ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME II

PROPOSED RESIDENTIAL DEVELOPMENT

AT

Gorey, Co. Wexford

Prepared by

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LIST OF ABBREVIATIONS

AA Appropriate Assessment

ABP An Bord Pleanála

CDP County Development Plan

CMP Construction Management Plan

CA Competent Authority (An Bord Pleanála)

CSO Central Statistics Office

DAHG Department of Arts, Heritage and the Gealtacht

DCENR Department of Communications, Energy and Natural Resources

DEHLG Department of Housing, Planning and Local Government

EIA Environmental Impact Assessment

EIAR Environmental Impact Assessment Report

EMP Environmental Management Plan

EPA Environmental Protection Agency

ESRI Economic and Social Research Institute

GDP Gross Domestic Product

GSI Geology Survey Ireland

IAA Irish Aviation Association

IEEM Institute of Ecology and Environmental Management

IFI Inland Fisheries Ireland

LAP Local Area Plan

NHA/pNHA Natural Heritage Area / proposed Natural Heritage Area

NIAH National Archive of Architectural Heritage

NPWS National Parks and Wildlife Service

NRA National Roads Authority

NPF National Planning Framework

OPW Office of Public Works

PBSA Purpose-Built Student Accommodation

RMP Record of Monuments and Places

RPG Regional Planning Guidelines

RPS Record of Protected Structures

SAC Special Area of Conservation

SMR Sites and Monuments Record

SPA Special Protection Area

SHD Strategic Housing Development

SUDS Sustainable Drainage System

TMP Traffic Management Plan

WFD Water Framework Directive

WCC Wexford County Council

1.0 INTRODUCTION AND METHODOLOGY

1.1 INTRODUCTION & TERMS OF REFERENCE

John Spain Associates, Planning & Development Consultants, have been commissioned by Amil Properties Limited, to prepare an Environmental Impact Assessment Report (EIAR) for a proposed development of houses, apartments, duplex apartments as well as a creche at Ramsfortpark, Gorey, Co. Wexford. This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates, and approved by John Spain, Managing Director.

The site is located on the north-west edge of Gorey town, approximately 1km from the town centre. It is accessed from the Fort Road, which runs along its western boundary. The other side of Fort Road is currently under residential development at the town end, with some single detached houses further north. To the north of the site is agricultural land, although it is zoned residential and forms part of the Creagh Key Development site, as defined in the Gorey Town & Environs Local Area Plan 2017-2023.

The central purpose of the EIA process is to undertake an assessment of the likely and significant impact on the environment of the proposed development in parallel with the project design process, and to document this process in an Environmental Impact Assessment Report (EIAR); which is then submitted to the competent/ consent authority, in order to inform the subsequent decision as to whether the development should be permitted to proceed.

A full description of the proposed development lands together with a description of the proposed development is provided in Chapter 2 of this EIAR document.

The Strategic Housing Development (SHD) proposal relates to a residential development of 297 no. dwellings comprising 26 no. 2 bedroom terraced houses, 125 no. 3 bedroom houses; 77 no. 4 bedroom houses; 4 no. 5 bedroom houses, 36 no. 2 bedroom apartments and 29 no. 3 bedroom apartments, a crèche of c. 554 sq. m (with outdoor play area), as well as associated infrastructure works to include underground sewerage upgrade works. The cumulative assessment of the EIAR includes for the future development of the adjoining CE zoned lands under the ownership of AMIL Properties.

This EIAR document has been prepared in accordance with the European Union EIA Directive 85/337/EC as amended by directives 97/11/EC, 2003/4/EC, 2011/92/EU and 2014/52/EU, as well as the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, and a description of the methodological approach to the preparation of this EIAR is provided in the following sections of this chapter.

1.2 DEFINITION OF EIA AND EIAR

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

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). Where current national guidelines and regulations refer to an environmental impact statement or EIS, this can be taken to be the same as an environmental impact assessment report (EIAR).

A definition of Environmental Impact Assessment Report (EIAR) has not been included in the revised directive however the EPA Guidelines (2017)1 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.

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/ consent authorities use 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.

1.3 EIA LEGISLATION

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, Directive 2003/4/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.

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 16 May 2017.

The Planning and Development Act 2000 (as amended) and Planning and Development Regulations 2001 (as amended) have been updated to reflect the requirements of Directive 2014/52/EC. The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, refers.

The Department is in the process of updating the March 2013 *'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. The Draft Guidelines prepared by the EPA (August 2017) have also informed this EIAR.

EIA provisions in relation to planning consents are currently contained in the Planning and Development Act, 2000, as amended, (Part X); and in Part 10 of the Planning and Development Regulations, 2001, as amended.

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

1.4 EIA GUIDELINES

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 EIARs in the development sector. Table 1.1 sets out the relevant key EIA Guidance which has been consulted in the preparation of this EIAR document. In addition, the individual chapters of this EIAR should be referred to for further information on the documents consulted by each individual consultant.

We would also note that the pre-application discussions with the Planning Authority and An Bord Pleanála, including the Board's opinion informed the content of the EIAR.

Table 1.1 – EIA Guidelines Consulted as Part of the Preparation of this EIAR

Irish
• Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA, August 2017 • Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment August 2018 • Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems - Key Issues Consultation Paper, Department of Housing, Planning, Community and Local Government, 2017. • Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017). • Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoECLG, March 2013). • 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 (Planning and Development) (Environmental Impact Assessment) Regulation 2018
European Union (in addition to Directives referenced above)
• Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, European Commission, 2017 • EU Guidance on EIA Screening (DG Environment 2001). • Guidance on EIA Scoping (DG Environment 2001). • EIA Review Checklist (DG Environment 2001). • Study on the Assessment of Indirect & Cumulative Impacts as well as Impact Interaction (DG Environment 2002).

The most recent guidelines are the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports published by the EPA and the key issues consultation paper published by the Department.

The new EPA draft guidelines have been prepared to help practitioners interpret the amended EIA Directive and are likely to be updated and finalised following the updates to the Planning and Development Act 2000 (as amended) and Planning and Development Regulations 2001 (as amended).

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.

The content of this Environmental Impact Assessment Report has been prepared in accordance with the provisions of Article 5(1) and Annex IV of Directive 2014/52/EU and Schedule 6, Article 94 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

1.5 EIA PROCESS OVERVIEW

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; and
- Assessing and Evaluating.
- Screening: This stage establishes if an EIAR is required for a proposed development.

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. Scoping request letters were issued to a range of stakeholders at the commencement of this EIA process and the responses received have been considered as part of the compilation of the EIAR.

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 2 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. This stage of the EIAR is presented in Chapters 6 to 17.

1.6 SCREENING – REQUIREMENT FOR EIA

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 (as amended) 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 within categories 10(b)(i) and 10(b)(iv) of Part 2 of Schedule 5 of the Planning and Development Regulations 2001-2015. Category 10(b)(i) refers to ‘Construction of more than 500 dwellings’.

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

The overall SHD application site is 11.41 hectares which includes the underground sewerage upgrade works (along public road between 'Ashwood Grove/Willow Park' and 'Cois Doire' as well as Ramsfort Park Avenue, Garden City) on the public road (for approximately 1.1km) connecting the subject site to the public sewerage infrastructure on the Arklow Road (R772). It is also noted that the overall Masterplan site area is approximately 12 hectares (including CE zoned lands under the control of the applicant). Having regard to the overall size of the site and to category 10(b)(iv) of Part 2 of Schedule 5 of the Planning and Development Regulations 2001 as amended an EIAR is required.. Having regard to the overall size of the site and to category 10(b)(iv) of Part 2 of Schedule 5 of the Planning and Development Regulations 2001 as amended a mandatory EIA is required.

1.7 SCOPING

The 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 defined in the EC guidance2 as:

'determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR'.

The applicant is committed to ensuring that all of its development projects conducted in a responsible and sustainable manner. A scoping process to identify the issues that are likely to be most important during the Environmental Impact Assessment process was carried out by the applicant, design team and EIAR consultants and informed the format of this EIAR.

Section 173(2) (a) of the Planning and Development Act 2000, as amended, provides that a request for scoping may be submitted to the planning authority, however this is not mandatory. The second paragraph of Article 5(2) of Directive 2014/92/EU provides that Member States can choose to make it mandatory that competent authorities have to give a scoping opinion irrespective of whether the developer so requests. The transposition of this provision is optional and the consultation paper from the Department indicates that it is not intended to introduce mandatory scoping.

The EIAR prepared for the scheme 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 (as amended) and in recent guidance 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 and Methodology,
- Project Description and Alternatives Examined,
- Population and Human Health,
- Biodiversity,
- Land and Soils,
- Water,
- Air Quality and Climate,
- Noise and Vibration,
- Landscape and Visual Impact,
- Material Assets Traffic, Waste and utilities,
- Archaeology, Architectural and Cultural Heritage,
- Interactions of the Foregoing,
- Principal Mitigation and Monitoring Measures,
- Non-Technical Summary.

[2] Guidance on EIA Scoping, EC, 2001

In addition to the above a series of standalone reports have been prepared to accompany the application and which have helped inform the above chapters of the EIAR where relevant. Roadplan have prepared a Traffic and Transport Assessment Report. IE Consulting have prepared a Site Specific Flood Risk Assessment for the site and the route of the foul sewer. Strutec Engineers have produced a Construction Management Plan. In addition Panther Environmental has prepared an AA screening report. Chapter 2 provides details of the envisaged phased delivery of development on the lands.

It is necessary to examine each of the aforementioned sections of the EIAR with respect to the impacts that the proposed development may have on the environment. The purpose of this scoping exercise is to inform 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.

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

- Pre-application meetings with Wexford County Council/An Bord Pleanála as well as the Board's Opinion issued to the applicant as part of the SHD process;
- Draft Guidelines on the information to be contained in environmental impact assessment reports, EPA, 2017;
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems - Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017;
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017).
- The requirements of Part X of the Planning and Development Act, 2000, as amended, and Part 10 of the Planning & Development Regulations, 2001-2018;
- The requirements of the Wexford County Development Plan 2017-2023;
- The Gorey Local Area Plan 2017-2023;
- Regional and National Planning Policy Documents;
- The likely concerns of third parties;
- The nature, location and scale of the proposal;
- The existing environment together with any vulnerable or sensitive local features and current uses;
- The planning history of the site and relevant planning decisions in the vicinity of the site together with environmental assessments associated with the subject site and adjoining lands;
- The likely and significant impacts of the proposed development on the environment; and,
- Available methods of reducing or eliminating undesirable impacts.

A series of meetings have taken place with the technical staff of Wexford County Council and a consultation meeting has taken place between the Applicant and An Bord Pleanála under the strategic housing development process which assisted in the preparation of this EIAR and the SHD planning application.

1.8 INFORMATION TO BE CONTAINED IN AN EIAR

The content of this Environmental Impact Assessment Report 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;

(a) (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;

(b) (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;

(c) (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. W here 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."

It is also noted Article 94 of the European Union (Planning And Development) (Environmental Impact Assessment) Regulations 2018, transpose the 2014 EU Directive into Irish Law and are outlined:-

1. (a) A description of the proposed development comprising information on the site, design, size and other relevant features of the proposed development.

(b) A description of the likely significant effects on the environment of the proposed development.

(c) A description of the features, if any, of the proposed development and the measures, if any, envisaged to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment of the development.

(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.

2. Additional information, relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, on the following matters, by way of explanation or amplification of the information referred to in paragraph 1:

(a) a description of the proposed development, including, in particular—

(i) a description of the location of the proposed development,

(ii) a description of the physical characteristics of the whole proposed development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases,

(iii) a description of the main characteristics of the operational phase of the proposed development (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, and

(iv) 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;

(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) 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 selecting the chosen option, including a comparison of the environmental effects;

(c) a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without the development 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;

(d) a description of the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act likely to be significantly affected by the proposed development: 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;

(e) (i) a description of the likely significant effects on the environment of the proposed development resulting from, among other things—

(I) the construction and existence of the proposed development, including, where relevant, demolition works,

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

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

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

(V) the cumulation of effects with other existing or approved developments, or both, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources,

(VI) the impact of the proposed development on climate (for example

the nature and magnitude of greenhouse gas emissions) and the vulnerability of the proposed development to climate change, and

(VII) the technologies and the substances used, and

(ii) the description of the likely significant effects on the factors specified in paragraph (b)(i)(I) to (V) of the definition of 'environmental impact assessment' in section 171A of the Act should cover the direct effects and any indirect, secondary, cumulative, transboundary, shortterm, medium-term and long-term, permanent and temporary, positive and negative effects of the proposed development, taking into account the environmental protection objectives established at European Union level or by a Member State of the European Union which are relevant to the proposed development;

(f) 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;

(g) 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 an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;

(h) a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national

legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment 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, emergencies arising from such events.

1.9 PURPOSE OF THIS EIAR

The EPA Guidelines state that the main purpose of an EIAR *'is to identify, describe and present an assessment of the likely significant impacts of a project on the environment. This informs the CA's assessment process, its decision on whether to grant consent for a project and, if granting consent, what conditions to attach. The EIAR focuses on:*

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

In addition to identifying and predicting the likely predicted significant environmental impacts resulting from the proposed development, the EIAR should 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 intention of this EAR 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 An Bord Pleanála, statutory consultees and the public in assessing all aspects of the application proposals.

1.10 OBJECTIVES OF THIS EIAR

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; and
- Facilitating better consultation.

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.

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 development at Ballowen/Ramsfortpark, Fort Road, Gorey, Co. Wexford.

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

- Pursuing Preventative Action;
- Maintaining Environmental Focus and Scope;
- Informing the Decision; and
- Public & Stakeholder Participation.

1.10.1 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 2.

1.10.2 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; and,
- Have significant and adverse effects.

1.10.3 Informing the Decision

The EIAR document enables the competent/consent 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.

1.10.4 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 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. A summary of the pre-application discussions are contained in Volume III of this EIAR.

1.11 FORMAT AND STRUCTURE OF THIS EIAR

1.11.1 EIAR Structure

The structure of the EIAR is laid out in the preface of each volume for clarity. It consists of three volumes as follows:-

- Volume I: Non-Technical Summary (A non-technical summary of the information contained within Volume II).
- Volume II: Environmental Impact Assessment Report

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

Each of the environmental aspects as listed below are examined in terms of the existing or baseline environment, identification of potential construction and operational stage impacts and where necessary proposed mitigation measures are identified. The interaction of the environmental aspects with each other is also examined. Environmental aspects considered include:-

Chapter 3 Population and Human Health;
Chapter 4 Biodiversity;
Chapter 5 Land and Soils;
Chapter 6 Water;
Chapter 7 Climate (Air Quality);
Chapter 8 Air (Noise and Vibration);
Chapter 9 Landscape & Visual
Chapter 10 Material Assets – Traffic
Chapter 11 Material Assets - Waste Management
Chapter 12 Material Assets - Utilities
Chapter 13 Cultural Heritage (Local History, Archaeology & Architectural Heritage);
Chapter 14 Interactions
Chapter 15 Summary of Mitigation Measures
Chapter 13 References

- Volume III: Technical Appendices (Volume III contains specialists' technical data and other related reports).

1.11.2 EIAR Volume II Structure

The preparation of an EIAR document requires the assimilation, co-ordination and presentation of a wide range of relevant information in order to allow for the overall assessment of a proposed development. For clarity and to allow for ease of presentation and consistency when considering the various elements of the proposed development, a systematic structure is used for the main body of this EIAR document.

The structure used in this EIAR document is a Grouped Format structure. This structure examines each environmental topic[3] in a separate chapter of this EIAR document. The structure of the EIAR document is set out in Table 1.2 below.

[3] In some instances similar environmental topics are grouped.

Table 1.2 – Structure of this EIAR

Chapter	Title	Content
1	Introduction and Methodology	Sets out the purpose, methodology and scope of the document.
2	Project Description and Alternatives Examined	Sets out the description of the site, design and scale of development, considers all relevant phases from construction through to existence and operation together with a description and evaluation of the reasonable alternatives studied by the developer including alternative locations, designs and processes considered; and a justification for the option chosen taking into account the effects of the project on the environment.
3	Population and Human Health	Describes the demographic and socio-economic profile of the receiving environment and potential impact of the proposed development on population, i.e. human beings, and human health.
4	Biodiversity	Describes the existing ecology on site and in the surrounding catchment, and assesses the potential impact of the proposed development and mitigation measures incorporated into the design of the scheme.
5	Land and Soils	Provides an overview of the baseline position, the potential impact of the proposed development on the site's soil and geology and impacts in relation to land take and recommends mitigation measures.
6	Water	Provides an overview of the baseline position, the potential impact of the proposed development on water quality and quantity and recommends mitigation measures.
7	Air Quality and Climate	Provides an overview of the baseline air quality and climatic environment, the potential impact of the proposed development, the vulnerability of the project to climate change, and recommends mitigation measures.
8	Noise and Vibration	Provides an overview of the baseline noise environment, the potential impact of the proposed development and recommends mitigation measures.
9	Landscape & Visual Impact	Provides an overview of the baseline position, the potential impact of the proposed development on the landscape appearance and character and visual environment, and recommends mitigation measures.
10-12	Material Assets	Describes the existing traffic, waste management and services and infrastructural requirements of the proposed development and the likely impact of the proposed development on material assets.
13	Archaeology and Architectural and Cultural Heritage	Provides an assessment of the site, and considers the potential impact of the proposed development on the local archaeology, architectural and cultural heritage; and recommends mitigation measures.

