and Aerial Photography – www.osi.ie;

The National Monuments (Amendment) Act 1994, Section 12;

http://webgis.archaeology.ie/NationalMonuments/FlexViewer/;

Landscape and Landscape Assessment Draft Guidelines, Department of Environment, Heritage and Local Government (DoEHLG) 2000;

Guidelines for Landscape and Visual Impact Assessment, The Institute of Environmental Assessment / Landscape Institute (2nd& 3rd Ed 2002, 2013);

A Handbook on Environmental Impact Assessment – Guidance on the Environmental Impact, Scottish Natural Heritage (SHN) - Assessment' 2009. Appendix 1: Landscape and Visual Impact Assessment.

15.0. Identification of Significant Impacts / Interactions

15.1 Identification of Significant Effects

The purpose of this section of the EIAR is to draw attention to significant interaction and interdependencies in the existing environment. In preparing the EIAR, each of the specialist consultants have and will continue to liaise with each other and will consider the likely interactions between effects predicted as a result of the proposed development during the preparation of the proposals for the subject site and this ensures that mitigation measures are incorporated into the design process.

This approach is considered to meet with the requirements of Part X of the Planning and Development Act 2000 and Part 10, and schedules 5, 6 and 7 of the Planning and Development Regulations 2001, as amended. The detail in relation to interactions between environmental factors will be covered in each chapter of the EIAR.

All environmental factors are interlinked to a degree such that interrelationships exist on numerous levels. Interactions within the study area can be one-way interactions, two-way interactions and multiple-phase interactions which can be influenced by the proposed development. As this EIAR document has been prepared by a number of specialist consultants, an important aspect of the EIA process is to ensure that interactions between the various disciplines have been taken into consideration. This chapter of the EIAR was prepared by Bryan Meredith, $^{BA, MRUP, MIPI, MRTPI}$, Planning Consultant of Armstrong Fenton Associates.

All of the potential significant effects of the proposed development and the measures proposed to mitigate them have been outlined in the preceding chapters of this EIAR. However, for any development with the potential for significant environmental effects, there is also the potential for interaction amongst these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them, or have a neutral effect.

The purpose of this requirement of an EIAR is to draw attention to significant interaction and interrelationships in the existing environment. Armstrong Fenton Associates Planning Consultants, in preparing and co-ordinating this EIAR ensured that each of the specialist consultants liaised with each other and dealt with the likely interactions between effects predicted as a result of the proposed development during the preparation of the proposals for the subject and ensuring that appropriate mitigation measures are incorporated into the design process.

Having regard to the approach taken, the aspects of the environment likely to be significantly affected by the proposed development, during both the construction and operational phases, have been considered in detail in the relevant Chapters of this EIAR document. In addition, likely interactions between one topic and another have been discussed, where relevant, by the relevant specialist consultant(s).

The primary interactions can be summarised as follows:

- Noise, air, waste, water and traffic with population and human health;
- Land and soils with traffic, water, resource management, noise, air and biodiversity;
- Water with biodiversity;
- Waste with biodiversity;
- Cultural heritage and the landscape and
- Air quality and climate and traffic.

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.

During the Operational Phase, it is anticipated that water and traffic will be the key environmental factors impacting upon population and human health as a new residential landscape will be created. The increase in population will result in increased traffic and increased demands on water supply and increased requirements for wastewater treatment. These are addressed in the appropriate sections of this EIAR.

The relevant consultants liaised with each other and the project architects, engineers and landscape architects, where necessary, to review the proposed scheme and incorporate suitable mitigation measures, where necessary. As demonstrated throughout this EIAR, most inter-relationships are neutral in impact when the mitigation measures proposed are incorporated into the design, construction or operation of the proposed development.

Where appropriate, the relevant impact areas are considered in grouped form, as set out below.

15.2 Impact Interactions

Where any potential negative effects have been identified during the assessment process, these impacts have been avoided by design or reduced by the proposed mitigation measures.

Table 15.1 over provides a summary of the potential interactions anticipated from the proposed development.

Subject	Interaction With:	Interactions / Inter-Relationships
Population & Human Health	**Air Quality**	The completed development will generate additional emissions to the atmosphere associated with the development, and due to plant equipment within the development. However, air quality in the region of the site is expected to be within the limits set by the air quality standard. During construction there may be potential for slight dust nuisance in the immediate vicinity of the site. However, dust control measures, which include a range of measures such as wheel washes and covering of fine materials will minimise the impact on air quality. A dust management plan will be formulated for the site. The effect of construction on air quality will not be significant following the implementation of the proposed mitigation measures. It is proposed to adhere to good working practices and dust mitigation measures to ensure that the levels of dust generated will be minimal and are unlikely to cause an environmental nuisance. There is no significant impact from dust once the development is completed. Overall, it is envisaged that the proposed development will not have a significant impact on air quality.
Population & Human Health	**Noise**	The greatest potential for noise and vibration impact arising from the proposed development will be in the construction phase. However, following the implementation of the proposed mitigation measures in relation to noise, the impact associated with the construction phase of the proposed development is predicted to be temporary and intermittent in nature. No significant impacts on the local noise and vibration climate are predicted during the operational phase of the proposed development.
Air Quality	**Soils**	Exposed soil during the construction phase of the proposed development may give rise to increased dust emissions. However, the implementation of a dust management plan and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.
Material Assets	**Air Quality**	The proposed development is located in an urban area. However, mitigation measures for dust control and dust suppression can keep the potential for dust to impact upon neighbouring properties in Santry very low.

Subject	Interaction With:	Interactions / Inter-Relationships
Water	**Biodiversity**	During the construction phase, surface water quality would be protected through the implementation of mitigation measures, which include the regular maintenance and inspection of construction plant, the appropriate storage of potentially polluting substances and the supervision of all concrete works. Therefore, no potential significant impacts upon water quality is anticipated during the construction phase. There would be no potential impacts to water quality during the operational phase of the development.
Material Assets – Resource & Waste Management	**Water**	Should waste be incorrectly handled or stored at the development site during construction works, it has the potential to cause an adverse impact upon water quality in the area through leaching of materials to groundwater or surface water. However, waste is to be segregated and stored in suitably contained waste receptacles at the site compound, considerably reducing the potential risk of pollution to water. It is not considered that there would be any significant risk to water quality as a result of waste management during the operational phase, given that waste would be collected by private, licenced waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard.
Material Assets Waste	**Biodiversity**	Waste has the potential to impact upon biodiversity during the construction phase, by causing pollution to soils and water and by potentially attracting pests / vermin to the site. However, wastes would be stored in suitably contained waste receptacles at the site compound, reducing the potential of pollution to soils and water. Furthermore, the majority of wastes generated during the construction phase would be inert materials, which would reduce the potential for issues regarding pests / vermin. It is not considered that there would be any significant impact upon biodiversity due to waste management during the operational phase, given that waste would be collected by licenced waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard.