Chapter	Title	Content
14	Interactions of the Foregoing	Describes the potential interactions and interrelationships between the various environmental factors
15	Summary of Mitigation and Monitoring Measures	Sets out the key mitigation and monitoring measures included in the EIAR Document for ease of reference.
16	Reference List	List of references within the chapters of the EIAR

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

Table 1.3 – Methodology Employed to Evaluate Environmental Topic

- **Introduction:** Provides an overview of the specialist area and specifies the specialist who prepared the assessment.
- **Study Methodology:** This subsection outlines the method by which the relevant impact assessment has been conducted within that chapter.
- **The Existing Receiving Environment (Baseline Situation):** In describing the receiving environment, the **context, character, significance and sensitivity** of the baseline receiving environment into which the proposed development will fit is assessed. This also takes account of any proposed developments that are likely to proceed.
- **Characteristics of the Proposed Development:** 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 each chapter those characteristics of the proposed development which are relevant to the area of study are described; for example the chapter on landscape and visual impact addresses issues such as height and impact on the surrounding landscape.
- The characteristics of projects must be considered, with particular regard to: (a) the size and design of the whole project; (b) cumulation with other existing and/or approved projects; (c) the use of natural resources, in particular land, soil, water and biodiversity; (d) the production of waste; (e) pollution and nuisances; (f) the risk of major accidents and/or disasters which are relevant to the project concerned, including those caused by climate change, in accordance with scientific knowledge; (g) the risks to human health (for example due to water contamination or air pollution).
- **Potential Impact of the Proposed Development:** This section provides a description of the specific, direct and indirect impacts that the proposed development may have. This is provided with reference to both the Receiving Environment and Characteristics of the Proposed Development sections while also referring to the (i) magnitude and intensity, (ii) integrity, (iii) duration and (iv) probability of impacts. Impact assessment addresses direct, indirect, secondary, cumulative, transboundary, short, medium and long-term, permanent, temporary, positive and negative effects as well as impact interactions.
- **Do Nothing Scenario:** In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place.

- **Avoidance, Remedial and Mitigation Measures: Avoidance,** remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential impacts. This includes avoidance, reduction and remedy measures as set out in Section 4.7 of the Development Management Guidelines 2007 to reduce or eliminate any significant adverse impacts identified.

- **Predicted Impacts of the Proposed Development:** This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, transboundary, short, medium and long-term, permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied.

- **Monitoring:** 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.

- **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 to the environment.

- **Interactions:** This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts

- **Difficulties Encountered in Compiling:** This section provides an indication of any difficulties encounters by the environmental specialist in compiling the required information.

1.12 EIAR PROJECT TEAM

1.12.1 EIAR Project Management

The preparation of this EIAR was project managed, co-ordinated and produced by John Spain Associates. John Spain Associates role was to liaise between the design team and various environmental specialist consultants. John Spain Associates were also responsible for editing the EIAR document to ensure that it is cohesive and not a disjointed collection of disparate reports by various environmental specialists. John Spain Associates does not accept responsibility for the input of the competent specialist consultants or the design team.

1.12.2 EIAR Competent Experts/Environmental Specialists

Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR document which are mandatorily required as per the EIA Directive and Planning and Development Regulations 2018.

The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

'Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality'.

In order to outline compliance with this requirement of the amended directive and in line with emerging best practice the EIAR states the names of the environmental consultants who have prepared each element of the EIAR and lists their qualifications and relevant experience; demonstrating that the EIAR has been prepared by competent experts.

Each environmental specialist was commissioned having regard to their previous experience in EIA; their knowledge of relevant environmental legislation relevant to their topic; familiarity with the relevant standards and criteria for evaluation relevant to their topic; ability to interpret the specialised documentation of the construction sector and to understand and anticipate how their topic will be affected during construction and operation phases of development;

ability to arrive at practicable and reliable measure to mitigate or avoid adverse environmental impacts; and to clearly and comprehensively present their findings.

Each environmental specialist was required to characterise the receiving baseline environment; evaluate its significance and sensitivity; predict how the receiving environment will interact with the proposed development and to work with the EIA project design team to devise measures to mitigate any adverse environmental impacts identified.

The relevant specialist consultants who contributed to the EIAR and their inputs are set out in Table 1.4 below.

Table 1.4 – EIAR List of Competent Experts

Organisation	EIAR Specialist Topics / Inputs
John Spain Associates, Planning & Development Consultants, 39 Fitzwilliam Place, Dublin 2, D02 ND61 T: 01 662 5803 E: rkunz@johnspainassociates.com Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt	Introduction and Methodology Project Description and Alternatives Examined Population and Human Health Interactions of the Foregoing Principal Mitigation and Monitoring Measures Non-Technical Summary
Strutec Architects and Engineers Liam Minogue B Arch (Hons) Damien Murphy BSc (Eng) MIEI Dan O'Sullivan DipArch (Hons) RIAI RIBA	Project Description and Alternatives Examined
Panther Environmental Solutions (PES) Ltd Lorraine Wyse BSc, Degree in Environmental Science and Health Dip Ecology	Biodiversity
Corey Cannon BSc (Hons) Zoology	Biodiversity (Bats)
IE Consulting Jer Keohane BSc, MSc, FCIWEM, C.Geol, MIEI | Technical Director Eoin Fitzpatrick | Contaminated Land Scientist BSc, MSc, PGeo	Land and Soils/ Population and Human Health
IE Consulting Jer Keohane BSc, MSc, FCIWEM, C.Geol, MIEI | Technical Director	Water
Roadplan Richard Frisby | BScEng MIEI	Material Assets-Traffic
Panther Environmental Solutions Ltd Lorraine Wyse BSc, Degree in Environmental Science and Health Dip Ecology Mr. Nial Ryan B.Sc in Applied Physics from Dublin City University and an M.Sc in Medical Device Regulatory Affairs	Material Assets (Waste Management)
Panther Environmental Solutions Ltd B Lorraine Wyse BSc, Degree in Environmental Science and Health Dip Ecology Mr. Nial Ryan B.Sc in Applied Physics from Dublin City University and an M.Sc in Medical Device Regulatory Affairs	Material Assets (Utilities)

Organisation	EIAR Specialist Topics / Inputs
Panther Environmental Solutions Ltd Mr. Nial Ryan B.Sc in Applied Physics from Dublin City University and an M.Sc in Medical Device Regulatory Affairs	Air Quality and Climate (Population and Human Health)
Panther Environmental Solutions Ltd Martin O'Looney B.Sc. Degree in Environmental Science	Noise and Vibration (Population and Human Health)
Murray and Associates Jim Bloxam, MA in Landscape Architecture (UCD) - corporate member of the Irish Landscape Institute.	Landscape and Visual Impacts
Seán Shanahan BA (Hons) Archaeology and Philosophy (NUI Galway 2006), MSc GIS and Remote Sensing (Hons) (NUI Maynooth, 2012) Edel Barry BA (Hons) Archaeology and English (NUI Galway 2004), MPhil Archaeology (UCC 2010), HDip ArcGIS (UCC 2011).	Archaeology, Architectural and Cultural Heritage

1.13 NON-TECHNICAL SUMMARY

The EIA Directive requires 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 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 the Competent Authority.

The 2018 EIA Guidelines prepared by the DHPLG state that the Non-Technical Summary *"should be concise and comprehensive and should be written in language easily understood by a lay member of the public not having a background in environmental matters or an in-depth knowledge of the proposed project."*

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 in Volume I.

1.14 LINKS BETWEEN EIA AND APPROPRIATE ASSESSMENT/NIS

Article 6(3) of the Habitats Directive (92/43/EEC) states any project not directly connected with or necessary to the management of a Natura 2000 site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to the Appropriate Assessment procedure of its likely implications for the site in view of the site's conservation objectives.

In January 2010 the DoEHLG issued a guidance document entitled '*Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities'*. This guidance document enshrines the '*Source-Pathway-Receptor'* into the assessment of plans and projects which may have an impact on Natura 2000 sites.

The Department of the Environment, Heritage and Local Government are introducing further legislation on this issue of Appropriate Assessment. The Department advises that all projects are screened for Appropriate Assessment.

An Appropriate Assessment screening was undertaken by Panther Environmental Solutions Ltd in accordance with '*Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance on the Provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC)'.* The AA Screening is submitted with the SHD application.

1.15 AVAILABILITY OF EIAR DOC

A copy of this EIAR document and Non-Technical Summary of the EIAR document is available for purchase at the offices of An Bord Pleanála and Wexford County Council (Planning Authority) at a fee not exceeding the reasonable cost of reproducing the document. It can also be viewed on the SHD website- www.creaghshd.ie, set up by the applicant.

1.16 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.

1.17 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.

1.18 QUOTATIONS

EIAR documents by their very nature contain statements about the proposed development, some of which are positive, and some negative. Selective quotation or quotations out of context can give a very misleading impression of the findings of this EIAR. The EIAR study team urge that quotations should, where reasonably possible be taken from the conclusions of specialists' chapters or from the non-technical summary and not selectively.

1.19 EIA QUALITY CONTROL AND REVIEW

John Spain 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 Report4 and the Department of Housing, Planning, Community and Local Government have published a consultation paper5, 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.

1.20 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. It is noted that the subject lands are located in the townland of *"Ballowen or Ramsfort".* The EIAR makes reference to Ballyowen, which is also used locally and within some of the baseline studies, by consultants.

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

5 *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.*

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT AND ALTERNATIVES EXAMINED

2.1 INTRODUCTION AND TERMS OF REFERENCE

This section of the EIAR has been prepared by John Spain Associates, Planning & Development Consultants, and provides a description of the proposed development and also explains the evolution of the scheme design through the reasonable alternatives examined. This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates, and approved by John Spain, Managing Director. The description of the proposed development is one of the two foundations upon which an EIAR is based (the other being the description of the existing environment described in this chapter and by each of the specialist consultants in the subsequent chapters). It is also a requirement of the EIA Directive (as amended) to present an outline of the main alternatives considered and a justification of the final proposed development.

A systematic approach in accordance with the EPA *"Guidelines on Information to be Contained in an Environmental Impact Statement"* (EPA 2002), *"Advice Notes on Current Practice (in preparation of Environmental Impact Statements)"* (EPA 2003), *"Draft Guidelines on the Information to be Contained in EIARs"* (2017) and other EIA guidance documents was used to ensure all relevant aspects of the development are accurately and fully described. The objective is to provide a description of the proposed development in sufficient detail, which when taken together with the description of the existing environment provided, will allow an independent reader without acquired technical environmental knowledge, to understand the significant impacts likely to arise from the proposed development.

The description of the proposed development is set out in this chapter and the following chapters by each specialist consultant in terms of those environmental topics which will form the basis of the impact assessment process and the characteristics of the proposed development which could potentially affect population, human health, cultural heritage and archaeology, biodiversity, landscape, land and soil, water, air, climate, noise and material assets and the interaction between the aforementioned factors. The EIA Directive also requires that the description of the site, design, size or scale of the development, considers all relevant phases of the existence of the project from its construction through to its existence and operation (and where applicable its restoration or decommissioning).

This EIAR document fully reflects the key environmental factors of the proposed development which were recognised from the scoping carried out by the design team and the level of detail required will vary considerably according to the sensitivity of the existing environment and the potential of the project for significant effects.

2.2 DESCRIPTION OF THE LOCATION OF THE PROPOSED DEVELOPMENT

The site is located on the north-west edge of Gorey town, approximately 700m from the town centre. It is accessed from the Fort Road, which runs along its western boundary. The other side of Fort Road is currently under residential development at the town end, with some single detached houses further north. To the north of the site is agricultural land, although that immediately adjacent is zoned residential and forms part of the Creagh Key Development site, as defined in the Gorey Town & Environs Local Area Plan 2017-2023.

The subject lands are located within the townlands of "Ballowen or Ramsfortpark" (also known as Ballyowen), while the route of the foul sewer is located within the townland of "Gorey Corporation". Ballowen and Ballyowen are used throughout the text.

The site area of the SHD application is approximately 11.37 hectares (including foul sewer route from site to the Arklow Road. The EIAR also includes a cumulative assessment of the CE zoned lands under the control of the applicant, which are adjacent.

The Site Layout Plan prepared by Strutec Architects shows the overall layout in Figure 2.1. of the Housing Development.

Figure 2.1 – Site Layout Housing and Creche

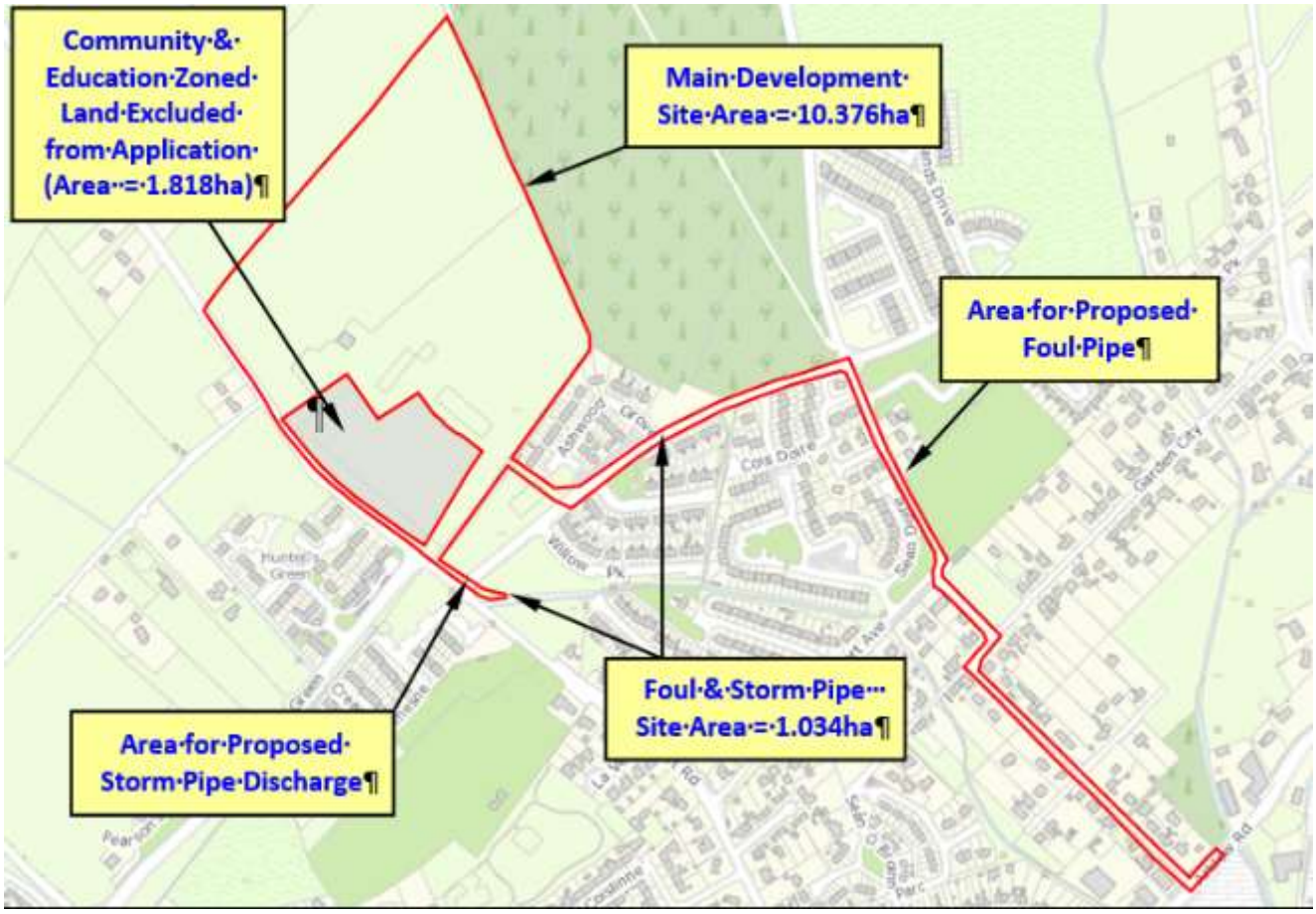
Source: Strutec Architects

2.3 DESCRIPTION OF THE PHYSICAL CHARACTERISTICS OF THE WHOLE PROPOSED DEVELOPMENT

The proposed development comprises 297 dwellings, consisting of 232 two, three, four and five bedroom houses and 65 two and three bedroom apartments and duplexes. The dwellings are arranged in a wide variety of units of both two and three storeys.

In addition it is proposed to provide a foul sewer connection from the subject site along the public road (c. 1.1km), to connect to the Arklow Road, to the south.

Figure 2.2 – Site Boundary including Foul Sewer Route



Source: IE Consulting

2.3.1 Demolition

The proposal includes for the demolition of the existing steel structures storey building located which formed part of the previous use of a portion of the lands (Walsh Mushrooms).

The southern/south-western part of the site has an exposed steel frame and concrete hardstandings that remain from the previously existing mushroom sheds that occupied that section of the site. Any demolitions will be carried out by a competent Demolition Subcontractor in accordance with the current code for demolition and the consulting engineer's specification.

It is anticipated that the vast majority of the waste generated from demolitions will be segregated wherever possible for reuse or recycling in accordance with the relevant legislation and guidelines and the project's Construction and Environmental Management Plan.

2.3.2 Residential Development

A wide variety of unit options are included in the proposal, ranging from 2 bedroom dwellings and apartments, to 5 bedroom dwellings. These are arranged in terraces, semi-detached and detached configurations, with small sets of apartments defining the key corner sites of the residential blocks.:-

Table 2.1 – Overall Residential Development Mix

	2 bedroom	3 bedroom	4 bedroom	5 bedroom	
Apartments	36	29			65
Houses	26	125	77	4	232
	62	154	77	4	297
	20.9%	51.9%	25.9%	1.3%	100.0%

Source: Strutec Architects Schedule of Areas

Houses

The houses are designed as two and three storey family dwellings, in detached, semidetached or terraced configurations. Some of the houses are designed in 2.5 level format, with bedrooms partially occupying the roof space, apart from type F, which has been designed to give particular definition to the main avenue. Individual plot layouts provide good separation to ensure privacy and minimise overlooking. The end-row and end terrace house types have been used to turn corners, with front doors and windows giving activity and passive supervision to the sides and avoiding large blank gables.

The house types are designed to suit a range of family sizes, with nine types:

Type A:

This is a 2 storey four bedroom detached house. This type occurs across the northern part of the development and is also used as a corner house, where the entrance façade is at right angles to the main row. Type A has off-street parking.

Type B:

Type B is a four bedroom detached house planned over 2.5 levels, with the uppermost floor partially occupying the roof space. This type is proposed for various locations in the northern part of the development. Type B has off-street parking.

Type C:

This is a four bedroom 2.5 storey semi-detached house, with the uppermost floor partially occupying the roof space. This type is has a similar plan to type B (although the formal treatment is different) and is proposed for various locations along the northern boundary of the development. Type C has off-street parking.

Type D:

Type D is a three bedroom 2 storey semi-detached house, which occurs throughout the development. There are a small number of locations where it is also used in a terraced format. Type D has off-street parking.

Type E:

This type is a three bedroom 2 storey semi-detached house, which occurs throughout the development. To suit its positions, this has a deeper plan than type D and there are also some locations where it is used in a terraced format. Type E has off-street parking.

Type F:

Type F is a three bedroom shallow plan 3 storey house. Living accommodation at ground floor level is dual aspect to front and rear, overlooking rear gardens. This type is used along the main avenue, to lend appropriate scale and definition to the street edge of the main 'spine' of the development. Type F has on-street parking.

Type G:

Type G is a three bedroom 2 storey terraced house with private access from front to rear, also giving a wider plan at first floor level. This type is located along the southern boundary of the development and in some locations along the main avenue. Type G has on-street parking.

Type H:

This type is a two bedroom 2 storey terraced house, with a dual aspect living space. Type H is located in the southern part of the development and has on-street parking.

Type J:

This type is a large five bedroom 2.5 storey detached house and occurs in a small number of locations in the northern part of the development. Type J is designed to address its corner and end of row positions and has off-street parking.

The variety of house types provides for a wide choice to suit all potential occupiers and many household types, as well as permitting a very efficient site layout. The mix of house type in any one row creates visual interest and contribute to the specific character of the development, both overall and in each street.

Apartments

The apartment buildings are small blocks of 2 or 3 units in 2.5 to 3 storeys on predominantly corner sites. They are in the format of ground floor single-storey units with duplex units above served by an external stairs to ambulant disabled criteria. Please refer to the Design statement and Access Statement prepared by Stutec Architects.

Among the objectives were to provide a variety of types at a scale in keeping with the housing, and using the typology to finish the block corners, avoiding blank row terminations and allowing opportunities for small pockets of landscaped area benefitting from passive overlooking. The scale and corner strategy also allowed greater flexibility for solar access, view and all dual-aspect units.

A particular approach to suit the location has been taken to the design of the apartments and duplexes, which are dispersed and integrated throughout the development to form the urban block corners, rather than concentrated into large blocks. Each corner site is individually designed with a scale of either two or three storeys, composed of two or three units, depending on location. This approach lends a distinctive and particular character to the proposal, giving variety as well as reinforcing the urban strategy in a location where large blocks of apartments are unlikely to be successful. Consisting of both two and three bedroom units, the apartments and duplexes are generously sized, to facilitate comfortable and generous living. Entry to the ground floor apartments is from the street side, while entry to the upper floor apartments and duplexes is from the communal space to the rear, with all units having own door access.

Materials and Finishes

Proposed external wall finishes to the buildings comprise a mix of durable brick with smooth and textured high quality self-coloured render, with zinc cladding highlighting particular features such as entrances. Window finishes will be timber or uPVC and entrance doors & screens will be solid or glazed painted composite construction. Roof finishes to all dwellings will consist of dark slates, with careful attention paid to the eaves detail and downpipe positions. Balconies to apartments/duplexes will have glass balustrades when facing the street with galvanized & powder coated steel balustrades to the rear, all with solid floors.

Garden walls and duplex access stairs will be finished in brick to the public side and screening to bin-stores will have a brick or render finish.

The proposed dwellings will comply with the known upcoming changes to Part L including NZEB with sufficient leeway to accommodate changes not detailed at this time, and with opportunities for individual owners to add further energy-saving or renewable-energy measures, e.g. heat-recovery systems and photovoltaic panels.

2.3.3 Future CE Zoned Lands

While not part of the SHD application, the adjoining CE (Community) zoned lands, under the control of the applicant will include for some community based uses such as a 2 storey nursing home, (c. 60 bedrooms & 3,000 sq. m), a 2 storey mixed medical centre building (c. 2,000 sq. m), and sheltered accommodation.

2.3.4 Car Parking and Cycle Parking Provision

Overall there will be 608 car parking spaces to serve the house, apartments and creche. Parking for house types A – E and J is provided to the front of each house within its curtilage, and as such, is always close to the dwelling entrance and in view from the house.

Parking for the apartments/duplexes and house types F - H is on-street but well overlooked and immediately adjacent. On-street parking areas will be landscaped and designed to avoid long stretches of relentless parking. Secure and sheltered bicycle parking to serve the apartments/duplexes is also provided.

In compliance with the Wexford County Development Plan 2013-2019, parking for people with disabilities will be provided at the rate of at least one space in every 25 standard spaces up to the first 100 spaces plus one space per every 100 standard spaces or part thereof thereafter. The spaces will measure at least 6.0 x 3.7m including transfer hatching to the side and rear. Please refer to site layout drawings also.

2.4 ACCESS

The western edge of the site contains the main vehicular entrance, as well as pedestrian entrances from the Fort Road, leading to the town centre and schools established on Creagh Avenue. The southern boundary is shared with the existing Ashwood Grove/Willow Park development, linked through the landscape spaces and with pedestrian/cycle and vehicular access. The eastern boundary connects through the central landscape space into Ramsfortpark Forest, while the northern boundary includes pedestrian/cycle and vehicular links into the adjacent site. Gorey Town Park is situated immediately to the south of the site.

2.5 LANDSCAPING

2.5.1 Introduction

Currently the southern portion of the site is taken up with the remnants of the previous industrial/agribusiness use on site. There are substantial areas of hardcore and rubble, with the shell of a demolished industrial unit still standing to the south. The northern portion of the site is currently in arable agricultural use. Pioneer species of Grey Willow and scrub vegetation has started to colonise this southern portion of the site.

The open space elements within the site consist of a larger neighbourhood park through the centre of the development, linking Fort Road with the existing Coillte lands of Ramsfortpark Forest. Two further areas of open space are provided, one to the north of the site and one to the south.

There are three areas of open space identified for passive recreation within the development, totalling 1.41 hectares.

The design intent is to create a high quality and appropriate landscape for future residents, which will meet their recreational needs and provide an attractive visual setting and social amenity space. The principles of inclusivity for all age groups, universal accessibility and sustainable development are applied to ensure an inclusive and environmentally responsible design solution.

Where feasible, native trees and plants are proposed to enhance local biodiversity, in accordance with the relevant policies of the Wexford County Council Development Plan 2013-2019 and the Green City Guidelines from the Urban Institute of 2008.

2.5.2 Landscape Layout and Design

The site layout proposal aims to create a unifying streetscape which is rich in detail and diverse in textural and spatial qualities, with open spaces and boundary planting lending a verdant and visually attractive atmosphere. The open spaces are directly over-looked by dwellings, providing passive surveillance for safety.

Within all open spaces there are areas for informal play, casual recreation and passive leisure. The quality of these spaces is enhanced by the inclusion of features such as natural play elements, seating, paths, native planting and

landform, and the utilisation of environmentally appropriate materials. The palette of materials will also be used to integrate the proposed architectural forms and materials within the landscape.

2.5.3 Open Space Areas

The neighbourhood Park is the central landscape feature within the development. This continuous green spine links Fort Road, through the development, with Ramsfort Park Forest. Although vehicular roadways cross the park in two locations, the open space reads as a continuous element, due to the raised tables and pedestrian crossings at each of the roadways. This continuity is also emphasised with similar structural planting species to the road edges of the three spaces and differing species within the park.

Figure 2.3 – Central Open Space – Neighbourhood Park

Source: Murray Associates

The open space elements within the site consist of a larger neighbourhood park through the centre of the development (measuring 0.885 Ha) linking Fort Road with the existing Coillte lands of Ramsfortpark Forest. Two further areas of open space are provided, one to the north of the site and one to the south, measuring 0.521 Hectares in total.

The central, wider area of the neighbourhood park allows for an informal (40m x 20m) grassed kickabout area and a formal playground space. Landforms are incorporated within the open space to further enhance the feeling of enclosure and privacy from the existing development, while still allowing for safe sightlines. This central open space has a natural, rural feeling, with informal grouping of native trees and areas of meadow planting. This acts as a link with the wider rural landscape of the surrounding area.

The play strategy within the development is to incorporate a formal play area of approximately 300 square metres (10-12 equipment pieces) in the central neighbourhood park with other natural play areas within other local open spaces.

Two further areas of local open space are allowed for. The southern open space acts as a pedestrian link with Gorey town and a gateway space to the development. The design language of this space is more formal as befits an entranceway to the development.

The northern open space is a smaller local space for adjacent units and incorporates natural play elements.

Figure 2.4 – Northern Open Space

Source: Murray Associates

Communal Open Space

Within the apartment blocks there is an allowance of semi-private communal open space for use by the residents of the block. The quantum of space for each apartment is in accordance with the DoHPLG Planning Guidelines for Design Standards for New Apartments.

Materials and Site Furniture

A simple palette of hard landscape materials is proposed. External spaces are designed to minimise hazards or impediments to access or movement and will be void of steps or pronounced level changes. Hard landscape surfaces are chosen for slip resistance and to be free draining. Public footpaths are to be brushed concrete, with pre-cast concrete kerbs. Private driveways are to be permeable concrete block paving, while rear terraces are to be concrete flag paving. Site furniture is simple yet robust, with all proposed landscape lighting to utilise LED lamps.

2.5.4 Hedgerows - Overall

Overall, there will be an increase of approximately 316 metres of native hedgerow on the boundary with Ramsfort Park Forest, with a further 521 linear metres being rehabilitated and enhanced (both the western boundary with Fort Road and the northern boundary adjacent to the neighbouring development site). Therefore, there is a total of 837 linear metres of native hedgerow associated with the development.

Across the site there will also be approximately 340 no. new native and non-native trees planted.

Hedgerows - Northern

The existing hedgerow boundary in this location (387 linear metres) consists of a few unmanaged native species (Hawthorn, Holly and Gorse) with large areas overgrown with Bramble, Ivy and Bracken. Elsewhere, large gaps are present in the fabric of the hedge.

Proposals for the existing hedgerow allow for the rehabilitation of this boundary. The existing bramble and ivy will be cleared, with new native hedgerow species planted to fill in the gaps evident in the existing hedgerow.

Although the 7 no. trees are required to be removed, the existing hedgerow will remain intact. The 7no. existing trees along the northern boundary will be replaced by 26no. semi-mature native trees (Lime - *Tilia x europaea*, 30-35cm girth).

Hedgerows – Eastern

This portion of the site is adjacent to the existing Coilte-owned Ramsfort Park Forest. The existing boundary vegetation of juvenile oak trees will not be effected by the proposed development. The boundary treatment proposed is a wire mesh fencing with steel pole supports.

Hedgerows – Western

Along the western boundary with Fort Road it is proposed to retain, where possible, the existing specimen trees (Ash, Oak and Beech). 15no. trees will be removed due to the development roadway and cycleway. Many of these existing trees are of fair to poor quality. This current hedgerow will be rehabilitated by removing the Bramble (Rubus sp.) and Ivy (Hedera sp.) and reinforcing the existing hedgerow planting of Hawthorn (Crataegus monogyna) with mixed native hedgerow underplanting.

Hedgerows – Southern

The existing Leyland Cypress (Cupressus × leylandii) planting to the south of the site, adjacent to the north of Ashwood Grove, is proposed to be removed to allow for the development. There will be a solid boundary wall of 2 metres in height between the dwellings on Ashwood Grove and the proposed rear gardens of the development in this area.

2.6 SERVICES

2.6.1 Foul Sewer

Gorey Town and surrounds is serviced by a public sewer, with treatment occurring at Courtown-Gorey Wastewater Treatment Plant (WWTP). Courtown-Gorey WWTP is operated by Irish Water and holds a Waste Water Discharge Licence with the EPA (D0046-01). The WWTP provides secondary treatment of wastewater with phosphorous removal. The WWTP has been designed for an agglomeration (population equivalent) size of 36,000 and currently services an agglomeration (population equivalent) of approximately 18,000.

It is proposed that foul water from the proposed development will be discharged to the mains sewer system. The impact on the public foul sewerage system will be to increase the loading on the Courtown Wastewater Treatment Works. The volume of foul water generated from the proposed development is calculated to be 224 m3/day.

2.6.2 Surface Water Drainage

It is proposed to construct a gravity stormwater drainage system that discharges to the nearby Ballyowen Stream, which is located approximately 80m south-east of the main development site area. The proposed stormwater system shall include the main development site area of 10.376 hectares but shall also accommodate the runoff from the future development of the area zoned for ‘Community and Education’, which is an area of 1.818 hectares.

The proposed stormwater drainage network has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies, Volume 2 New Development. The proposed stormwater network layout is shown on Drawing Numbers IE1505-001-C to IE1505-006-C, prepared by IE Consulting.

2.6.3 Attenuation

The proposed stormwater drainage is divided into two catchments with separate attenuation systems proposed in each area. Infiltration was not considered as part of the attenuation design as infiltration rates in Gorey and the wider county are generally poor.

The two attenuation systems have been designed for no flooding up to the 1 in 100 year rainfall event including 10% climate change. A modular Storm Tech attenuation system is proposed for both catchments.

2.6.4 Water Supply

It is proposed to obtain water from the mains supply. The total water usage for the development is calculated to be 168 m3/day. Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce volumes and associate abstraction and treatment costs for the proposed development.

2.6.5 ESB Supply

There are two power line systems within the vicinity of Gorey town; a 220 kV line between Arklow and Crory and a 110 kV line between Arklow and Crane. A 220 kV station is located at Arklow, and 110 kV stations are located at Arklow, Banoge, Crory and Crane. Currently, there is no gas supply to the north County Wexford region.

2.6.6 Telecommunications

Gorey town has a number of broadband, phone and television channel providers, including Eir, Sky, Virgin and Vodafone. Gorey town is included in SIRO's (a joint venture company between ESB and Vodafone) Phase 1 plan to deliver fibre broadband with speeds of up to 1,000 Mbps.

2.7 CONSTRUCTION MANAGEMENT STRATEGY

It is envisaged that the development of the lands will occur for up to approximately 10 years. Given the nature of the project and the need for flexibility to respond to market demand, the development phases are indicative. An outline Construction Environmental Management Plan which has been prepared by Strutec Engineers, has been reviewed by the relevant EIAR consultants and is included in the SHD application.

This EIAR presents proposed mitigation measures to ensure that the planned development of the lands does not generate significant adverse impacts for residential and working communities in the vicinity of the site.

The proposed development, as described, is detailed on the planning application drawings and particulars which accompany the application.

2.7.1 Scope of the Proposed Construction Works

An indicative construction sequence is outlined below to show the buildability of the project. The actual construction sequence will be confirmed when a contractor is appointed. The main stages of construction will proceed in a general sequence as follows:-

- Enabling Works including demolition, set-up of site construction facilities service diversion works and tree removal.
- Site clearance will include cut and fill of existing ground profiles and formation of key site features.
- Construction of drainage, water supply and utility service distribution network within the site.
- Construction of buildings.
- Landscaping.
- Building fit-out and commissioning.

The proposed development also includes off-site roads and infrastructure upgrade works to waste water drainage, storm water drainage and water supply services.

2.7.2 Main Stages/phases of Construction

The expected construction staging provides for 5 phases. While the pace and timing of this phasing is highly dependent on unpredictable market conditions, the overall site design and phasing strategy takes account of the infrastructure and open space provisions associated with each phase, together with the proportional provision of Part V dwellings. However, it is feasible that market conditions would require alterations to any programme which is specified at this time and it is likely that it will be reviewed in the course of construction.

The main demolitions will be carried out by a competent demolition sub-contractor in accordance with the current code for demolition and the consultant engineers specification. It is anticipated that the vast majority of the waste generated from demolitions will be segregated wherever possible for reuse or recycling in accordance with the relevant legislation and guidelines and the project's Construction Waste Management Plan.