Subject	Interaction With:	Interactions / Inter-Relationships
Material Assets – Resource & Waste Management	**Human Beings**	Should waste be incorrectly handled or stored at the development site, it has the potential to cause an adverse impact upon human beings through nuisance, including visual, odour and pests, and pollution to soils and water. It should also be noted that given the inert nature of the majority of C&D waste types, it is unlikely that issues regarding odour or pests would arise. During the operational phase, suitably contained wheelie bins / waste receptacles would be provided to the residential area, commercial and community use facilities by private waste contractors, thus there would be no significant risk of pollution to soils. Waste would be collected on a regular basis, typically on a two-weekly basis alternating between recyclables and municipal waste. Therefore, waste would not be envisaged to accumulate to high enough volumes to cause nuisance.
Material Assets – Resource & Waste Management	**Landscape**	Waste and litter have the potential to adversely affect the appearance of the landscape. However, as waste management measures would be implemented as part of the proposed development, it is considered that there would be no significant adverse impact upon the landscape.
Air, Population and Human Health	**Biodiversity**	An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna. However, the risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader national / global scale. During the construction phase of the development, there would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and fauna in Santry Demesne Park and in the surrounding area. The potential impact of dust would be temporary, given the transient nature of construction works. Dust control would be an integral part of construction management practices, with mitigation measures implemented where required, including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required. It should be noted that an important interaction exists between air quality and flora, whereby vegetation can play an important role in acting as an air purifier by absorbing carbon dioxide and giving out oxygen. It would therefore be anticipated that potential carbon dioxide emissions generated by home heating systems and discharged from vehicle exhausts would be somewhat mitigated by vegetation in the environs of the site.

Subject	Interaction With:	Interactions / Inter-Relationships
Air & Climate	**Surface Water / Groundwater**	The interactions between Air & Climate and surface water and groundwater will be mainly limited to the construction phase and are mitigated by the drainage design and proposed mitigation measures.
Air Quality	**Biodiversity**	An increase in dust emissions during the construction phase has the potential to adversely impact upon flora by blocking leaf stomata, interfering with photosynthesis, respiration and transpiration processes. However, given the transient nature of construction works, and given that standard dust control measures would be implemented, no significant impact would be anticipated.
Air & Climate	**Biodiversity**	During construction there are potential issues for biodiversity if the trees in the surrounding area were to be covered in dust during construction. However, this will be mitigated by the implementation of a proposed dust minimisation plan and then there should be no impacts on nearby trees.
Noise	**Population and Human Health/Biodiversity**	Increased noise levels during the construction phase will be temporary only and are not expected to have a long-term significant adverse effect upon Population and Human Health in the general area. Furthermore, the application of binding noise limits and hours of operation, along with the implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact is kept to a minimum. There will be no significant increase in ambient noise levels arising during the operational phase of the proposed development. Noise generated during the construction and operational phases of the proposed development has the potential to impact upon Population and Human Health and fauna within the vicinity of the site. During the construction phase, noise may be generated due to increased vehicle movements and the operation of construction plant. It is anticipated that there would be a moderate impact, for limited periods of time, on the nearest local residences and fauna within the vicinity of the development. Control and mitigation measures would be implemented to reduce noise and vibration, including measures relating to equipment operation and timing of activities. Given the transient nature of construction works, and provided mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings or biodiversity.

Subject	Interaction With:	Interactions / Inter-Relationships
Landscape	**Population and Human Health**	Changes to the landscape character of the site itself will include the development of new buildings and associated landscape. The landscape and visual impact associated with Population and Human Health focuses on the effects to dwellings. The settlement pattern comprises residential development to the south and east, with the Santry centre located to the south-east. The proposed development generates visual effects, and the effects and associated amelioration of these effects is discussed in the impact section of the chapter.
Landscape	**Biodiversity**	The long-term effects of the proposed development will have a positive effect on the provision of landscaped areas associated with the development, creating pedestrian connections from the subject site to Santry Demesne to the north. Further consultation with the Ecological Consultant will take place at implementation and monitoring stages to ensure adherence to best practice and sound ecological principles.
Surface Water / Groundwater	**Soils/Geology/Waste Management**	There is a close link between soils & geology and water (hydrogeology and hydrology). For example, surface water runoff during the construction phase may contain increased silt levels (e.g. runoff across areas stripped of hardstanding) Impacts on the geological environment include stripping of topsoil which will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden runoff. Waste Management and dust management is also considered in interactions as soil removal will be required for this development. Interactions between soils/geology will be mainly limited to the construction phase due to material excavation

Subject	Interaction With:	Interactions / Inter-Relationships
Material Assets - Utilities	**Material Assets - Waste Management, and Water (hydrogeology)**	The proposed works result in an increase in surface water runoff, if not catered for adequately this may have an effect on the hydrogeology.
Material Assets – Resource & Waste Management	**Traffic and Transportation/Soils and Geology**	Waste management interacts with traffic and transportation, soils and geology. The direct and indirect effects of waste-related transport are considered in Chapter 11, Traffic and Transportation and the geotechnical characterisation of the scheme is considered in Chapter 6 – Land and Soils.
Material Assets – Traffic	**Population and Human Health**	Temporary negative impacts to human health may be likely during the construction phase due to noise, dust, air quality and visual impacts which are discussed in other chapters within this EIAR. The traffic impacts, which would also be temporary in duration are not considered to be significant due to the implementation of the mitigation measures identified.

Table 15.1 – Summary of Potential Interactions / Inter-relationships

15.2.1 Summary of Interaction of Impacts

Schedule 6 Item 2 (b) of the Planning and Development Regulations, 2001-2015 requires that proposed developments are examined with regard to the inter-relationship of aspects referred to in Item 2 (b) of Schedule 6. The matrix incorporated in Table 15.2 over inter-relates the various Chapters of this EIAR to the various impact headings referred to in Schedule 6 Item 2 (b) of the Planning and Development Regulations, 2001 - 2015. The matrix also indicates where these statutory information requirements have been incorporated in this EIAR. It should be emphasised that this matrix does not represent a form of relative assessment of impacts, but merely identifies and amalgamates areas of principal interaction and significance.