Archaeological monitoring of earthmoving works for site preparation will be undertaken to ensure that any features of an archaeological nature that may be revealed are identified, recorded and fully resolved.

Chapter 5, Land and Soils provides detailed information on excavation material and mineralogy. Chapter 11, Waste Management contains more detailed information on Resource and Waste Management associated with the project. Mitigation measures to minimise environmental impacts are described in the relevant sections of the EIAR.

2.7.3 Construction of Services

Following on from completion of site clearance, demolition, site re-profiling works construction activities will focus on the installation of underground utilities to provide the infrastructure required for storm water drainage, foul water drainage, water supply, power and building utility systems.

Temporary Construction Works

During the construction phase it will be necessary to provide contractor welfare facilities for the workers. A site office and staff welfare facilities will be installed at a suitable location centrally within the overall site. All surplus plant and materials shall be stored in this location when not in use. Welfare facilities will include a canteen, drying room, toilets and first aid. Power will be provided using a small petrol generator. The petrol generator and fuel storage containers used for various items of plant will be located within a sealed containment bund.

Temporary portable toilet facilities will be provided on site. These units will be maintained and the waste collected therein will be disposed of using an appropriate contractor. Storage areas will be clearly identified and agreed with all relevant parties in advance of construction.

The site will be secured with hoarding on all open sides and accessible approaches.

Hoarding and Site Segregation

Construction site hoardings are used to provide a secure site boundary to what can be a dangerous environment for people who have not received the proper training and are unfamiliar with construction operations. Site hoarding also performs an important function in relation to minimising some of the potential environmental impacts associated with construction, namely noise, visual impact, and dust deposition.

Hoarding will be established around the site construction area (where required) before any significant construction activity takes place. Hoardings works will be of the same nature as that carried out for similar operations at most construction and building sites.

Contractors must erect hoarding to a minimum of a 2.4m high in either close-sheeted hoarding as appropriate to the works and as per the contractor's approved site plan. Hoarding must be maintained in a presentable condition to ensure safe passage.

Construction Compound

It is proposed to provide a construction compound in the western portion of the subject site. The compound will provide secure and safe refuge space for contractor facilities and equipment. The Compound is strategically selected for proximity to the key construction elements it will serve whilst also being readily accessible from the primary construction entrance to the site.

The compound may be used as material staging areas, temporary car parking for construction workers, site offices and huts, welfare facilities for workers (including changing rooms & lockers), storage of plant and equipment, etc. The location of the temporary compound is indicated on the site layout. It is noted that the location is indicative, and may change as the scheme is built out.

2.7.4 Hours of Working

Working hours will be strictly in accordance with the granted planning conditions with no works on Sundays or Bank Holidays. If work is required outside of these hours, written approval will be sought by the contractor from the Local Authority.

It is anticipated that normal working hours may be 7am to 7pm Monday to Friday and 8am to 5pm on a Saturday. However, it may be necessary to work outside of these hours at night and at weekends during certain activities and stages of the development (e.g. concrete pouring) which will be subject to agreement with the Local Authority.

Deliveries of material to site will be planned to avoid high volume periods. There may be occasions where it is necessary to have deliveries within these times. The Contractor will develop, agree and submit a detailed Traffic Management Plan for the project prior to commencement.

2.7.5 Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) will be prepared by the main contractor and agreed with the Planning Authority prior to commencement of development in the event of a grant of permission. The main construction access route will be from Fort Road (from the Walsh Mushrooms entrance).

The CMP will provide details of intended construction practice for the development, including:-

- Location of the site and materials compound(s) including area(s identified for the storage of construction refuse.
- Location of areas for construction site offices and staff facilities.
- Details of site security fencing and hoardings.
- Details of on-site car parking facilities for site workers during the course of construction
- Details of the timing and routing of construction traffic to and from the construction site and associated directional signage, to include proposals to facilitate the delivery of abnormal loads to the site.
- Measures to obviate queuing of construction traffic on the adjoining road network.
- Measures to prevent the spillage or deposit of clay, rubble or other debris on the public road network.
- Alternative arrangements to be put in place for pedestrians and vehicles in the case of the closure of any public road or footpath during the course of site development works.
- Details of appropriate mitigation measures for noise, dust and vibration, and monitoring of such levels.
- Containment of all construction-related fuel and oil within specially constructed bunds to ensure that fuel spillages are fully contained. Such bunds shall be roofed to exclude rainwater.
- Off-site disposal of construction/demolition waste and details of how it is proposed to manage excavated soil.
- Means to ensure that surface water run-off is controlled such that no silt or other pollutants enter local surface water sewers or drains.

The contractor will incorporate specific measures as discussed with the Roads and Transport Section of WCC including:-

- Defined access routes;
- Location of site access junctions in each phase;
- Restrictions to work hours;
- Any other items required by WCC.
- The CTMP will be agreed with both Wexford County Council and An Garda Síochana, prior to commencement of works.

2.7.5.1 Traffic Management & Construction Access

The following measures are envisaged:-

- No parking on access routes. No unloading or blockages of access routes. Such vehicles will be immediately requested to move to avoid impeding works;

- In accordance with the CMTP, the contractor must appoint a Traffic Management Coordinator responsible for the management of traffic management related activities on site

Contractors must adhere to the overall traffic management measures for the internal road network from the preferred construction traffic entrance road to their site. This shall include the following as a minimum:-

- Speed limits;
- Parking restrictions; and
- Safe access/egress to existing internal Hospital access roadway.

2.7.6 Construction Phasing

Drawing PL-030 prepared by Strutec Architects illustrates the indicative construction staging sequence for the proposed development.

The proposed order of construction of key elements is as follows, however this is subject to detailed review by the Contractors at construction stage and specifics may require adjustment once the contractor has been appointed.

- Phase 1 (approximately 72 dwellings)
  - Form site access
  - Connect incoming water supply, electrical & comms
  - Construct required foul sewer outfall outside the site
  - Partial construction of main avenue
  - Construct main central landscape open space
- Phase 2 (approximately 77 dwellings)
  - Construction of crèche/childcare facility (required for 75 dwellings or more)
- Phase 3 (approximately 43 dwellings)
- Phase 4 (approximately 38 dwellings)
  - Construct southwestern open space
- Phase 5 (approximately 67 dwellings)
  - Complete main avenue

2.8 ENERGY DEMAND AND ENERGY USED

2.8.1 Energy Statement

Strutec Engineering has prepared Energy Statement for the proposed development. The Energy Statement outlines how the construction and performance of the proposed development will meet or exceed legislative and planning requirements, with particular emphasis on meeting the upcoming Nearly Zero Energy Buildings standards.

Due to the expected timeframe for the proposed construction, and in the interest of sustainability, the Energy report assesses compliance with the anticipated NZEB requirements rather than the current standards for MPCPC and MPEPC.

The proposed dwellings will comply with the known upcoming changes to Part L including NZEB with sufficient leeway to accommodate changes not detailed at this time, and with opportunities for individual owners to add further energy-saving or renewable-energy measures, e.g. heat-recovery systems and photovoltaic panels.

The proposed development will meet or exceed where feasible the requirements of Part L.

At every stage of the design process sustainable design considerations have been integral to the key decisions made for the proposed development. The main aims of sustainable building are: -

- Prevention of unnecessary use of materials.
- Efficient use of materials.
- Efficient use of energy.
- Use of renewable and recycled sources.
- Selection of materials with the least environmental impact.

2.8.2 Sustainable Construction

Buildings have considerable environmental impact, for example through operational energy, transportation of people between them, raw materials consumed by the building, and use of land. They also perform important economic and social functions, and make a significant contribution to quality of life.

2.8.3 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).

2.9 EMISSIONS AND WASTE

2.9.1 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 of this Environmental Impact Assessment Report.

2.9.2 Municipal Waste/Waste Management

A construction and operational waste management plan is contained in Volume III of this EIAR.

The proposed Waste Management Plan has been prepared to 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*

Each section of the Waste Management Plan presents 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 are also 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

Where contaminated soils/materials 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. We refer the Board to the IE Consulting Excavation report and the Soils chapter which provides a methodology in relation to the existing brownfield portion of the subject site.

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 (apartments) and individual houses. 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 retail units, gymnasium and cafe shall have designated commercial waste bins for both general and recyclable waste which shall be stored within the boundaries of the retail building areas. Waste shall be collected on a weekly basis by an appropriately permitted commercial waste contractor.

2.9.3 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.

2.10 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 3-15 which deal with *'Aspects of the Environment Considered'*. No significant adverse impact is predicted to arise from the use of natural resources.

2.11 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 in the relevant in Chapters 3-15 which deal with '*Aspects of the Environment Considered'*. There will be no significant direct or indirect effects arising from these sources.

2.12 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.

2.13 TRANSBOUNDARY IMPACTS

Large-scale transboundary projects[6] 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 Gorey, within the administrative area of County Wexford, transboundary impacts on the environment are not considered relevant, in this regard.

[6] 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

2.13 ALTERNATIVES CONSIDERED

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."*

The 2018 EIA Regulations describe alternatives as follows:-

"(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."

The presentation and consideration of various alternatives investigated by the project design team is an important requirement of the EIA process. This section of the EIAR document provides an outline of the main alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the development proposed, taking into account and providing a comparison the environmental effects. Alternatives may be described at three levels:

- Alternative Locations.
- Alternative Designs.
- Alternative Processes.

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).

Pursuant to Section 3.4.1 of the Draft 2017 EPA Guidelines, 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'…"*

The Draft 2017 Guidelines are also instructive in stating:

"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 subject scheme is for the construction of residential units, a childcare facility and associated open space and road and service infrastructure, on brownfield and green-field agricultural lands which are zoned for residential use in the Gorey Local Area Plan. Having regard to the above it was not considered necessary to consider alternative sites for the proposed development.

The consideration of the main alternatives in respect of the development of the subject lands was undertaken by the Design Team and has occurred throughout an extensive and coordinated decision-making process, over a considerable period of time. The main alternatives considered are identified below.

2.13.1 Alternative Locations

The site is zoned for residential development under the Gorey Local Area Plan 2017-2023 with the overall AMIL Properties landholding including lands zoned for Community/Education, and as such, consideration of alternative sites is not pertinent. In effect, an alternative location in this instance i.e., a *'do- nothing'* alternative for the subject site, would mean that these residential zoned lands would not be utilised for the purposes of meeting the need for new residential accommodation within Gorey. If development does not occur sequentially from the existing development footprint, it is likely that pressures for the development of land which is either un-zoned or un-serviced and not as close to the town centre would be greater. This would lead to a dispersed and unsustainable form of development.

A *"do-nothing*" scenario was considered to represent an inappropriate, unsustainable and inefficient use of these strategically located residential zoned lands. The suitability of the lands for development, within an established development area of the County and the sites location adjacent to public transport and excellent road infrastructure were also key considerations.

The Draft EIAR Guidelines also note that:-

"Higher level alternatives may already have been addressed during the strategic environmental assessment of relevant strategies or plans. Assessment at that level is likely to have taken account of environmental considerations associated, for example, with the cumulative impact of an area zoned for industry on a sensitive landscape."

This is of relevance to the proposed development of the lands at Creagh. On the strategic or *'higher'* matters of already determined policy, we refer to the Wexford County Development Plan 2017-2023 and the Gorey Local Area Plan 2017-2023 which make reference to strong policies in support of the development of Gorey.

The zoning of the subject site had undergone a Strategic Environmental Assessment (SEA) as part of the compilation of the Gorey LAP 2017-2023. The SEA considered *inter alia* alternative strategies for development having regard to environmental considerations.

The Alternative Development Strategy for the Gorey Local Area Plan 2017-2023 that emerged from the planning/SEA process is Alternative Development Strategy B1 (which is a variant of Alternative Development Strategy B).

The preferred alternative states that:-

"Intensifying uses, by providing for increased density redevelopment of sites within proximity to public transport nodes, and delivering some inner link roads would contribute towards a more consolidated and compact town with associated benefits with respect to sustainable mobility, energy usage and emissions to air including noise and greenhouse gases."

The environmental benefits of developing brownfield sites such as the subject site is identified in Alternative Development Strategy B(1).

"Brownfield development has a greater potential to result in lower levels of direct effects as a result of reducing the need to develop semi-natural greenfield lands – such effects include loss of ecology (including non-designated ecology and ecological corridors and stepping stones), visual impacts, the sealing of greenfield soils and threats to the status of waters (which has the potential to interact with aquatic ecology and human health). Brownfield development is more likely to facilitate both sustainable mobility and enhancement of cultural (archaeological and architectural) heritage and its context in urban areas. Brownfield development is also more likely to conflict, if unmitigated, with concentrations of cultural heritage – as these often occur in urban areas."

It is highlighted that the use of brownfield sites is promoted in the National Planning Framework (NPO no. 3a).

2.13.2 Alternative Uses

In addition to residential use, there are other land uses which are permitted in principle on these lands. It is not considered that an alternative comprising one of the alternative uses would result in the best use of these lands, particularly having regard to the general acknowledged need for housing. The environs of the subject site are largely residential in nature interspersed with some commercial uses. In this context, the proposal now the subject of this application comprises appropriate land uses in accordance with the proper planning and sustainable development of the area. The future development of the adjacent CE zoned lands under the control of the applicant will further broaden the range of uses in the area.

2.13.3 Description of Alternative Processes

This is not considered relevant to this EIAR having regard to the nature of the proposed (residential) development.

2.13.4 Alternative Designs

The proposed residential development has been prepared in accordance with the requirements of the Wexford County Development Plan 2017-2023 and the Gorey LAP 2017-2023 and has been the subject of a number of pre-application meetings with the Planning Authority prior to lodgement of the SHD application with An Bord Pleanála. The pre-planning meeting notes are set out in Appendix 2 of the Consistency Report prepared by John Spain

Associates which accompanies this SHD application. The proposal has also been the subject of a pre-application SHD consultation with the Board, with a number of significant design alterations arising following feedback from An Bord Pleanála.

The key environmental and practical considerations which have influenced the design of the proposed development and the alternative layouts on the subject lands have been influenced by the following:

- The need to achieve an appropriate density in the context of the Sustainable Residential Guidelines for Planning Authorities having regard to the location of the site close to the town centre.
- The need to ensure any residential development provides a good mix of housing typologies which meet current market demand and which are deliverable in the short to medium term.
- The need to provide an appropriate level of housing provision on the residential zoned lands.
- Alternatives in relation to permeability.
- Alternative road junction design
- The need to deliver good quality open space in appropriate locations and to link the substantial open space to as much of the existing green network (hedgerows) and the adjacent forest to the east.
- To have regard to the site's topography and to ensure the design the residential development and associated infrastructure respects the existing features and limits the impacts on the land.
- Protection of existing trees and hedgerows where possible, , to enhance the amenity of the area.
- The detailed planning history of the site and neighbouring lands.
- The quality of the urban environment to be delivered and the associated impact on human health.
- The provision of 10% social housing on site.

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 alternatives development options considered for the site, starting with the previously permitted development (in 2006), and then describing design options and changes which were incorporated into the scheme as the proposals progressed through pre-application discussions with the Planning Authority and with An Bord Pleanála. We summarise the key design changes arising following the lodgement of the SHD pre-application to ABP and then provide an overview of the scheme submitted for approval. The principal considerations and amendments to the design of the scheme, having regard to and comparing the key environmental issues, are set out and discussed.

Alternative no. 1

The first alternative considered by the design team was to consider the use of the previous permitted use and layout which related to a portion of the southern section of the subject lands.

Wexford Planning Reg. Ref. 20052925

The previously permitted development comprised the demolition of all the buildings on the subject site along with the construction of a mixed use development of 14,148 sq. m to consist of a neighbourhood shopping centre of 4,695 sq. m with an anchor store of 2,150 sq. m, as well as 12 no. retail/commercial units, a two storey children's adventure centre of 3,698 sq. m, retail warehouse units 1,498 sq. m, restaurant/takeaway unit of 260 sq. m DIY Garden Centre of 3,771 sq. m, 12 no. industrial units of c. 1,724 sq. m as well as 384 no. car parking spaces and access arrangements all on a 5.7 hectare site at Ballowen, Ramsfort Park, Gorey.

It received a Final Grant of Permission 8-9-2006 and under Manager's Order P.0344/11 an Extension of time was granted until the 7th of September 2016

Having regard to the change in the zoning objective relating to the subject site to residential and to the CE land use zoning objective, it was considered that pursing the retail led development was not appropriate having regard to the broad policy objectives of locating substantial retail development in the town centre and would potentially lead to unsustainable car based travel patterns, and associated negative environmental considerations relating to noise, emissions etc., within the northern portion of the town, given the scale.

Previously Permitted Development - Comparison of Environmental Effects

Taking into account the effects of a proposed retail led scheme on the environment, it is considered that a residential development will create a walkable neighbourhood, which will be able to avail of local services such as schools, and the amenities located in the town centre, located c. 700m-1,000m to the south. From a comparison of the environmental effects, a residential development, with permeability and good linkages to the town will lead to a more sustainable and environmentally beneficial form of development compared to a retail led development at this location (having regard to noise, nuisance, air quality).

Alternative 2: Routes for the upgrade of wastewater connection

Following the SHD pre-application meeting with An Bord Pleanála and the Board's Opinion, the route for the foul water connection to the public sewer was given consideration. Different options were examined having regard to environmental considerations, in relation to the route of the upgrade of the wastewater connection. The initial route was made in consultation with Irish Water and Wexford County Council. Following consultation with Inland Fisheries Ireland (IFI), the route was discounted, due to the potential impacts to the stream, arising from the works to construct the trenches and sewer pipes during the construction phase.

An alternative route, which follows the public road was then examined.

Review of Routes – Comparison of Environmental Effects

Following a detailed review by the design team of the options, and taking into account environmental considerations, and a comparison of environmental effects, option route no. 1 was chosen. An indication of the main reasons for selecting the chosen option with regards to their environmental impacts are outlined hereunder.

<u>Option 1</u>

IE Consulting noted that option was preferred as it avoided the potential impacts to water quality and Biodiversity, which had the potential to impact on the Ballyowen Stream.

<u>Option 2</u>

IE Consulting considered that this option was the next preferred as some of the route is located in green open space and is the shortest route. However, it does have 2 river/bridge crossings and possibly could require pumping to get under these. (They noted that Wexford Co Co also wanted to avoid pumping).

<u>Option 3</u>

This was IE Consulting 3rd preference as most of the route requires digging up roads and is a longer route than Option 2. It does have 2 river/bridge crossings and possibly could require pumping to get under these. (They noted that Wexford Co Co. also wanted to avoid pumping).

<u>Option 4</u>

This was IE Consulting least favourite option as it would require pumping and crossing under the river/bridge. The is crossing under the river/bridge would be about 4m below the road level. The road then rises along Fort Road by about 4m so the only solution is a pump station. (IE Consulting noted that Wexford Co Co also wanted to avoid pumping).

Original Route (submitted to Pre-application stage to An Bord Pleanála)

Following a review of the environmental effects and taking into account the effects of the proposed development on the environment, this option was omitted due to concerns expressed by Inland Fisheries Ireland on the Ballyowen Stream and impacts on Biodiversity (fisheries).

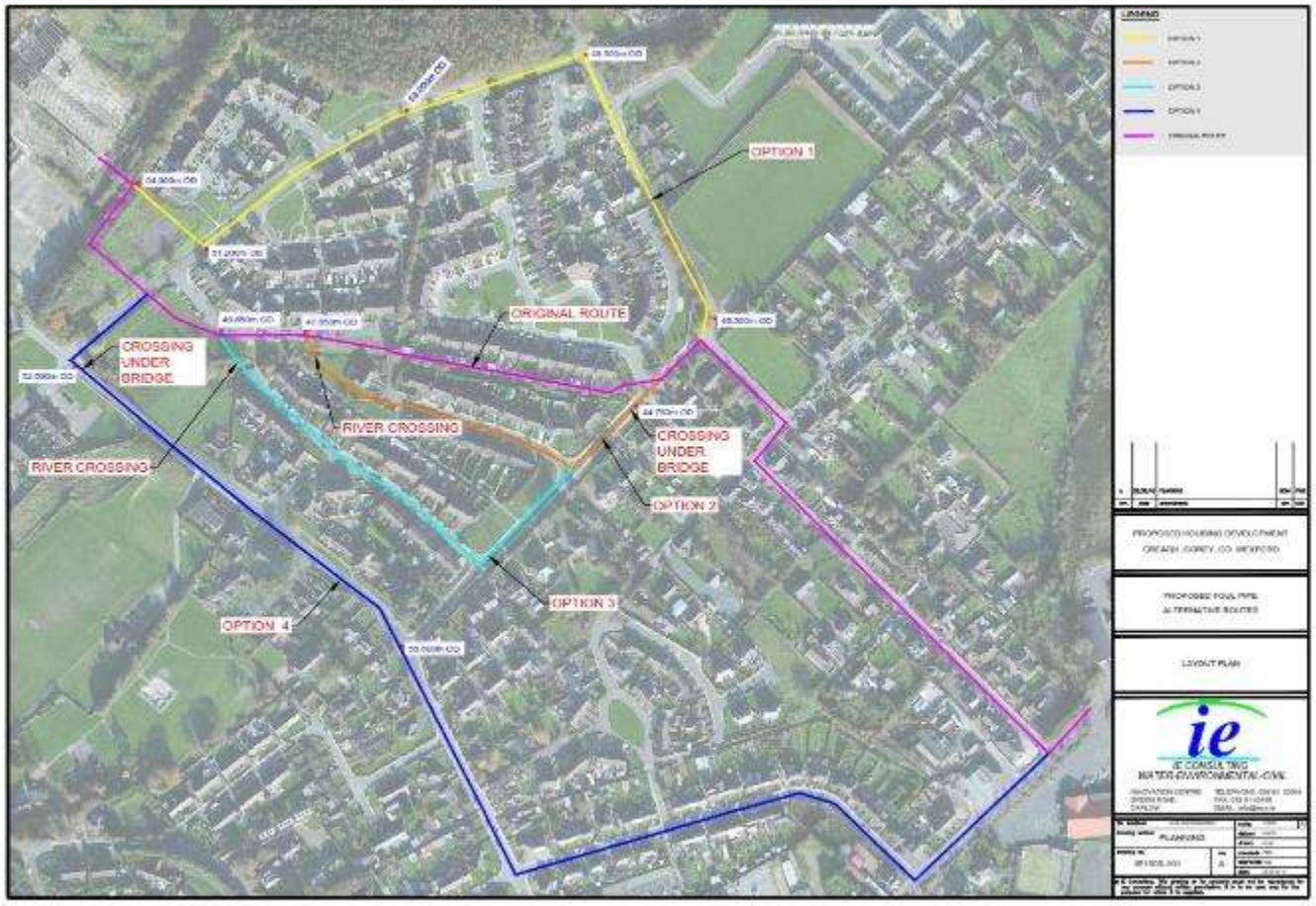


Table 2.2 – Comparison of Environmental Effects

Criteria	Option 1 (Preferred Alternative)	Option 2	Option 3	Option 4	Original Route
Population and Human Health	Neutral	Neutral	Neutral	Neutral	Neutral
Biodiversity	Positive	Negative	Positive	Positive	Negative
Soils	Neutral	Neutral	Neutral	Neutral	Neutral
Hydrology, Geology and Hydrogeology	Positive	Neutral	Neutral	Positive	Negative
Air and Noise	Neutral	Neutral	Neutral	Neutral	Neutral

Criteria	Option 1 (Preferred Alternative)	Option 2	Option 3	Option 4	Original Route
Landscape and Visual	Neutral	Neutral	Neutral	Neutral	Neutral
Material Assets Transportation	Neutral	Neutral	Neutral	Negative	Positive
Archaeology	Neutral	Neutral	Neutral	Neutral	Neutral

With reference to the above, it is noted that the potential impacts to archaeology are broadly similar as the routes travel along for the most part along public roads. For Material Assets, transportation, the impacts relate mainly to short term nuisances due to the construction of the foul pipe route. While the impacts to wider population would be less using the original route, due to less short term traffic impact, the impact on the Ballyowen stream was a significant environmental effect, which arising from the review of the routes, it was decided to mitigate through re-design.

For Landscape and Visual, the comparison of environmental effects was considered to be neutral having regard to the nature of the proposal which comprises an underground foul pipe. As part of a road opening licence, the contractor would be required to ensure that the road would be restored to its original state.

The Air and Noise impacts would be broadly similar for the different routes, albeit different localities would have the potential to experience some short term noise and dust emissions.

As part of the road opening licence, it is anticipated that a Construction Traffic Management Plan would be agreed with Wexford County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents. Please refer to the Preliminary Construction Management Plan, prepared by Strutec Consulting Engineers which forms a part of this SHD application for further detail.

Alternative 3 – Site Re-examination having regard to Comparison of Environmental Effects

With reference to current best practice on the design and layout of residential scheme and having regard to guidance provided in the Design Manual for Urban Roads and Streets; the Flood Risk Guidelines; the County Development Plan and the Gorey Local Area Plan 2017-2023, the overall layout for the lands started with an examination of the following key site (environmental) characteristics:-

- Existing trees and hedgerows;
- Vehicular entrance locations (permeability)

The main environmental considerations has been to achieve a design solution for all the buildings proposed which would enable all of the functional and operational requirements of this mixed use development including a significant quantum of residential development 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 preservation of a sense of open space and the desire to ensure that new buildings deferred to adjoining properties has driven the final layout form and design solution as proposed.

Alternative locations for the various built elements of the development were considered and examined at the design stage. The primary elements determining siting included natural site topography, the proximity of the site to adjoining properties, visual impact considerations and the provisions of the detailed design guide for the subject lands contained in the Gorey Local Area Plan.

The following outline a series of iterations:-

Pre-planning Meeting to WCC 12/12/2017

The scheme which was submitted for pre-application consultation with Wexford County Council was the product of an iterative process of design amendments and improvements resulting from the pre-application process. This process was guided by the need to manage the impact of the proposed scheme on the environment.

The amendments to the scheme which had been incorporated to that point reflect the findings of investigations and surveys undertaken by the EIAR team for the proposed development.

Pre-application SHD Submission to An Bord Pleanála

The scheme which was presented to An Bord Pleanála at pre-application stage, re-examined the mix of units and provided for apartments dispersed throughout the development, located on the corners of the blocks. There was a revision to the number of access points, compared to the previous iteration, presented to Wexford County Council.

2.13.5 Final Layout Alternative

With reference to the final layout the iterative process outlined above which included alternative site layouts were considered with the objective of producing an overall high quality designed scheme accommodating a new high quality residential development, which has undergone a robust consideration of relevant alternatives having regard to the comparison of environmental effects and meets the requirements of the EIA Directive, based on the multidisciplinary review across all environmental topics. This section outlines an indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

The proposed design consideration for the subject lands were the subject of 2 no. formal pre-application meetings with Wexford County Council as well as a formal SHD meeting with An Bord Pleanála. The environmental issues which most informed the design process related to ecology, water, noise, and the potential impacts on existing and future traffic and transport in the area. These considerations have informed the consideration of alternative layouts, open space, the issue of road and access arrangements up to the submission of the current scheme as a Strategic Housing Development application to An Bord Pleanála.

Following a comparison of the environmental effects, this alternative was reviewed following the pre-application discussions with An Bord Pleanála and the subsequent opinion from the Board.

The key changes proposed related to:

- (Item no. 1 of ABP Opinion) - Review of the function and layout of the central spine of the internal road network to present a stronger edge and improved urban design whereby the location of the proposed creche was moved closer to the internal road. The indicative masterplan layout (on the wider CE zoned lands) also envisages a stronger edge to this street.

- (Item no. 2 of ABP Opinion) - Increasing permeability to the north (to adjacent residential zoned lands) and to the south, which will provide enhanced connectivity and promote sustainable modes of transport for this new residential precinct within Gorey. The revised alternative includes for greater compliance with DMURS.

- (Item no. 3 of ABP Opinion) – Revisions to open space layout to include for improved passive surveillance through the removal of banks in selected locations. Greater passive surveillance through the re-positioning of the apartments, and greater cyclist connectivity linking the open space areas.

- (Items 4 and 5 of ABP Opinion) - A detailed review of the route of the extension to the infrastructure network was undertaken (please see Alternative 4 below). This review reduced the potential for flood risk through the rerouting of the proposed extension to the infrastructure network so that it wouldn't impact on the river.

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

In summary, the design of the proposed development takes into account all environmental effects raised with respect to previous design alternatives and within the Board's Opinion, and provides for a development that has been optimised to amplify positive environmental effects whilst reducing negative environmental impacts wherever possible.

2.14 DESCRIPTION OF THE OPERATION STAGE 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, creche 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 the 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.

2.14.1 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 and the limitations of physical boundaries, adjoining land uses and land ownership the potential for growth of the proposed development is considered limited and confined primarily to potential minor domestic extensions 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 Gorey Local Area Plan 2017-2023. Any adjacent undeveloped 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.

2.14.2 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.

2.14.3 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".*

Construction Phase Mitigation

With reference to the construction phase of the proposed development, the objective of the *CWMP prepared by IE Consulting* is to ensure that waste generated during the proposed construction and operation phases will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts 1996 - 2013 are complied with.

An Environmental Management Plan and Construction Health and Safety Plan will be developed to include all aspects of the project. These plans and construction activities must be in agreement with Strutec Ltd. policies such as environmental health and safety requirements for contractors.

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. The route of the sewerage connection, would be subject to a road open licence under Section 254 of the Planning and Development Acts 2000-(as amended) from Wexford County Council. As part of the road opening licence, it is anticipated that a Construction Traffic Management Plan would be agreed with Wexford County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

There will be some short term impacts during the construction phase as the pipes are laid, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and disturbance to residents and business 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.

Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used.

During the operational phase of the development the design of the scheme has undergone a Road Safety Audit and has had regard to DMURS during its design. This will promote a pedestrian friendly environment, promoting

sustainable development and reducing the influence of cars. This has the potential to reduce accidents within the proposed development.

With reference to natural disasters (e.g. flooding), the proposed development has undergone a Site Specific Flood Risk Assessment, prepared by IE Consulting. The main area of the site where development is proposed is not at risk of fluvial, pluvial or groundwater flooding.

2.15 RELATED DEVELOPMENT AND CUMULATIVE IMPACTS

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.

3.0 POPULATION AND HUMAN HEALTH

3.1 INTRODUCTION

The 2014 EIA Directive (2014/52/EU) has updated the list of topics to be addressed in an EIAR and has replaced 'Human Beings' with 'Population and Human Health'. This chapter also meets the requirement for assessment of 'Human Beings' as per Schedule 6 of the Planning and Development Regulations 2001-2018. This chapter of the EIAR was prepared by Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates.

It should be noted that there are numerous inter-related environmental topics described throughout this EIAR document which are also of relevance to Population and Human Health. Issues such as the potential likely and significant impacts of the proposed development on landscape and visual impact, biodiversity, archaeology, architectural and cultural heritage, air quality and climate, noise and vibration, water, land and soils, material assets including traffic and transport impacts, residential amenity etc. are of intrinsic direct and indirect consequence to human health. For detailed reference to particular environmental topics please refer to the corresponding chapter of the EIAR.

Population and Human Health comprise an important aspect of the environment to be considered. Any significant impact on the status of human health, which may be potentially caused by a development proposal, must therefore be comprehensively addressed.

Population and Human Health is a broad ranging topic and addresses the existence, activities and wellbeing of people as groups or 'populations'. While most developments by people will affect other people, this EIAR document concentrates on those topics which are manifested in the environment, such as new land uses, more buildings or greater emissions. Matters relating to air pollution, noise are examined by the relevant competent experts in the relevant individual chapters, with a summary below.

3.2 STUDY METHODOLOGY

At the time of writing there is no guidance from the EU Commission on the 2014 EIA Directive to indicate how the new term 'Human Health' should be addressed. Therefore this chapter of the EIAR document has been prepared with reference to recent national publications which provide guidance on the 2014 EIA Directive including 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.

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[7]".

A site visit was undertaken to appraise the location and likely and significant potential impact upon human receptors. Desk based study of published reference documents such as Central Statistics Office Census data, the ESRI Quarterly Economic Commentary, the Gorey Local Area Plan and the Wexford County Development Plan was also carried out.

The Department of Environment, Community and Local Government provide a proposed approach to reflect the requirements of the 2014 EIA Directive in relation to Population and Human Health in their Key Issues Consultation Paper. Firstly, the paper states that 'it is considered that the change from "*human beings*" to "*population and human health*" in relation to EIA is primarily clarificatory and to ensure consistency with, in particular, the SEA Directive'.

[7] *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

Secondly, in terms of practical implications as regards the assessment of effects the paper states that '*it is intended that the consideration of the effects on populations and on human health should focus on health issues and environmental hazards arising from the other environmental factors, for example water contamination, air pollution, noise, accidents, disasters, and not requiring a wider consideration of human health effects which do not relate to the factors identified in the Directive'*.

The Draft Guidelines on the information to be contained in environmental impact assessment reports, published by the EPA states that *'in an EIAR, the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc'.*

This chapter of the EIAR document focuses primarily on the potential likely and significant impact on Population, which includes Human Beings as required under the Schedule 6 of the Regulations, and Human Health in relation to health effects/issues and environmental hazards arising from the other environmental factors. 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. The reader is directed to the relevant environmental chapter of this EIAR document for a more detailed assessment, by the relevant experts.

3.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

3.3.1 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. Specific environmental chapters in this EIAR provide a baseline scenario relevant to the environmental topic being discussed. Therefore, the baseline scenario for separate environmental topics is not duplicated in this section; however, in line with guidance provided by the EPA and the Department, the assessment of impacts on population and human health refers to those environmental topics under which human health effects might occur, e.g. noise, water, air quality etc.

An outline of the likely evolution without implementation of the project as regards natural changes from the baseline scenario is also provided.

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

- Economic Activity;
- Social Patterns;
- Land-Use and Settlement Patterns;
- Employment; and
- Health & Safety.

3.3.2 Economic & Employment Activity

The CSO's Quarterly Labour Force Survey (which has now replaced the Quarterly Household Survey) for Q3 2018, indicated that there was an annual increase in employment of 3.0% or 66,700 in the year to the third quarter of 2018, bringing total employment to 2,273,200. This compares to an annual increase of 3.4% or 74,100 in employment in the previous quarter and an increase of 2.2% or 48,500 in the year to Q3 2017.