Chapter No.	Chapter Headings in EIAR	Interaction of Impacts / Identification of Significant Effects									
		Population & Human Health	Biodiversity	Land & Soils	Water	Air Quality & Climate	Noise & Vibration	Material Assets	Waste Management	Cultural Heritage	Landscape
4	Population & Human Health		✓		✓	✓	✓	✓	✓	✓	✓
5	Biodiversity	✓		✓	✓	✓			✓		✓
6	Land, Soils & Geology		✓		✓	✓	✓	✓	✓		
7	Water	✓	✓	✓				✓	✓		
8	Air Quality & Climate	✓	✓	✓	✓			✓			
9	Noise	✓						✓			
10	Material Assets: Built Services		✓	✓	✓	✓					
11	Material Assets: Transportation	✓		✓	✓	✓	✓		✓		
12	Material Assets: Resource & Waste Management	✓	✓	✓	✓				✓		✓
13	Archaeology & Cultural Heritage	✓									
14	The Landscape	✓							✓		
✓	Area of Principal Interaction										

Table 15.2 – Interactions Matrix

15.3 Other Impacts

15.3.1 Direct and Indirect Effects Resulting from the Use of Natural Resources

Schedule 6 Item 2 (c) of the Planning and Development Regulations, 2001 - 2015 requires that an EIAR contains a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from the use of natural resources. No likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative) of the proposed development on the environment are expected to arise from the use of natural resources.

15.3.2 Direct and Indirect Effects Resulting from Emission of Pollutants, Creation of Nuisances and Elimination of Waste

Schedule 6 Item 2 (c) of the Planning and Development Regulations, 2001 - 2015 requires that an EIAR contains a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from the emission of pollutants, the creation of nuisances and the elimination of waste. No likely significant effects on the environment are expected to arise from the emission of pollutants, the creation of nuisances or the elimination of waste.

15.4 Residual Impacts and Cumulative Impacts

Residual impacts can be defined as the final impacts that occur after proposed mitigation measures have taken effect. Many of the findings of the EIA have been incorporated into the design of the development and have contributed to the reduction or amelioration of potential impacts. Where residual impacts arise, they are detailed in the relevant chapters and further mitigation measures detailed where necessary.

Cumulative impacts are defined as: *"The addition of many small impacts to create one larger, more significant, impact"* (EPA 2002). Cumulatively, these impacts may be significant if they occur close together in terms of location and time. The cumulative impact of the proposed development is categorised as neutral and moderate.

As outlined in Chapter 3 this EIAR, where relevant, the EIAR also takes account of other development(s) within the area. These impacts have been addressed in the relevant chapters of the EIAR.

To determine traffic impacts in Chapter 11, the traffic generated by the proposed development is combined with the baseline traffic generated by the traffic on the road network in the area. The potential traffic impacts from other developments were also considered in the assessment (e.g. residential developments - adjacent to the site to the south and east).

Each of the relevant specialists has considered the potential for cumulative impact in preparing their assessments. While there is the potential for negative impacts to occur during the construction stage of the scheme, with the implementation of the appropriate mitigation outlined

in the EIAR, the residual cumulative impact is not considered to be significant.

15.5 Environmental Commitments and Mitigation Measures

Mitigation measures to be adopted during the construction and operational phases of the proposed development are detailed within each chapter. These measures should be implemented through planning conditions imposed by the planning authority / An Bord Pleanála.

Mitigation measures will be managed by the contractor(s) as part of the Construction Management Plan and by the developer/ landowners thereafter.

15.6 Conclusion

This EIAR has regard to and builds on the Strategic Environmental Assessment prepared with the Dublin City Development Plan 2016-2022.

The EIAR has considered the likely, significant, adverse effects of the proposed project on the receiving environment.

Mitigation measures are included, to avoid and / or reduce impacts on the environment where considered necessary. This includes mitigation measures incorporated into the design of the proposed development.

The EIAR concludes that there are no material or significant environmental issues arising which were not anticipated by the Dublin City Development Plan 2016-2022 and considered in its Strategic Environmental Assessments.

16.0 Summary of EIA Mitigation and Monitoring Measures

16.1 Introduction

The central purpose of EIA is to identify potentially significant adverse impacts at the pre-consent stage and to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR document has been prepared by Armstrong Fenton Associates and sets out a summary of the range of methods described within the individual chapters of this EIAR document which are proposed as mitigation and for monitoring. It is intended that this chapter of the EIAR document will provide a useful and convenient summary to the competent/consent authority of the range of mitigation and monitoring measures proposed. This chapter of the EIAR was prepared by Bryan Meredith BA, MRUP, MRTPI, MIPI, of Armstrong Fenton Associates Planning Consultants.

EIA related conditions are normally imposed by the competent/consent authority as part of conditions of planning consent and form a key part of the Impact Anticipation and Avoidance strategy. Conditions are principally used to ensure that undertakings to mitigate are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented. A secondary role of EIA related conditions is to ensure that resources e.g. bonds / insurances will be available and properly directed for mitigation, monitoring or remedial action, in the event that the impacts exceed the predicted levels.

Monitoring of the effectiveness of mitigation measures put forward in the EIAR document, both by the competent authorities and the developer, is also an integral part of the process. Monitoring of environmental media and indicators arise either from undertakings or from conditions.

In the case of mitigation and monitoring measures it is important for all parties to be aware of the administrative, technical, legal and financial burdens that can accompany the measures proposed. It is also important to ensure that, where monitoring is provided for, it is clearly related to thresholds, which, if exceeded, cause a clearly defined set of actions to be implemented.

16.2 Mitigation Strategies

16.2.1 Introduction

There are three established strategies for impact mitigation - avoidance, reduction and remedy. The efficacy of each is directly dependent on the stage in the design process at which environmental considerations are taken into account (i.e. impact avoidance can only be considered at the earliest stage, while remedy may be the only option available to fully designed projects).

16.2.2 Mitigation by Avoidance

Avoidance is generally the fastest, cheapest and most effective form of impact mitigation. Environmental effects and consideration of alternatives have been taken into account at the earliest stage in the project design processes. The consideration of alternatives with respect to the development of the subject lands has been described in Chapter 3.

16.2.3 Mitigation by Reduction

This is a common strategy for dealing with effects which cannot be avoided. It concentrates on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the *"end of pipe*" approach because it does not seek to affect the source of the problems (as do avoidance strategies above). As such this is regarded as a less sustainable, though still effective, approach.

16.2.4 Reducing the Effect

This strategy seeks to intercept emissions, effects and wastes before they enter the environment. It monitors and controls them so that acceptable standards are not exceeded. Examples include wastewater treatment, filtration of air emissions and noise attenuation measures.

16.2.5 Reducing Exposure to the Impact

This strategy is used for impacts which occur over an extensive and undefined area. Such impacts may include noise, visual impacts or exposure to hazard. The mitigation is effected by installing barriers between the location(s) of likely receptors and source of the impact (e.g. sound barriers, tree screens or security fences).

16.2.6 Mitigation by Remedy

This is a strategy used for dealing with residual impacts which cannot be prevented from entering the environment and causing adverse effects. Remedy serves to improve adverse conditions which exist by carrying out further works which seek to restore the environment to an approximation of its previous condition or a new equilibrium.

16.3 Mitigation and Monitoring Measures

The following provides a list, for ease of reference, of the mitigation and monitoring measures recommended in each chapter of the EIAR.

16.3.1 Project Description and Alternatives Examined

Construction Phase

It is envisaged that the development of the lands subject of the proposed development will occur over a five year period. Given the nature of the project and the need for flexibility to respond to market demand, the development phases are indicative. An Outline/Preliminary Construction Management Plan has been prepared and reviewed by the relevant EIAR consultants and is included in the SHD application. A Construction and Environmental Management Plan has been prepared by DBFL Consulting Engineers which addresses noise and vibration, traffic management, working hours, pollution control, dust control, road cleaning, compound/public health facilities and staff parking associated with the construction works, and is submitted as part of this SHD planning application.

Operational Phase

Not applicable.

Monitoring

Not applicable.

16.3.2 Population and Human Health

Construction Phase

A range of construction related remedial and mitigation measures are proposed throughout this EIAR document with reference to the various environmental topics examined and the inter-relationships between each topic. These remedial and mitigation measures are likely to result in any significant and likely adverse environmental impacts on population and human health during the construction phases being avoided. Readers are directed to Chapter 16 of this EIAR document which summarises all of the remedial and mitigation measures proposed as a result of this EIA.

During the Construction Phase a number of mitigating measures should be considered, including *inter alia:*

- Maintain a Construction Environment Management Plan (CEMP) in effect for duration of works;
- Restrict working hours from 07:00 to 18:00; Monday to Friday and from 08:00 to 14;00 on Saturdays. No general works are envisaged to be carried out on Sundays. Should there be a need to work Sundays/Bank Holidays, a written request will be made to DCC for permission to do so. Any conditions from DCC relating to out of hours working will be followed including any required notifications to relevant parties;
- Maintain a Traffic Management Plan (TMP) in effect for duration of works;
- The CEMP will be agreed with the Planning Authority upon receipt of planning permission. The construction of the proposed development shall adhere to the relevant provisions of this Plan; and;
- As part of the CEMP, maintain a Dust and Noise abatement plan in operation.

Operational Phase

Where relevant, mitigation measures to address the potential impacts of noise, air traffic etc. on people are included in the appropriate chapters of this EIAR. No likely significant impacts have been identified for population, or land use, accordingly no mitigation measures are required for the Operational Phase.

The proposed development has been designed to avoid significant impacts in relation to local amenities and recreational facilities by:

- Incorporating the provision of a new community use facility within the design proposal;
- Incorporating the provision of a new residential amenity facility within the design proposal;
- Incorporating the provision of 5 no. commercial / retail facilities within the design proposal;
- The provision of c.1,915 sq.m of public open space representing c. 13% of the site area.

Monitoring

In relation to the impact of the development on population and human health it is considered that the monitoring measures outlined in regards to the other environmental topics such as water, air quality and climate and noise etc. sufficiently address monitoring requirements.

16.3.3 Biodiversity

Construction Phase

The proposed development does not overlap or adjoin any Natura 2000 site. Potential impacts on Natura 2000 sites are considered in the Appropriate Assessment accompanying this Planning Application. The Appropriate Assessment screening concludes that '*these complete, precise and definitive findings, based on the best available scientific evidence, remove all reasonable scientific doubt that the proposed development will have any significant effect on the Natura 2000 sites detailed above. It is also noted that, no avoidance or preventative/mitigation measures have been taken into account in this Appropriate Assessment Screening Report and its conclusions. Accordingly, a Stage 2 Appropriate Assessment is not required to be carried out in relation to the proposed development.'*

Similar to the analysis for the Natura 2000 sites provided above, the proposed development does not overlap or adjoin any national sites for nature conservation. There is a potential hydrological connection between Santry Demesne pNHA, North Dublin Bay pNHA and the site via the Santry River as storm drains from the proposed development flow into the Santry River.

In the absence of mitigation measures there is potential for surface water run-off containing silt and/or pollutants from the site to negatively impact Santry Demesne pNHA and the legally protected plant species there during the Construction Phase of the proposed development. The potential impact to Santry Demesne pNHA as a result of the Construction Phase of the proposed development is therefore considered to be negative, short-term, moderate in the absence of suitable mitigation.

The potential for surface water generated at the site of the proposed development to reach North Dublin Bay pNHA and cause significant effects is negligible due to, the downstream distance (over 6 river km) and consequent potential for dilution in the Santry River and Dublin Bay. Any potential surface water containing sediments, silts and/or pollutants would become diluted to non-discernible levels.

There is either a significant intervening distance, marine buffer or no hydrological or alternative pathway between the site of the proposed development and the remaining pNHAs in the zone of influence. Therefore, significant impacts on these sites are ruled out.

Some sections of hedgerows along the site boundary will likely be cleared as part of the proposed development works. This habitat has the potential to be utilised by small mammal species such as pygmy shrew and hedgehog for foraging/nesting. Therefore, it is considered that the loss/damage to this habitat would represent a negative, permanent, slight impact in the absence of suitable mitigation.

Watercourses are highly sensitive to contamination with excess sediment, fuel and cementitious materials during the Construction Phase of developments. There is a potential hydrological connection between the site and a local waterbody as storm drains from the site will flow into the Santry River. In the absence of mitigation measures there is a potential negative short-term, moderate impact to the Santry River during the Construction Phase via surface water run-off containing silt and/or pollutants from the site to this waterbody.

The negative impacts to terrestrial mammals will be largely as a result of habitat loss and disturbance. No mammals were recorded within the proposed development site during the survey on the 13th of May 2021 although Hedgehog and Pygmy Shrew may use some of the more vegetated margins of the site.

The proposed development could have a negative, permanent, significant impact at a local level on the aforementioned mammal species, if they are present, in the absence of mitigation/compensatory measures, through the removal of hedgerows within the site of the proposed development.

Noise and dust generated during the Construction Phase has the potential to cause negative, short-term, moderate impacts in the form of disturbance to mammals at a local level. Increased lighting at the site also has the potential to cause negative, temporary, slight disturbances to mammals in the locality.