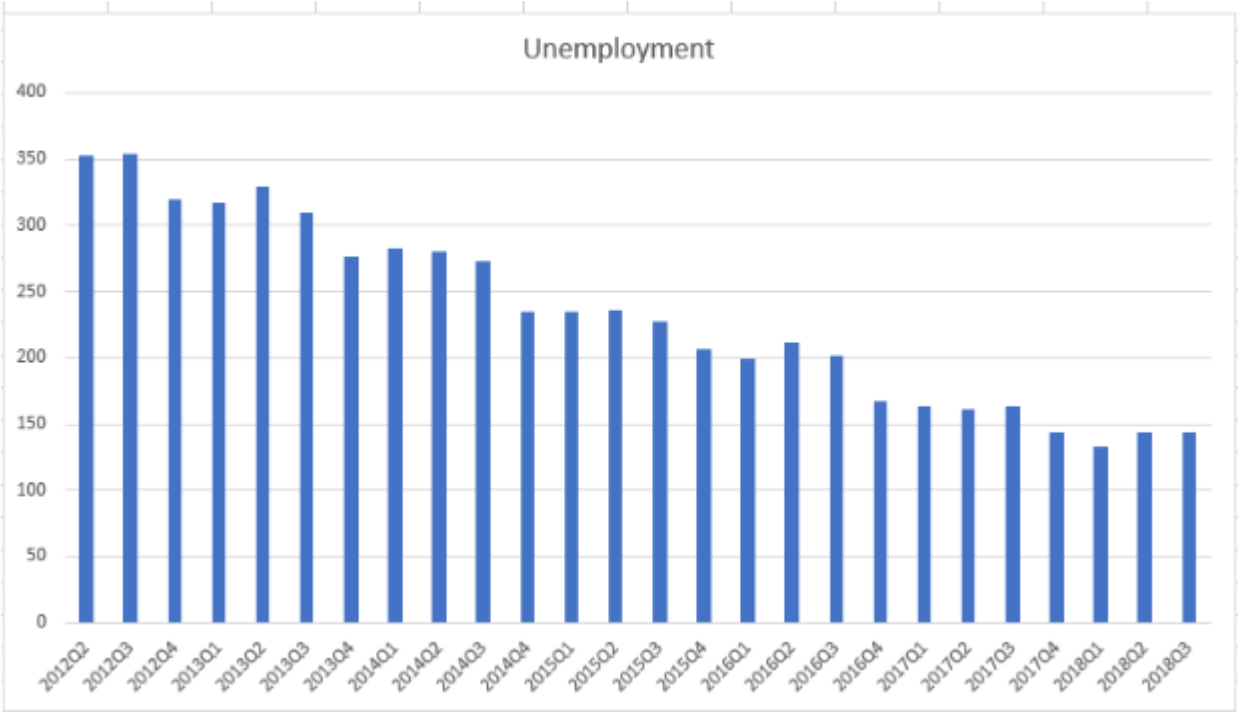
The increase in total employment of 66,700 in the year to Q3 2018 was represented by an increase in full-time employment of 44,200 (+2.5%) and an increase in part-time employment of 22,500 (+5.1%), representing an improvement in the quality and quantity of employment in the economy. The ESRI Quarterly Economic Commentary for Winter 2018 states that while headline GDP suggests a growth rate of over 8% for the economy, underlying economic activity grew somewhere in the region of 4.5% to 5%.

According to the ESRI, a relatively benign UK exit from the EU (such as the establishment of a European Economic Area agreement) would see the Irish economy grow by 3% in 2019, compared to a 4% growth where the UK remains in the EU. If the United Kingdom were to leave under a WTO style agreement, then, according to the ESRI, Irish economic activity in 2019 would grow by approximately 2.5% in 2019.

According to the CSO's Quarterly Labour Force Survey, Unemployment decreased by 19,700 (-12.1%) in the year to Q3 resulting in the total number of persons to 143,000, which is the 25th quarter in succession where the overall number of persons unemployed declined on an annual basis.

The above sources demonstrate that the national economy and employment levels were expected to improve further through 2018 and beyond into 2019, with the Government faced with the challenge of sustaining economic activity and competitiveness during a period of likely full employment. This in turn results in increased demand for residential dwellings.

Figure 3.1 – Unemployment rate in Ireland by month to Q3 2018 (%) *CSO Labour Force Survey*



3.3.3 Social Patterns

The CSO data illustrates that the population of the Irish State increased between 2011 and 2016 by 3.8%, bringing the total population of the Irish State to 4,761,865. The rate of growth slowed from 8.1% in the previous census, attributable to the slower economic activity in the early part of the census period resulting in a reduced level of immigration, albeit offset to a degree by strong natural increase.

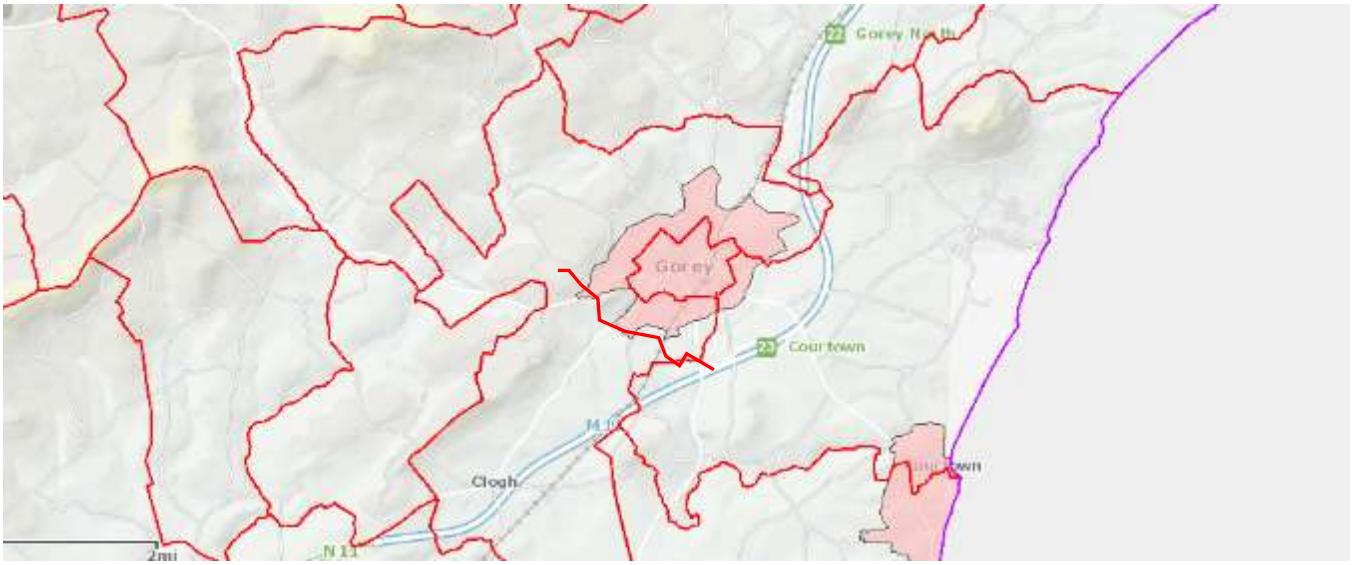
The Central Statistics Office (CSO) provides information on population and socio-economic aspects of the population residing within the Electoral District (ED) of Gorey, which the subject lands are located within the administrative area of Weford County Council. The most recent census of population by the CSO was undertaken in 2016. The census provides demographic trends for the Country, region, county, town and local levels. The CSO population statistics relevant to this EIAR are set out in Table 3.1 below.

Table 3.1 – Population Change in the State, Wexford County and Gorey 2011 - 2016 (Source: CSO)

Area	Number of Persons		
	2011	2016	% change 11-16
Ireland - State	4,588,252	4,761,865	3.8
Wexford County	145,320	149,722	3.0
Gorey	9,144	9,822	7.4

Source: Central Statistics Office 2011 and 2016

Figure 3.2 – Image of the Gorey Electoral Division (Source Pobal.ie)



The CSO data illustrates that the population of the Irish State increased between 2011 and 2016 by 3.8%, bringing the total population of the Irish State to 4,761,865. The rate of growth slowed from 8.1% in the previous census, attributable to the slower economic activity in the early part of the census period. The economy has recovered in recent years with consequent population growth predominantly attributed to natural increase, greater economic activity, increased job opportunities and continued immigration.

Growth within the County was slightly lower than the national average with a growth rate of 3.0%. However, growth within Gorey was significantly higher with the population of the town increasing by approximately 7.4% over the last intercensal period.

The substantial growth in the area is likely to be attributable to the designation of growth areas in this part of the County, the availability and provision of physical and social infrastructure, and the associated significant level of residential development that has progressed in this area in recent years.

3.3.4 Land Use & Settlement Patterns

The site is located within the administrative area of Wexford County Council. As Gorey has a population of in excess of 5,000, a Local Area Plan is in place for the area. In this respect, the policies and objectives found within the existing Wexford County Development Plan 2017-2023 in combination with the Gorey Local Area Plan 2013-2019 form the development plan for the area. The subject site is zoned for 'Residential' (R) and 'Open Space and Amenity' (OS). According to the Land Use Matrix in Section 11.3 of the Gorey LAP, residential is a permitted in principle use, which is a use which "is generally acceptable subject to complying with the relevant policies, objectives, standards and requirements set out in the LAP and the CDP

The predominant land use immediately surrounding the subject site consists of a mix of existing residential lands to the south and west. Additional residential zoned lands are located to the north. The overall landholding includes for CE zoned lands which are anticipated to accommodate a rage of community uses such as a creche (as part of the SHD application). Separately, the emerging proposals for the adjacent lands under the control of AMIL properties, is to include for a range of community based uses such as a 2 storey nursing home, (c. 60 bedrooms & 3,000 sq. m), a 2 storey mixed medical centre building (c. 2,000 sq. m), and sheltered accommodation. Town Centre zoned lands are located further to the south some 700m from the subject site. The site occupies a substantial portion of undeveloped lands in the northern part of the settlement of Gorey.

The residential development in this area is generally of lower density within older residential dwellings to the south (Ashwood Grove) and east adjoining Fort Road (Hunter's Green). These generally consist of a mix of single storey bungalows on significantly sized plots combined with a range of detached homes of various styles.

The Gorey LAP aims to build on the settlement's strengths and provide a focused approach to planning for future growth in a coherent sustainable spatial fashion. This is to be achieved by promoting a more consolidated urban form that facilitates sustainable economic base and creates sustainable and integrated communities while balancing future development with the conservation and enhancement of the town's natural and built environment. The proposed development at Creagh will ensure a development of appropriate scale, density and layout is achieved through respecting the zonings at the site as stated within the Gorey LAP and promoting high quality sustainable residential development as set out in the Sustainable Residential Guidelines.

The development will consolidate the existing urban built form and provides a new infill area of residential land use located c. 700-1,000m to the town centre, to the south, which respects the lower density of neighbouring dwellings to the south and east. The Planning Report which accompanies this application addresses land use zoning in more detail.

3.3.5 Health & Safety

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.

3.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

This section considers the '*level of impact'* on the environment of any particular aspect of the proposed development. For this chapter the potential impact on Population and Human Health is discussed. A full description of the proposed development is provided in Section 2 of this EIAR document. In summary the proposal is for a residential development of 297 no. dwellings comprising 65 no. apartments and 232 no. houses as well as a creche of 554 sq. m, public open space, communal open space as well as supporting infrastructure.

3.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

3.5.1 Introduction

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 proposed development. As stated, guidance documents from the EPA and the Department outline that the assessment of impacts on population and human health should focus on health issues and environmental hazards arising from the other environmental factors and does not require a wider consideration of human health effects which do not relate to the factors identified in the EIA Directive.

Additionally, this section addresses the socio-economic and employment impacts of the proposed development. For a more detailed assessment of potential impacts please refer to specific chapters of the EIAR which assess the environmental topics outlined in the EIA Directive.

3.5.2 Water

Construction Phase

Provision of water infrastructure for the proposed development would involve construction activities within the subject lands mainly involving trench excavations conducted in parallel with the other services. The potential impact on the

local public water supply network would be short term and imperceptible. Therefore, the impact on human health and population in this regard is considered to be insignificant.

During the construction phase there is potential for weathering and erosion of the surface soils from precipitation and run-off and surface water runoff may also contain increased silt levels or pollutants from the construction processes.

Operational Phase

The estimated water demand for the proposed residential development comprising of 297 dwellings and crèche would be 181.65 m^3/day and 5.5 m^3/day respectively. No significant impact would be anticipated upon the Gorey Regional Creagh water supply zone. Further details are discussed in Chapter 6 of this EIAR.

The proposed development will result in an increase of impermeable areas associated with areas of residential use, hard standing car parking and access. However there will be no increase in runoff rate as post-development rates will match greenfield values through the use of SuDS and attenuation storage. Therefore, the impact on population and human health in this regard is considered to be insignificant.

3.5.3 Noise

Construction Phase

During the construction phase, there will be extensive site works, involving construction machinery, construction activities on site, and construction traffic, which will all generate noise. It is not expected that the predicted short-term increase in HGV movements associated with the construction phase of the development will have an adverse impact on the existing noise climate of the wider area or on local receptors. The construction noise levels will be of relatively short term duration and will only occur during daytime hours which will serve to minimise the noise impacts at local existing receptors, and therefore minimise potential impacts on human health and population.

It is predicted that the construction phases shall result in a short term increase in noise levels in the area as well as introducing tonal and impulsive noise as a result of construction activities such as pneumatic breaking, cutting, excavating, vehicle movements and general manual construction activities.

Due to the phased nature of the development which will occur over an approximate 48-54 month period, there will be slight to moderate impacts on existing residents in properties constructed in the early phases of the development. However, the proposed construction phase noise mitigation measures as detailed in Chapter 8 - Noise shall ensure that all construction activities are controlled and managed and audited by an independent acoustic consultant to confirm that the mitigation measures are implemented throughout the construction phase.

Operational Phase

The main potential for altering the noise environment once the development is operational, and thus impact neighbouring residential receptors and potentially human health, is road traffic noise associated with the development.

In terms of impact on residential amenity the sound insulation requirements of the residential units have been assessed to ensure that external noise from traffic movements along the internal link road are minimised. Appropriate landscaping and siting of open space throughout the site will serve to further mitigate noise levels at residential properties within the development. Traffic movements within the development do not have an adverse impact on internal noise levels, and therefore there will be no adverse impact on human health in this regard.

3.5.4 Air Quality & Climate

Construction Phase

During the construction phase, site clearance and ground excavation works have the potential to generate dust emissions rising from the operation and movement of machinery on site. This has a potential impact on population and human health. Mitigation measures are outlined in Chapter 7 – Air Quality and Climate including avoiding unnecessary vehicle movements and manoeuvring, and limiting speeds on site so as to minimise the generation of airborne dust, and spraying surfaces with water and wetting agents to control dust emissions.

Construction equipment will also give rise to some exhaust emissions, and construction traffic to and from the site will generate additional hydrocarbon and particulate emissions from the vehicle exhausts.

CO2 will be released into the atmosphere as a result of the movement of construction vehicles and use of plant. However, emissions associated with such activities will not be significant.

It is predicted that the activities detailed above will result in an imperceptible impact on local air quality and sensitive receptors. Therefore, the potential impact on human health and population in this regard is considered negligible.

Operational Phase

The operational phase of the proposed development will result in a slight impact on local air quality primarily as a result of the requirements of new buildings to be heated and with the increased traffic movements associated with the development.

The extensive landscaping schemes including the green open space area which extends through the site connecting to the extensive Creagh Park, will include native trees, grasses and shrubs which will also contribute to the adsorption of carbon dioxide from the atmosphere and the release of oxygen to the atmosphere.

It is predicted that the operational phase of the development will not generate air emissions that would have an adverse impact on local ambient air quality or local human health, as stated in Chapter 7 – Air Quality and Climate.

3.5.5 Landscape and Visual Impact

Construction Phase

The construction phase will have short term landscape and visual impacts. The impacts are not considered significant on population and human health.

Operational Phase

The operational phase of the proposed development has the potential to lead to positive impacts on population and human health as a result of the significant quantity of open space and recreational provision including a green open space corridor located centrally within the scheme and associated pedestrian and cycle ways throughout the site and areas of public recreation and playgrounds located throughout the site. The inclusion of a creche facility will help provide a high quality residential environment with provision for good quality exercise and play areas as well as being a valuable amenity resource to surrounding residential areas.

The proposed development incorporates design principles such as permeability, shared surfaces and pedestrian and cyclist linkages which prioritise multi-modal forms of transport as alternatives to the private car and therefore has the potential to positively impact on population and human health. Landscape and visual impacts of the proposed development are minimised through the appropriate siting and scaling of residential dwellings. This sensitive siting and scaling ensures the development fits well within its surrounding landscape.

3.5.6 Economic Activity

Construction Phase

The construction phase of the proposed development is likely to result in a positive net improvement in economic activity in the area of the proposed development site, particularly in the construction sector and in associated and secondary building services industries. The construction sector (including associated services) was documented as one of the most adversely impacted sectors of the Irish economy following the economic downturn in 2008 and subsequent recession. The sector has recovered in recent years and this development will help to further enhance growth.

The phased construction of the proposed residential units and a childcare facility, alongside associated physical infrastructure will result in a construction period over a 48-54 month period and will consequently enhance economic activity during this period. It is difficult to estimate the number of employees who will be engaged on a phased residential development such as this. A considerable amount of the work will be undertaken by sub-contractors who will also work elsewhere on a phased basis over the construction phase.