Construction Phase of the proposed development in the absence of suitable mitigation.

There is potential for negative impacts on Otter in the Santry river during the Construction Phase of the proposed development due to potential surface water containing silt, sediments or pollutants entering local surface water drains. This could potentially impact the prey population for otter utilising the waterbody. This constitutes a negative, short-term moderate impact in the absence of suitable mitigation.

A total of ten bird species were recorded with the site of the proposed development during the site visit on 13th of May 2021. Nine of these species are green-listed species, with one amber-listed species (Herring Gull) seen flying over the site and on the rooftop of an adjacent building. The proposed development will have no impact on Herring Gull.

Local birds are likely to adapt to a certain degree of urban ambient noise due to the location of the site, the Construction Phase of the proposed development will likely result in elevated noise levels associated with the demolition and construction works. As a result, there is a potential risk of noise disturbance to birds in the vicinity of the Site, representing a negative, short-term, slight impact in the absence of suitable mitigation.

The bird species recorded on site were all associated with the treelines and hedgerow along the boundary of the Site. Should hedgerow vegetation be cleared from the site during the breeding bird season (March 1st to August 31st) there is the potential for nesting birds to be harmed and

nests to be destroyed. This would be in contravention of the Wildlife Acts and Amendments (2000) which provides protection to breeding bird species and their nests and young.

Therefore, in the absence of any mitigation or precaution, this risk represents a potential negative, permanent, significant impact to breeding birds.

The CEMP details measures to prevent accidental spill offs and to enact a Surface Water Urban Drainage System (SUDS) scheme across the site. The CEMP dictates that a dust control strategy must be implemented for all construction works. The existing site is agricultural and amenity grassland and there are no habitats present on site that are of any ecological value. The earthworks proposed within the project description will not have effects beyond the site boundary.

The construction phase and movement of heavy vehicles across the site could cause localised disturbance of birds that may use the perimeter vegetation. Given the low quality of habitat available this is expected to be very low. This would be expected to have a probable, short-term impact at a local level but there is likely to be an existing degree of habituation to regular traffic on the site so this impact may not be across the whole area. Bird species are particularly sensitive to disturbance effects due to increased noise and on-site activity.

Operational Phase

It is not envisaged that there will be any significant impacts to habitats at the site of the proposed development associated with the Operational Phase. Surface water from the proposed development will ultimately enter the Santry River via a network of storm sewers. There will be no significant impacts to the Santry river as a result of the Operational Phase of the proposed development due to the suite of SuDS measures on site which will reduce the flow rate of surface water run-off and largely eliminate the risk of pollution of waterbodies arising from the proposed development.

The overall habitat quality at the site will improve as a result of the proposed development due to the proposed landscaping and planting design, this will have a Positive, permanent, significant impact on fauna utilising the area. It is proposed to use native species to create new hedgerows, treelines, meadows and gardens. This will potentially provide new foraging, nesting/roosting and commuting habitat at the site and have an overall Positive impact on local biodiversity.

There is potential for a negative, permanent, slight local impact through the increased lighting associated with the Operational Phase of the proposed development.

As negative impacts as a result of the Operational Phase of the proposed development on waterbodies are not anticipated negative impacts on Otter as a result of water quality issues in the Santry River are not expected.

The overall impact on bat species due to the operational phase of the proposed development is considered to be negligible, once the general recommendations and specific lighting mitigation measures are implemented from Section 4.0 of the Bat survey report.

No significant effects on bird species are anticipated to arise as a result of the operational phase of the proposed development.

As negative impacts as a result of the Operational Phase of the proposed development on waterbodies are not anticipated, negative impacts on fish as a result of water quality issues in the

Santry River are not expected.

Monitoring

The impacts are foreseen to be low due to the characteristics of the project, and the ecological value of the receiving environment is also low. Monitoring measures are proposed during construction phase and compliance with the CEMP, with compliance with same required by all contracted workers. This process is foreseen to be sufficient monitoring with regard to ecological impacts and the integrity of the wider landscape ecology.

16.3.4 Land, Soil and Geology

Construction Phase

With regards to the demolition of existing structures, during demolition of existing structures hazardous material on site is to be identified and removed following the correct procedures.

Excavation of existing subsoil layers will be required in order to allow for basement excavation, drainage and utility installation and provision of underground attenuation of surface water. Underlying subsoil layers are expected to be generally suitable for reuse as non-structural fill.

In the context of materials imported to site, these will be natural stones sourced from locally available quarries in accordance with the appropriate statutory guidelines, greenfield/inert soil imported under a Waste Permit issued by the local authority; or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of article 27(1) of the European Communities (Waste Directive) Regulations, 2011.

Imported materials will be granular in nature and used in the construction of road pavement foundations, drainage and utility bedding and surrounds. Imported fill may be required to raise the development to the required level for drainage.

Materials will be brought to site and placed in their final position in the shortest possible time. Any imported material will be kept separate from the indigenous arisings from the site. All excavation to accommodate imported material will be precisely co-ordinated to ensure no surplus material is brought to site beyond the engineering requirement.

Due to the site being brownfield, earthworks plant (e.g. dump trucks) and vehicles delivering construction materials to site (e.g. road aggregates, concrete deliveries etc.) have potential to cause rutting and deterioration of the soil layers, resulting in erosion and generation of sediment laden runoff. This issue can be particularly noticeable at site access points (resulting in deposition of mud and soil on the surrounding road network). Dust generation can also occur during extended dry weather periods as a result of construction traffic.

During the construction phase there is a risk of accidental pollution from the sources noted below. Accidental spills and leaks may result in contamination of the soils underlying the site.

- Storage of oils and fuels on site
- Oils and fuels leaking from construction machinery
- Spillage during refuelling and maintenance of construction machinery
- Use of cement and concrete during construction works

Groundwater vulnerability is mapped as *'low'* by the GSI at the proposed site. This vulnerability will likely be temporarily increased due to the removal of soils, subsoils and made ground cover during construction. Therefore, accidental spillages may have potential to impact on the '*locally important'* aquifer.

Any excavations associated with development of the site are expected to be moderate. The drainage infrastructure will require excavations of approximately 2.0m on average with 3.0m in the deepest sections. A basement is proposed for under blocks Blocks A, B, C, D, E & F and expected to be in the region of approximately 3m. It is possible that underlying geology may be disturbed in areas of deep excavation, this will be verified by site investigation works following the receipt of planning permission.