The construction phase will also have secondary and indirect '*spin-off*' impacts on ancillary support services in the area of the site, such as retail services, together with wider benefits in the aggregate extraction (quarry) sector, building supply services, professional and technical professions etc. These beneficial impacts on economic activity

will be largely temporary but will contribute to the overall future viability of the construction sector and related services and professions over the phased construction period.

The proposed development could have a slight negative impact on the surrounding area during construction phase due to traffic and associated nuisance, dust and noise. These issues and appropriate mitigation measures are addressed in Chapters 7 & 8 of the EIAR, in the Traffic and Transportation Assessment, Construction Management Plan and the Waste Management Plan which accompany the application. The Traffic and Transportation Assessment recommends that a Construction Traffic Management Plan be implemented for the site which will minimise disruption to the surrounding road network.

Operational Phase

The operational phase of the proposed development will result in the provision of 297 residential units and a creche. This will provide accommodation for approximately 840 persons, based upon the existing average occupancy rate of 2.83 persons per household. This increase in occupancy in the area will enhance local spending power and will assist with the delivery of a critical mass of population which will support a wide range of additional local businesses, services, transport infrastructure and employment opportunities. Provide much needed residential accommodation within the town of Gorey and accords with National Policy on delivering Sustainable Residential Communities.

3.5.7 Social Patterns

Construction Phase

The construction phase of the proposed development is unlikely to have any significant impact on social patterns within the surrounding area. Some additional temporary additional local populations may arise out of construction activity. However these impacts are imperceptible, temporary in nature and therefore not considered significant.

It is acknowledged that the construction phase of the project may have the potential for some short-term negative impacts on local residents. Such impacts are likely to be associated with construction traffic and possible nuisances associated with construction access requirements. These impacts are dealt with separately and assessed elsewhere in the EIAR, including Chapter 2 - Project Description and Alternatives Examined, Chapter 7 - Air Quality and Climate and Chapter 9 - Noise and Vibration and also in the Traffic and Transportation Assessment report. Such impacts will be short term and in the longer term, the completed scheme will have beneficial impacts for local businesses, residents and the wider community. Any disturbance is predicted to be commensurate with the normal disturbance associated with the construction industry where a site is efficiently and properly managed having regard to neighbouring activities. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts to nearby residents. A Construction Management Plan has been prepared and is submitted with this SHD planning application.

Operational Phase

The addition of new residents to the area will improve the vibrancy and vitality of the area and will help to support existing community and social infrastructure. The subject lands are located in an accessible location with easy access to the town centre. The cumulative development of the lands offer a range of facilities which are beneficial to the wider community. Lands under control of the applicant are zoned CE community. The current proposal includes for a creche and the reminder of the CE zoned lands will for a range of community based uses such as a 2 storey nursing home, (c. 60 bedrooms & 3,000 sq. m), a 2 storey mixed medical centre building (c. 2,000 sq. m), and sheltered accommodation. This will contribute positively to the social pattern and facilities offering within Gorey. The implementation of the linear park / green corridor will attract pedestrians and cyclists into the area and promote healthy living through social activities. This will help create sustainable and active communities.

3.5.8 Land-Use & Settlement Patterns

Construction Phase

The construction phase of the proposed development will primarily consist of site clearing, excavation and construction works, and has the potential to impact adversely and result in the temporary degradation of the local visual environment on a short-term basis. The visual impacts are assessed in greater detail in Chapter 9.

Secondary land use impacts include off-site quarry activity and appropriate disposal sites for removed spoil. Construction works are likely to take place on a phased basis, which will moderate the potential impacts on adjoining land use. The Construction Management Plan addresses these issues in more detail.

The construction phase may result in a marginally increased population in the wider area due to increased construction employment in the area, however, this would be temporary in nature and the impact would be imperceptible.

Operational Phase

The operational phase of the proposed development will result in the introduction of a residential accommodation land use to the subject site which will provide much needed housing for the growing population of the immediate area. Furthermore, a significant quantity of open space consisting of recreational and amenity space is also provided, promoting healthy communities.

3.5.9 Employment

The impact of the proposed development in relation to employment has been discussed under economic activity.

3.5.10 Health & Safety/ Risks of Major Accidents and/or Disasters

Construction Phase

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".*

The construction phase of the proposed development may give rise to short-term impacts associated with construction traffic, migration of surface contaminants, dust, noise and littering. Secondary impacts may include resulting increased traffic arising from hauling building materials to and from the proposed development site which are likely to affect population and human health distant from the proposed development site, including adjacent to aggregate sources and landfill sites.

Construction impacts are likely to be short term and are dealt with separately in the relevant chapters of this EIAR document and will be subject to control through a Construction Management Plan. The construction methods employed and the hours of construction proposed will be designed to minimise potential impacts. The development will comply with all Health & Safety Regulations during the construction of the project. Where possible, potential risks will be omitted from the design so that the impact on the construction phase will be reduced.

3.5.11 Potential Cumulative Impacts

The potential cumulative impacts of the proposed development on population and human health have been considered in conjunction with the ongoing changes in the surrounding area, particularly the construction and eventual occupation of the adjacent residential development outside the red line boundary to the west.

The cumulative impact of the proposed development will be a further increase in the population of Gorey. Completion of this residential zoned land by approximately 840 persons. The increase in population has been taken into account in the Strategic Environmental Assessment of the Gorey LAP 2017-2023. Lands under control of the applicant are zoned CE community. The current proposal includes for a creche and the reminder of the CE zoned lands will for a range of community based uses such as a 2 storey nursing home, (c. 60 bedrooms & 3,000 sq. m), a 2 storey mixed medical centre building (c. 2,000 sq. m), and sheltered accommodation. The long term impact is considered to be positive having regard to the zoning objectives relating to the subject lands as well as the promotion of sustainability

With regard to human health, the cumulative impact of the proposed development will include the provision of a new high quality and sizeable new neighbourhood which will include a large quantum of high quality green space. The development of the CE zoned lands which are located adjacent are anticipated to include a nursing home, mixed medical centre building and sheltered accommodation, which will benefit the broader health of the population.

3.5.12 *'Do Nothing'* Scenario

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place.

A '*do nothing'* scenario would result in the subject lands remaining brownfield and green-field and undeveloped. This would be an underutilisation of the site from a sustainable planning and development perspective, particularly considering the location of the infill lands.

The lands are considered a logical extension to Gorey in the context of the sequential approach promoted by the development plan and will enable the sustainable and organic growth of the settlement whilst improving permeability and west-east connectivity to the Creagh town park, located to the east.

The '*do-nothing'* scenario would result in the status of the environmental receptors described throughout this EIAR document remaining unchanged. The potential for any likely and significant adverse environmental impacts arising from both the construction and operational phases of the proposed development would not arise. In terms of the likely evolution without implementation of the project as regards natural changes from the baseline scenario, it is considered there would be limited change from the baseline scenario in relation to population (human beings) and human health.

3.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential likely and significant environmental impacts.

3.6.1 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 15 of this EIAR document which summarises all of the remedial and mitigation measures proposed as a result of this EIA.

POP & HH CONST 1:

In order to protect the amenities enjoyed by nearby residents, premises and employees a full Construction Management Plan (including traffic management) should be prepared by the contractor and implemented during the construction phase.

With reference to the construction phase of the proposed development, the objective of the *CWMP prepared by IE Consulting* is to ensure that waste generated during the proposed construction and operation phases will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts 1996 - 2013 are complied with.

An Environmental Management Plan and Construction Health and Safety Plan will be developed to include all aspects of the project. These plans and construction activities must be in agreement with Strutec Ltd. policies such as environmental health and safety requirements for contractors.

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. The route of the sewerage connection, would be subject to a road open licence under Section 254 of the Planning and Development Acts 2000-(as amended) from Wexford County Council. As part of the road opening licence, it is anticipated that a Construction Traffic Management Plan would be agreed with Wexford County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

There will be some short term impacts during the construction phase as the pipes are laid, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and disturbance to residents and business 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.

Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used.

With reference to natural disasters (e.g. flooding), the proposed development has undergone a Site Specific Flood Risk Assessment, prepared by IE Consulting. The main area of the site where development is proposed is not at risk of fluvial, pluvial or groundwater flooding.

A Health and Safety Plan will be prepared (required by the *Safety, Health and Welfare at Work (Construction) Regulations 2013*) to address health and safety issues from the design stages through to the completion of the construction and maintenance phases. The Health and Safety Plan will comply with the requirements of the Regulations and will be reviewed as the development progresses.

Safety on site will be of paramount importance. Only contractors with the highest safety standards will be selected. During the selection of the relevant contractor and the respective subcontractors their safety records will be investigated.

Prior to working on site, each individual will receive a full safety briefing and will be provided with all of the safety equipment relevant to the tasks the individual will be required to perform during employment on site.

Safety briefings will be held regularly and prior to any onerous or special task. 'Toolbox talks' will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed.

All visitors will be required to wear appropriate personal protective equipment prior to going on to the site and will undergo a safety briefing by a member of the site safety team.

Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with at all times.

Article 27 Risk Assessment

As set out in the IE Consulting Excavation Plan (included in the application) the proposed development of the site will require the by-product declaration of 4,470 m3 of soil/subsoil for offs-site re-use.

In accordance with Article 27 of the Waste Directive Regulations 2011, and the recent EPA Consultation regarding the Article, soil and stone may be suitable for use if the soil meets generally accepted standards for the management of soil contamination such as the LQM/CIEH Generic Assessment Criteria (2nd Edition) and the EPA's Management of Contaminated Land & Groundwater at EPA Licenced Sites. The Article 27 application can be supported where necessary by a site-specific use risk assessment that will assess the risk of the proposed soils re-use at the proposed end point.

The risk assessment process allows mitigating factors concerning the re-use of the material to be highlighted or addressed prior to the movement and placement of the soils at the end user site. The Article 27 Risk Assessment would be site specific to the receptor site.

3.6.2 Operational Phase

The operation phase is considered to have likely significant positive impacts on human beings in relation to the provision of additional residential units, open space, childcare provision, to cater for the demands of a growing population in accordance with the residential zoning objectives pertaining to the site.

During the operational phase of the development the design of the scheme has undergone a Road Safety Audit and has had regard to DMURS during its design. This will promote a pedestrian friendly environment, promoting sustainable development and reducing the influence of cars. This has the potential to reduce accidents within the proposed development.

3.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term permanent, temporary, positive and negative effects as well as impact interactions which the proposed development may have, assuming all mitigation measures are fully and successfully applied. It should be noted that in addition to remedial and mitigation measures, impact avoidance measures have also been built in to

the EIA and project design processes through the assessment of alternatives described in Chapter 2 of this EIAR document.

3.7.1 Construction Phase

The construction phase of the proposed development will primarily consist of site clearance, excavation and construction works, which are likely to take place over 4 main phases, which will be largely confined to the proposed development site. Notwithstanding the implementation of remedial and mitigation measures there will be some minor temporary residual impacts on population (human beings) and human health most likely with respect to nuisance caused by construction activities. It is anticipated that subject to the careful implementation of the remedial and mitigation measures proposed throughout this EIAR document any adverse likely and significant environmental impacts will be avoided. Positive impacts are likely to arise out of an increase in employment and economic activity. The overall predicted likely and significant impact of the construction phase will be short-term, temporary and likely to be neutral.

The construction of the sewerage connection to facilitate the proposed development will require works to the public road will likely entail some localised impacts to residents. The Construction Management Plan will ensure that disruption and nuisances will be kept to a minimum.

3.7.2 Operational Phase

The proposed development will result in a generally positive alteration to the existing undeveloped site in terms of the provision of residential units to serve the growing residential and student population of the area in accordance with the objectives of the Wexford County Development Plan and the Gorey LAP. Positive impacts on population and human health will include health benefits associated with the provision of a significant quantity of open space, pedestrian and cyclist routes, a highly permeable layout which connects to adjacent development and delivers the objectives of the Local Area Plan. The provision of creche facilities on site enhances the quality of the development and helps to create sustainable communities.

The implementation of the range of remedial and mitigation measures included throughout this EIAR document is likely to have the impact of limiting any adverse significant and likely environmental impacts of the operational phase of the proposed development on population and human health.

3.8 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.

3.9 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.

3.10 INTERACTIONS

As noted above, there are numerous inter-related environmental topics described in detail throughout this EIAR document which are of relevance to 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.

3.11 CUMULATIVE ASPECTS

An increase in local housing, and some increase in employment opportunities and service provision (crèche) as well the development of the adjacent CE zoned lands in a future separate application has the potential to generate direct, indirect and induced economic benefits locally. 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, including the CE zoned lands. 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.

3.12 DIFFICULTIES ENCOUNTERED IN COMPILING

No significant difficulties were experienced in compiling this chapter of this EIAR document.

4.0 BIODIVERSITY

4.1 INTRODUCTION

This section outlines the biodiversity currently present in the area of the proposed development and assesses the impact of the proposal on terrestrial and aquatic habitats and species identified. This section should be read in conjunction with the site layout plans for the proposed development and project description sections of the EIAR. Mitigation measures have been proposed where feasible.

The ecological assessment involved a desktop review and the undertaking of field assessments of the site to identify habitats and species of flora and fauna present in order to determine the ecological diversity of this area.

The objectives of the ecological assessment were as follows:

To undertake a comprehensive desktop review to identify Natura 2000 sites within the vicinity of the proposed development and to determine previously recorded flora and fauna for the area;

To undertake a field assessment of the proposed development site and surroundings;

To evaluate the biodiversity value of the proposed development and surroundings;

To determine and assess the potential impacts of the proposed development on biodiversity;

To propose mitigation measures for both the construction and operational phases of the development to reduce potential impacts upon biodiversity.

4.2 METHODOLOGY

4.2.1 Legislative Context

The following legislation is relevant to the proposed development:

The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000

The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife. Under the Amendment Act of 2000, the scope was broadened to include freshwater aquatic species, including the majority of fish. The Act provides for the control of specific activities, which could adversely affect wildlife. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHAs).

The Flora (Protection) Order, 2015 (S.I. 356 of 2015)

This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to willfully cut, uproot or damage the listed species or interfere in any way with their habitats.

European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)

These regulations transpose the European Council Directive 92/43/EEC, as amended, on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the “Habitats Directive”) and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the “Birds Directive”) into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. The EC (Birds and Natural Habitats) Regulations also address invasive species, making it an offence without a licence to plant, allow to disperse, escape or spread, to reproduce or propagate, to transport, to sell or advertise invasive species specified in the regulations.

The Local Government (Water Pollution) Act, 1977, as Amended

This Act provides for the control of water pollution, by prohibiting the discharge of un-licenced polluting matter into waters.

European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009)

The regulations give statutory effect to Directive 2008/105/EC and provide legal status to quality objectives for all surface waters and environmental quality standards for pollutants. The regulations allow for the classification of surface waters by the Environmental Protection Agency (EPA) in accordance with the ecological objectives approach of the Water Framework Directive. The regulations also provide for the establishment of inventories of priority substances by the EPA and the preparation of pollution reduction plans.

The Fisheries (Consolidation) Act, 1959, as Amended

The Act prohibits the entry of polluting substances into waters, which have the potential to adversely impact upon fish, prohibits the obstruction of passage of certain fish species and provides legal protection to the spawn/fry of eels, salmon and trout, in addition to their spawning or nursey grounds.

Fisheries (Amendment) Act, 1999

This Act outlines the responsibilities of the Regional Fisheries Board to ensure the protection and conservation of fish and their habitats within its area of jurisdiction.

European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. 293 of 1988)

These regulations give statutory effect to Directive 78/659/EEC. The regulations designate salmonid waters, specify the quality standards for designated salmonid waters and outline the monitoring requirements.

Water Framework Directive (2000/60/EC)

The Water Framework Directive (WFD) aims to improve the water environment (including groundwater, rivers, lakes, estuaries and coastal waters) of E.U. Member States. The aim of the WFD is for Member States to achieve and maintain “good status” in all water bodies.

Planning and Development Regulations, 2001 to 2018

These regulations transpose the requirements of Directive 2014/52/EU (and previous Directive 2011/52/EU) on the assessment of the effects of certain projects on the environment into planning law. Under these regulations, development plans must include mandatory objectives for the conservation of natural heritage and for the conservation of European sites.

4.2.2 Relevant Guidelines

The following guidance documents have been consulted for this assessment, with a full list of consulted documentation and guidelines included within Section 4.12:

Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2016);

Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) (EPA, 2017);

Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009);

A Guide to Habitats in Ireland (Fossitt, 2000);

Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.*, 2011);

Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009);

Expedition Field Techniques: Bird Surveys (Bibby *et al.*, 2000);

Bird census and survey techniques (Gregory *et al.*, 2004);

Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.) (Collins 2016);

Bat Mitigation Guidelines for Ireland (Kelleher and Marnell, 2006);

Bats and artificial lighting in the UK (Bat Conservation Trust, 2018).

4.2.3 Study Area / Zone of Influence

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2016) and the National Roads Authority (2009), a Zone of Influence should be determined, which identifies the area in which the development could potentially impact upon ecological receptors. The zone of influence takes into consideration the assigned ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur.

Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary only for habitats, to buffers of 100m for specific species. However, it should be noted that these buffers were extended where required.