- All temporary construction compounds are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings
- All construction waste and/or scrapped building materials are to be removed from site on completion of the construction phase
- Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.
- All sediment control measures (e.g. sediment retention ponds) are to be decommissioned on completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawing

Operational Phase

The operational phase of the development is unlikely to have any significant adverse impacts on the local geological/hydrogeological environment due to the environmental considerations incorporated into the design. These measures will seek to avoid or minimise potential effects, in the main, through the implementation of best practice construction methods and adherence to all relevant legislation.

Monitoring

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to the CEMP.
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).

- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination).
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.)

No ongoing monitoring is proposed on completion of the construction phase.

16.3.5 Water

Construction Phase

The following measures are proposed during the construction phase to mitigate against risks to the surrounding hydrological environment:

- Surface water runoff during the construction phase may contain increased silt levels (e.g. runoff across areas stripped of hardstanding) or become polluted by construction activities.
- Discharge of rainwater pumped from excavations may also contain increased silt levels (potential impact on existing hydrology e.g. discharge to existing open drain).
- Accidental spills and leaks associated with storage of oils and fuels, leaks from construction machinery and spillage during refuelling and maintenance contaminating the surrounding surface water and hydrogeological environments.
- Concrete runoff, particularly discharge of wash water from concrete trucks (potential impact on existing hydrology e.g. infiltration to ground).
- Discharge of vehicle wheel wash water (potential impact on existing hydrology e.g. discharge to existing surface water drainage infrastructure).
- Improper discharge of foul drainage from contractor's compound (impact on existing hydrology e.g. cross-contamination of existing surface water drainage.).
- Cross contamination of potable water supply to construction compound.

Operational Phase

Potential operational phase impacts are noted below:

- Accidental hydrocarbon leaks and subsequent discharge into piped surface water drainage network (e.g. along roads and in driveway areas).
- Increased impermeable surface area will reduce local ground water recharge and potentially increase surface water runoff (if not attenuated to greenfield runoff rate).
- Increased discharge to foul drainage network (Daily Foul Discharge Volume = approx. 955m³)
- Increased potable water consumption (Average Daily Domestic Demand = approx. 144.6m³)

Implementation of the mitigation measures described below will prevent and minimize the potential impacts of this interaction.

Monitoring

Proposed monitoring during the construction and operational phase in relation to the water and hydrogeological environment are as follows:

- Adherence to Construction Management Plan.
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and vehicle wheel wash facilities.
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Monitoring of discharge from sediment retention ponds (e.g. pH, sediment content).
- During the operational phase an inspection and maintenance contract is to be implemented in relation to the proposed Class 1 fuel / oil separators, hydrobrakes, SuDS and attenuation facilities.

16.3.6 Air Quality and Climate

Mitigation

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 Appendix 8.3. These measures will be incorporated into the Construction Environmental Management Plan (CEMP) prepared for the site.

Construction Phase

In summary the measures which will be implemented will include:

- Prior to demolition blocks should be soft striped inside buildings (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- During the demolition process, water suppression should be used, preferably with a hand-held spray. Only the use of cutting, grinding or sawing equipment fitted or used in conjunction with a suitable dust suppression technique such as water sprays/local extraction should be used.
- Drop heights from conveyors, loading shovels, hoppers and other loading equipment should be minimised, if necessary fine water sprays should be employed.
- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.

- Public roads and footpaths outside the site will be regularly inspected for cleanliness and cleaned as necessary. If sweeping using a road sweeper is not possible due to the nature of the surrounding area then a suitable smaller scale street cleaning vacuum will be used.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.
- Hoarding or screens shall be erected around works areas to reduce visual impact. This will also have an added benefit of preventing larger particles of dust from travelling off-site and impacting receptors.

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

Climate

Construction stage 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 development. Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term nature 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.

Monitoring

Construction Phase

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

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.

16.3.7 Noise

Construction Phase

The proposed development has been classed as a high risk category site based on the DCC GPG risk assessment factors. As the proposed development is in the high risk category, the monitoring section (S.6) of the DCC GPG document identifies that: -

> *"The ABC Method detailed in Paragraph E.3.2 of BS 5228-1:2009 shall be used to determine acceptable noise levels for day, evening and night time work."*

Several safeguards exist to minimise the effects of construction and demolition noise and include:

- the various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
- guidance set out in BS5228-1:2009+A1:2014, that covers noise control on construction and open sites; and

It is recommended that the precise mitigation measures to control noise from the works are agreed with the local authority prior to the works starting. Generic measures below are given to illustrate the range of techniques available.

The Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise* and the *European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001*. These measures will ensure that: -

- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps that is required to operate outside of normal permitted working hours will be surrounded by an acoustic enclosure or portable screen.

BS 5228 -1:2009+A1 2014 includes guidance on several aspects of construction site practices, which include, but are not limited to: -

- selection of quiet plant;
- noise control at source;
- screening;
- liaison with the public, and;
- monitoring.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise

sources, limiting the hours of work and noise and vibration monitoring, where required.

Please refer to the prepared Construction Environmental Management Plan ('*CEMP*") prepared by DBFL Consulting Engineers which details the contractor will minimise noise and vibration on site during the construction phase.

Operational Phase

Building and mechanical services plant items are proposed that will serve the apartments and ground floor commercial/retail units.

The selection of building services plant will ensure that noise levels comply with relevant criteria set out in Chapter 9. It is acknowledged that the selection of the specific plant items is subject to change during the detailed design stage, and this is normal industry practice. However, noise from any new plant items will be designed and/or controlled so as not to give rise to any adverse effects at the nearest noise sensitive locations.

The effect associated with building services plant, once designed to achieve the relevant noise criteria, is categorised as

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site on some surrounding roads.

A traffic impact assessment relating to the proposed development has been prepared by DBFL Consulting Engineers, as part of this EIAR. Using this information, the related noise impacts along the relevant road links has been assessed. the predicted change in noise level associated with additional traffic on the existing road network, is negligible in magnitude. The impact is therefore imperceptible and long term.

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.

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, and therefore no further mitigation required.

As is the case in most buildings, the glazed elements and ventilation paths of the building envelope are typically the weakest element from a sound insulation perspective. In general, all wall constructions (i.e. block work or concrete and spandrel elements) 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 assessment has demonstrated that the recommended internal noise criteria can be achieved through consideration of the proposed façade elements at the design stage. The calculated

glazing and ventilation specifications are preliminary and are intended to form the basis for noise mitigation at the detailed design stage.

Monitoring

Not applicable

16.3.8 Material Assets: Built Services

Construction Phase

The construction works contractor shall liaise with the relevant utilities provider prior to works commencing, with on-going consultation throughout the proposed development. Where new services would be required, the construction works contractor shall apply to the relevant utility provider and adhere to the requirements outlined in the connection permit / licence.

The Contractor will be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

All works in the vicinity of utilities apparatus will be carried out in ongoing consultation with the relevant utility company or local authority and will be in compliance with any requirements or guidelines they may have.

Where new services or diversions to existing services are proposed, the Contractor will apply to the relevant utility company for a connection permit where appropriate, and will adhere to their requirements.

Mitigation measures proposed in relation to the drainage and water infrastructure include the following:

A detailed "*Construction Management Plan"* will be developed and implemented during the construction phase. Site inductions will include reference to the procedures and best practices as outlined in the *"Construction Management Plan".*

The construction compound will include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be removed off site to a licensed facility until a connection to the public foul drainage network has been established.

In order to reduce the risk of defective or leaking sewers, all new sewers should be laid in accordance with Irish Water standards, pressure tested and CCTV surveyed to ascertain any possible defects

Operational Phase

Please refer to Chapter 7 of this EIAR *"Water*" for mitigation measures associated with the surface water treatment. All new drainage lines (foul and surface water) will be pressure tested and will be subject to a CCTV survey to identify any possible defects prior to being made operational. Chapter 7 includes the mitigation measures associated with the surface water system for the development.

Water conservation methods such as the use of low flush toilets and low flow taps should be incorporated into dwellings to reduce water volumes and related treatment and abstraction costs of the development.

Similarly, water conservation methods would reduce the loading on the foul sewer network. As part of the development, a number of different SuDS measures are proposed to minimise the impact on water quality and quantity of the runoff and maximise the amenity and biodiversity opportunities within the site.

The measures detailed below have been designed to take account of potential percolation but have not been incorporated into any storage calculations. This will result in additional storage being available in extreme events.

The proposed SuDS measures will include a combination of Source Control, Site Control and Regional Control measures as part of a Management Train whereby the surface water is managed locally in small sub-catchments rather than being conveyed to and managed in large systems further down the catchment. The combination of SuDS measures will maximise the potential for surface water interception, reducing the impact on the existing surface water drainage network. The proposed techniques will offer a high level of treatment processes and nutrient removal of the turnoff, particularly during the *"first flush*".

The proposed development is located within an area designated for the type of development proposed.

As such the services pertaining to the development are required to facilitate the proposed scheme. It is not possible to not provide the services required. Notwithstanding this, the potable water, foul and stormwater services have all been designed in accordance with the requirements of the various stake holders, notable, Irish Water for the foul and potable water utilities and Dublin City Council for the surface
water services.

Monitoring

All internal potable water and drainage services within the proposed development will be monitored by the local authority / management firm and their maintenance personnel will routinely inspect and carry out maintenance as required. The external potable water and foul drainage connections to the public system will be maintained by Irish Water. The public surface water drainage connections and sewers will be maintained by Dublin City Council.

The electricity network will be monitored by ESB networks. Telecoms will be monitored by EIR and Gas Networks Ireland will monitor the existing gas network.

16.3.9 Material Assets: Transportation

Construction Phase

All construction activities on-site will be governed by a Construction Traffic Management Plan (CTMP), the details of which will be agreed in full with Dublin City Council (DCC) prior to the commencement of construction activities on site.

A Construction Management Plan is prepared as part of the planning application with an associated Construction Traffic Management Plan (CTMP) which incorporates a range of integrated control measures and associated management activities with the objective of minimising the construction activities associated with the development. The following initiatives will be implemented to avoid, minimise and/or mitigate against the anticipated construction period impacts:

- The works will be undertaken across three phases thereby minimising the otherwise concentration of construction activities into a single defined period.
- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads;
- Appropriate on-site parking and compound area will be provided to prevent overflow onto the local network;
- It is likely that some numbers of the construction team will be brought to/from the site in vans/minibuses, which will serve to reduce the trip generation potential;
- Delivery vehicles to and from the site will be spread across the course of the working day, therefore, the number of HGVs travelling during the peak hours will be relatively low;
- Truck wheel washes will be installed at construction entrances and any specific recommendations with regard to construction traffic management made by Westmeath County Council will be adhered to;
- Potential localised traffic disruptions during the construction phase will be mitigated through the implementation of industry standard traffic management measures. These traffic management measures shall be designed and implemented in accordance with the Department of Transport's Traffic Signs Manual *"Chapter 8 Temporary Traffic Measures and Signs for Roadworks*" and "*Guidance for the Control and Management of Traffic at Roads Works – 2nd Edition*" (2010); and
- Site entrance point/s from the public highway will be constructed with a bound, durable surface capable of withstanding heavy loads and with a sealed joint between the access and public highway. This durable bound surface will be constructed for a distance of 10m from the public highway.
- Material storage zone will be established in the compound area and will include material recycling areas and facilities;
- *'Way finding'* signage will be provided to route staff / deliveries into the site and to designated compound / construction areas;
- Dedicated construction haul routes will be identified and agreed with Westmeath County Council prior to commencement of activities on-site; and
- On completion of the works, all construction materials, debris, temporary hardstands etc. form the site compound will be removed off-site and the site compound area reinstated in full on completion of the works.

Operational Phase

A package of integrated mitigation measures has been identified to off-set the additional local demand that the proposed residential development at the subject site could potentially generate as a result of the forecast increase in vehicle movements by residents of the scheme. The identified measures and associated timescale for their implementation are summarised below.

- **Management** – A Mobility Management (MMP) has been compiled by DBFL with the aim of guiding the delivery and management of coordinated initiatives by the scheme promotor to be implemented upon occupation of the site. The MMP will ultimately seek to encourage sustainable travel practices for all journeys to and from the proposed development.

- **Car Parking Management Strategy** - A management regime will be implemented by the development's management company to control and actively manage the availability of on-site car parking for residents. The signing of a rental agreement for one of the proposed residential apartments will NOT include access to a designated on-site parking space. All potential residents (prior to signing rental agreement) will be notified that the proposed scheme is a '*low car allocation'* development with no access (or guarantee thereof) to either (i) the limited on-site residents car parking provision or (ii) apply to Dublin City Council for a residents parking permit (to park on-street in one of the neighbouring streets). Nevertheless, all residents of the proposed residential apartment scheme will have the opportunity to apply to the on-site management company for both a (i) residents car parking permit (updated weekly, fortnightly, monthly, quarterly or annually) and subsequently access to a dedicated (assigned) on-site basement car parking space or (ii) a visitor's car parking permit for a short period of time. A charge will be applied to obtain a permit with the objective of covering the associated management costs and discouraging long term usage of the car parking space. All surface located parking bays will also be subject to parking management regime.

- **Infrastructure** – Infrastructure measures identified to reduce reliance of private vehicles include the provision of ample secure cycle parking on site and ensuring a design which promotes permeability for pedestrians and cyclists to, through and from the development. The level of parking provision for the development will also act as a powerful mobility management measure, ensuring against an overprovision of parking and a resultant over reliance on the private vehicle.

- **Infrastructure** – Development proposed provision of dedicated pedestrian footpaths and cycle paths throughout the development site.

- **Car Sharing –** The provision of 4 no. dedicated car share (GoCar) spaces for the use of the scheme's residents. The availability of these on-site provide a viable alternative to residents owning private vehicles whilst still having access to a car as and when required.

As part of the MMP process, bi-annual post occupancy surveys are to be carried out in order to determine the success of the measures and initiatives as set out in the proposed MMP document. The information obtained from the monitoring surveys will be used to identify ways in which the MMP measures and initiatives should be taken forward in order to maintain and further encourage sustainable travel characteristics.

Monitoring

During the construction stage, the following monitoring exercises are proposed:

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- Internal and external road conditions; and
- Timing of construction activities.

16.3.10 Material Assets: Resource and Waste Management

Construction Phase

A project specific C&D WMP has been prepared in line with the requirements of the requirements

of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (DoEHLG, 2006), and is included as Appendix 12.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the C&D WMP (Appendix 12.1) in agreement with DCC or submit an addendum to the C&D WMP to DCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.

- The Contractor will be required to fully implement the C&D WMP throughout the duration of the proposed construction and demolition phases.

A quantity of topsoil, sub soil, clay and made ground which will need to be excavated to facilitate the proposed development. Project Engineers have estimated that c. 20,000 m^3 of excavated material will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.
In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to '*design out waste'*;
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Waste Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the demolition, excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse

opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval will be obtained prior to moving material as a by-product. However, it is not currently anticipated that Article 27 will be used.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development s dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the *EMR Waste Management Plan 2015 – 2021*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

Operational Phase

A project specific OWMP has been prepared and is included as Appendix 12.2.

- The Operator / Buildings Manager of the site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse and recovery at the site of the proposed development.

In addition, the following mitigation measures will be implemented:

- The Operator / Buildings Manager will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Organic waste;
    - Dry Mixed Recyclables;
    - Mixed Non-Recyclable Waste;
    - Glass;
    - Waste electrical and electronic equipment (WEEE);
    - Batteries (non-hazardous and hazardous);
    - Cooking oil;
    - Light bulbs;
    - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
    - Furniture (and from time to time other bulky waste); and
    - Abandoned bicycles.

- The Operator / Buildings Manager will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;

- The Operator / Buildings Manager will ensure that all waste collected from the site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available;

  and

- The Operator / Buildings Manager will ensure that all waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations, *the Litter Pollution Act 1997*, the *EMR Waste Management Plan 2015 – 2021* and the DCC Waste Management (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws 2018. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Monitoring

For the *"Construction Phase*", the objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. The CDWMP specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that the contractor(s) and sub-contractors are segregating waste. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

For the "*Operational Phase*", there may be opportunities to reduce the frequency of collection for dwellings within the development where estimates have been too conservative. Waste legislation should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

16.3.11 Archaeology and Cultural Heritage

Construction Phase

Based on the results of the desktop assessment there is some potential for medieval agricultural features relating to St Pappan's Church to the east or to the manor of Santry, which was located to the north, however these were not identified within the site directly to the south where only 19th century agricultural features were identified.

Operational Phase

Not applicable.

Monitoring

It is recommended that archaeological monitoring be carried out under licence after the demolition of the existing building during the removal of the concrete layer. Any features encountered during the monitoring programme should be tested, and if archaeological fully excavated by hand to preserve them by record.

In the unlikely event that significant archaeology is uncovered a revised mitigation plan may be necessary, which will be agreed upon in discussion with the City Archaeologist and The National Monuments Service.

Time should be allowed between the monitoring works and any construction or service laying in case archaeological features are uncovered.

16.3.12 The Landscape

Construction Phase

It is considered that the initial development will have a moderate effect on the existing brownfield character of the site. The landscape and visual change will be most pronounced during the mobilisation and construction stage, when activity is unfamiliar and when the existing character of the lands is altered by demolition and the removal of existing trees and vegetation. The changes arising from the initial site development and construction works will have slight negative landscape and visual effects.

In the medium to long term, the landscape effects (both on vegetation and character) would be moderate and positive, due to the conversion of the site from a vacant and industrial site to a considered high quality public realm and sequence of landscape spaces, both communal spaces and public open spaces. The landscape design provides for a detailed, permeable and site-specific response to the provision of high-quality public open spaces. The open space network provides for an attractive and diverse range of amenity and recreational opportunities. Equally the open space network enhances the strong urban design framework for the site.

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The following mitigation measures are proposed:

- Restrict hours of construction activity in accordance with local authority guidance
- Extend hoarding to restrict views of the site during construction
- Construct changes to topography and retaining elements in accordance with the proposed landscape plan to ensure that sight lines are retained across the site where required e.g. pedestrian route along the northern boundary.
- Plant tree species and sizes as per the proposed landscape plan in order to screen the development and create an appropriate landscape at ground level
- There are communal roof terraces included for residents which will be visible from the surrounding neighbourhood. The terraces will include tree, hedge and herbaceous planting.

Operational Phase

The mitigation measures, including measures taken during the design stage, which have evolved throughout the design process, that have been adopted in the proposed scheme and are detailed in the Landscape Plan, are as follows:

- Maintain all proposed vegetation to ensure that sight lines are retained across the site where required e.g. pedestrian route along the northern boundary;
- Maintain and manage proposed tree planting to ensure that it matures in accordance with industry best practice
- Application of best practice horticultural methods to ensure that mitigation measures establish and grow appropriately.

Landscape works are proposed to reduce and offset any adverse impacts generated due to the proposed development, where possible. The planting of substantial numbers of new trees and other planting in the open spaces the site boundaries and internal roads will enhance the overall appearance of the new development and compensate for the removal of hedgerows and trees where needed for the construction works, and increase the overall landscape capacity of the site to accommodate development.

Monitoring

The landscape design will be subject to a detailed design and construction process supervised by a qualified Landscape Architect to ensure that the design is implemented in accordance with best practice. A suitably qualified Arborist should be retained to supervise the implantation of tree protection measures in accordance with best practice.

Monitoring of the completed landscape works will be undertaken on a regular basis post completion. The proposed plantings will be subject to a defects and maintenance period for initial establishment and if any replacement trees or plantings are required these works shall be carried out during this period.