4.2.4 Desktop Research

Desktop research comprised of gathering information on designated sites within 15km of the proposed development, reviewing mapping sites to provisionally identify any potential ecologically important features prior to the site assessment and reviewing online resources to determine what notable species, including protected, rare or invasive, had previously been recorded for the proposed development area and environs. The following online resources were consulted as part of this process:

NPWS website: mapping of designated sites and information on designated sites within the vicinity of the development;

NPWS Wildlife Manuals for certain habitats and species;

National Biodiversity Data Centre (NBDC) website: data on notable species (protected, rare or invasive) within a 5km radius of the development;

NPWS reports on "*The Status of Protected EU Habitats and Species in Ireland*";

NPWS Ireland Red Lists for species;

Botanical Society of Britain and Ireland website: flora distribution maps;

Data on the status of bird species from "*Birds of Conservation Concern in Ireland 2014-2019*", (Coulhoun and Cummins, 2013);

Various mapping websites, including EPA Envision, Google Maps, Myplan and OSI.

In addition to the above, the National Parks and Wildlife Services (NPWS) was contacted on the 9th of November 2018 in relation to records for sensitive, rare, threatened and protected species within 10km of the development location. Results were returned on the 20th of November 2018.

A data request for bat records within 10km of the proposed development site was received from Bat Conservation Ireland (BCI) on the 12th October 2018.

4.2.5 Field Surveys Methodology

Site assessments were undertaken on various dates in 2017 and 2018 to examine the ecological context of the proposed development, as outlined in Table 4.1 below. Surveys had due consideration for the relevant best practice guidelines as referenced in Section 4.2.2.

Table 4.1 – Ecological Surveys Informing the EIAR

Survey	Study Area	Survey Dates
Habitat Survey (including invasive, rare or notable flora)	100m	21st December 2017 14th August 2018 28th September 2018
Fauna Survey	100m	21st December 2017 14th August 2018
Daytime Assessment of Bat Roost Potential	50m	24th September 2018
Bat Activity Survey	50m	24th September 2018 28th September 2018
Bat Activity Survey using Static Detector	50m	24th September 2018 - 28th September 2018

Habitats and Flora Survey

These assessments involved determining the habitats and flora present within the proposed development. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", (Fossitt, 2000), a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.,* 2011). The relative abundances of flora was determined using the DAFOR Scale, an acronym for the abundance levels – Dominant, Abundant, Frequent, Occasional and Rare.

During site walkovers, any notable flora species were recorded, with an emphasis on statutorily protected or rare species, species of conservation significance and invasive species.

Fauna Survey (Excluding Bats)

Fauna surveys were undertaken during bright and dry weather conditions, with any signs of fauna activity detected during other ecological surveys also recorded. Direct observation methods were used for the survey of fauna, however, these methods may not be suitable for shy and nocturnal species. Therefore, indirect methods were also employed, focusing on evidence of fauna including tracks, burrows/setts/nests, droppings, food items and hair. The habitats on site were assessed for signs of usage by fauna, and the potential to support protected or red-listed species.

Fauna Survey (Bats)

Areas within the site with the potential to support foraging/commuting and/or bat roost were the focus of the survey and assessment outlined below.

Assessment of Bat Roost Potential (Initial Daytime Assessment)

A daytime assessment of individual trees/treelines within the proposed development site potentially affected by the proposed development was undertaken on the 24th of September 2018.

The assessment comprised an external inspection of trees to identify potential roost features (PRFs). Close focusing binoculars were used to look for features which may support bat roosts, and evidence of bat activity. Bats may utilise several different roosts throughout the year and may only occasionally make use of any given feature, particularly cracks, crevices and fissures. The criteria used to categorise the PRFs or suitability of buildings and trees as a roost

are summarised in Table 4.2 below (based on Hundt, 2012 and Collins, 2016). Trees were assessed based on the presence of features commonly used by bats. Examples of such features include:

- Natural holes;
- Cracks/splits in major limbs;
- Loose bark; and,
- Hollows/cavities.

Table 4.2 – Bat Roost Potential Categories

Category	Description
High Trees / buildings that are suitable for use by large numbers of bats on a regular basis	Features include holes, cracks or crevices that extend or appear to extend back to cavities suitable for bats. In buildings, examples include eaves, barge boards, gable ends and corners of adjoining beams, ridge and hanging tiles, behind roofing felt or within cavity walls. In trees, examples include rot holes, woodpecker holes, splits and flaking or raised bark which could provide roosting opportunities. Any ivy cover is sufficiently well-established and matted so as to create potential crevices beneath. Further survey is required to determine whether or not bats are present and if so, the bat species present. Appropriate mitigation and potentially licensing requirements may then be determined. Seasonal constraints may apply.
Moderate Moderate potential is assigned to trees / structures with potential to support bat roosts but supports fewer features than a high potential building / tree and is unlikely to support a roost of high conservation value.	From the ground, building / tree appears to have features (e.g. holes, cavities, cracks or dense ivy cover) that may extend back into a cavity. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for roosting bats. Further survey is required to determine whether or not bats are present and if so, the bat species present. Appropriate mitigation and potentially licensing requirements may then be determined. Seasonal constraints may apply.
Low Low potential is assigned to structures and trees with features that could support individual bats opportunistically.	If no features are visible but owing to the size and age and structure, hidden features, sub-optimal for roosting bats, may occur that only an elevated inspection may reveal. In respect of ivy cover, this is not dense (i.e. providing PRF in itself) but may mask presence of PRF features. Further survey may be required for buildings only or works may proceed using reasonable precautions (e.g. controlled working methods, under license or supervision of a bat worker. Seasonal constraints may apply).

Dusk Emergence and Dawn Re-entry Surveys/Activity Survey

Dusk emergence and dawn re-entry surveys of individual trees/ treelines identified as having moderate potential (no trees were assessed as high) to support a bat roost were undertaken to determine the presence / probable absence of bat roosts. The location of treelines surveyed are shown in Figure 4.1. Surveys were undertaken on the following dates:

- 24 September 2018 (dusk survey)
- 28 September 2018 (dawn survey)

Surveyors were positioned in front of the individual trees. Surveyors recorded bat activity using heterodyne Elekon Batscanner detectors and / or the frequency division Anabat SD2. The dusk emergence survey commenced approximately 15 minutes before and continued for at least 90 minutes after sunset. The dawn re-entry survey commenced at least 90 minutes prior to, and continued until, sunrise. Following on from the emergence survey and

prior to the dawn re-entry survey, surveyors walked a transect of the site (see Figure 4.2) to record bat activity across the site. This identified potential commuting and foraging habitat within the site. Bat activity and use of these potential foraging and commuting habitats was recorded at each transect point.

Static Monitoring

To provide additional data concerning the use of the proposed development site by bats, a static detector was left out for three consecutive nights between 24th – 28th of September 2018. The static detector records bat activity to a memory card and this information is then analysed to confirm the species present and overall activity in a given location. The static monitoring location was chosen to incorporate the most suitable habitat features for bats within the proposed development site, for example commuting and foraging habitat (i.e. grassland, hedgerow, treelines).

Bat Call Analysis

Bat call analysis was undertaken using Analook software. Analook software was used to analyse bat calls recorded on the Anabat during static monitoring and dusk emergence and dawn re-entry surveys. Bat species identification was interpreted using known call parameters (*British Bat Calls: A Guide to Species Identification*, Jon Russ 2012) and existing literature on the ecology of Irish and UK bat species, including distribution, range, habitat associations and behavioural characteristics, in addition to professional judgement. Every attempt was made to identify bats to species level. However, in some instances it is only possible to take the analysis to genus level (distinguishing between certain bat species echolocation calls can be very difficult due to the overlap in call parameters e.g. those species within the *Myotis* genus).

Figure 4.1 – Bat Survey Locations

Figure 4.2 – Activity Survey (Transect Route)

Surveys Scoped Out

The following ecological features were scoped out:

Winter bird surveys: Habitats found within the study area are not considered suitable to support any significant wintering bird populations due to the absence of suitable wetland habitats and potential winter roosting habitats (such as reed beds and moorland).

Breeding bird surveys: The predominant habitats at the site are improved agricultural grassland, recolonising bare ground and buildings and artificial surfaces, which can be considered to be of low ecological value. Limited areas of scrub, hedgerow and treeline habitat exist with the potential to support breeding birds. Therefore, breeding bird checks were included within other ecological surveys in August 2018.

Invertebrate (aquatic) / Fish surveys: The only aquatic feature at the proposed development site is a drainage ditch, which is not considered to have the potential to support protected aquatic species or species of conservation interest. This drainage ditch is approximately 280m in length and joins with a drainage pipe connecting to the Ballyowen Stream approximately 145m from the proposed site.

Invertebrate surveys (terrestrial). Terrestrial habitats within the study area are considered unlikely to support any protected invertebrate species, as the study area does not support the food plants of the protected marsh fritillary (*Euphydryas aurinia*) or suitable habitat for protected whorl snail species (*Vertigo* spp*.).*

Reptile surveys. Areas of the study area provide suitable basking and refuge habitat for protected viviparous lizard (*Zootoca vivipara).* Historical aerial mapping shows that a good proportion of the site was cleared of vegetation, some areas of which have re-vegetated in recent years. The numbers of viviparous lizard, if present at the site, are likely to be low and unlikely to be picked up in survey.

Survey Limitations

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time, and is limited by various factors such as the season, timing of the survey, climatic conditions and species behaviour. Ecological surveys are therefore snapshots in time and should not be regarded as a complete study. Direct observations or evidence of protected species is not always recorded during ecological surveys. However, this does not indicate that the species is absent from the site.

To ensure any limitations encountered did not significantly impact upon the findings of the ecological assessments, the ecological surveys undertaken also assessed the potential of the habitats to support protected species and breeding birds and cognisance has been taken of baseline data (e.g. flora and fauna records from the NBDC, consultation with NPWS regarding protected, rare or threatened species) and a precautionary approach taken.

Bats

Bat surveys were undertaken at the end of the optimal survey season (May – September). Surveys undertaken in September may pick up mating or transitory roosts. However, they would not necessarily pick up maternity roosts which are best identified May – July. This is not considered a major limitation on this site as the trees identified for removal (and assessed for PRFs) are unlikely to support a maternity roost given the lack of any significant PRFs identified. The tree assessment was undertaken with the trees in full leaf, while a number of the trees had dense ivy cover which could hide PRFs. Mitigation measures are outlined (see Section 4.7.1) to ensure trees are checked again for any additional PRFs prior to felling. Temperatures during the surveys ranged from 8 – 11C, which is below the average recommended for undertaking bat surveys (guidance states 10C and above). However, this is not considered a limitation to the survey as bats were recorded during each survey indicating they were still active in the area during cooler spells of weather. Conditions were also dry and relatively calm during the surveys.

Site Evaluation Criteria

The ecological value of the habitats and species identified at the development site have been assessed following the criteria outlined in the 2009 NRA guidelines, and is consistent with *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2016).

Consultation

Inland Fisheries Ireland (IFI) and the Development Applications Unit (DAU) of the Department of Culture, Heritage and the Gaeltacht were consulted in order to ascertain potential key areas of concern resulting from the proposed development. A copy of the correspondence is contained within Appendix A.

During initial consultation, IFI outlined their concerns with regards a section of the proposed route of the foul sewer pipeline (approximately 320m) which would be located adjacent the Ballyowen Stream. Following these concerns, an alternative pipeline route is proposed, which was welcomed by IFI.

4.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

4.3.1 Designated Sites

The subject site is not designated under any Regional, National or European Environmental Designation. It does not therefore require assessment under the Wildlife (Amendment) Act 2000 (S.I No. 38 of 2000) or the European Communities (Natural Habitats) Regulations, 2011 (S.I No. 477 of 2011).

No Special Protection Areas (SPAs), RAMSAR sites or Natural Heritage Areas (NHAs) occur within 15km of the proposed development. Two Special Area of Conservation (SAC) sites occur within 15km of the proposed development and are shown in the following table:

Table 4.3 – Designated Sites within 15km of the Proposed Development

Site Name	Designation	Site Code	Distance
Slaney River Valley	SAC	000781	2.42 km W
Kilpatrick Sandhills	SAC	001742	10.86 km NE

There are also 8 proposed Natural Heritage Areas (pNHAs) within 15km of the proposed development. These pNHAs comprise of marshes, dunes and wooded areas, with Kilpatrick Sandhills also being designated as an SAC. These are listed in the following table:

Table 4.4 – Other Protected Sites within 15km of the Proposed Development

Site Name	Designation	Site Code	Distance
Arklow Rock-Askintinny	pNHA	001745	13.57 km NE
Kilpatrick Sandhills	pNHA	001742	10.86 km NE
Kilgorman River Marsh	pNHA	001834	8.59 km NE
Ballymoney Strand	pNHA	000745	6.51 km E
Courtown Dunes And Glen	pNHA	000757	5.39 km SE
Ardamine Wood	pNHA	001733	8.15 km SE
Donaghmore Sandhills	pNHA	001737	10.78 km S-SE
Cahore Point North Sandhills	pNHA	001736	13.04 km S-SE

The sites considered to be within the potential zone of influence of the development are the Slaney River Valley SAC (Site Code: 000781) and Kilpatrick Sandhills SAC (Site Code; 001742), located at their closest 2.42km and 10.86km from the proposed development site respectively.

While the Slaney River Valley SAC is not hydrologically connected to the proposed development, it has been included within the potential zone of influence given its proximity to the development site.

The existing drainage and proposed drainage (both stormwater and domestic wastewater following treatment) are / would discharge to the Irish Sea. However, the hydrological connectivity between the proposed development site and the Kilpatrick Sandhills SAC can be considered negligible, given the considerable hydrological distance to the SAC site (approximately 20km) and the considerable dilution of the site's drainage within the Owenavorragh River and Irish Sea. Nevertheless, this site has been included within the potential zone of influence of the proposed development with regards to water quality.

Slaney River Valley SAC (Site Code 000781)

The conservation objective of the Slaney River Valley SAC is: "*To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected".*

The Slaney River Valley SAC, measuring almost 6,020 hectares, is designated for seven Annex I habitats, including the priority habitat, and eight Annex II species as outlined in the tables below.

Table 4.5 – Slaney River Valley SAC – Annex I Habitats

Annex I Habitats	
Code	**Description**
1130	Estuaries
1140	Tidal Mudflats and Sandflats
1330	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
1410	Mediterranean salt meadows (*Juncetalia maritimi*)
3260	Floating River Vegetation
91A0	Old Oak Woodlands
91E0	Alluvial Forests*

** denotes a priority habitat*

Table 4.6 – Slaney River Valley SAC – Annex II Species

Annex II Species		
Code	**Common Name**	**Scientific Name**
1029	Freshwater Pearl Mussel	*Margaritifera margaritifera*
1095	Sea Lamprey	*Petromyzon marinus*
1096	Brook Lamprey	*Lampetra planeri*
1099	River Lamprey	*Lampetra fluviatilis*
1103	Twaite Shad	*Alosa fallax*
1106	Atlantic Salmon	*Salmo salar*
1355	Otter	*Lutra lutra*
1365	Common (Harbour) Seal	*Phoca vitulina*

The Slaney River Valley SAC comprises the freshwater stretches of the River Slaney as far as the Wicklow Mountains; a number of tributaries, the larger of which include the Bann, Boro, Glasha, Clody, Derry, Derreen, Douglas and Carrigower Rivers; the estuary at Ferrycarrig; and Wexford Harbour. The SAC flows through the Counties of Wicklow, Wexford and Carlow. Towns along the SAC but not within it include Baltinglass, Hacketstown, Tinahely, Tullow, Bunclody, Camolin, Enniscorthy and Wexford. The river is up to 100 m wide in places and is tidal at the southern end from Edermine Bridge below Enniscorthy. South of Kildavin the Slaney flows through an area of Ordovician slates and grits.

The SAC supports populations of several species listed on Annex II of the E.U. Habitats Directive, including Sea Lamprey, River Lamprey and Brook Lamprey, Otter, Salmon, small numbers of Freshwater Pearl Mussel, and Twaite Shad. The Slaney is primarily a spring salmon fishery and is regarded as one of the top rivers in Ireland for early spring fishing. The upper Slaney and tributary headwaters are very important for spawning. The SAC supports regionally significant numbers of Common Seal which occur year-round in Wexford Harbour where several sandbanks are used for breeding, moulting and resting activity.

The site is of high conservation value for populations of bird species that occur, including the internationally important populations of Mute Swan, Light-bellied Brent Goose, Bar-tailed Godwit and Black-tailed Godwit. The River Slaney supports typical riparian species, including Dipper and Kingfisher.

The SAC supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger, Irish Hare and Daubenton's Bat. Common Frog, another Red Data Book species, also occurs within the SAC.

The main site vulnerabilities, including any key pressures or trends within and around the Slaney River Valley SAC that have been identified as impacting upon the site, may be summarised as:

- Agricultural activities including cultivation, fertilisation, irrigation and the removal of hedgerows, copse or scrub;
- Forest and Plantation management and use;
- Pollution to surface waters;
- Invasive non-native species;
- Sand and gravel extraction;
- Transportation and service corridors, including paths, tracks, cycling paths, bridges and viaducts;
- Urbanisation, residential and commercial development discharges;
- Human induced changes to hydraulic conditions, including modifying structures of inland water courses and water abstraction;
- Natural erosion.

Kilpatrick Sandhills SAC (Site Code 001742)

The conservation objective of the Kilpatrick Sandhills SAC is: "*To maintain or restore the favourable conservation condition of the qualifying interests".*

The Kilpatrick Sandhills SAC, measuring almost 39.7 hectares, is designated for five Annex I habitats, as outlined in the tables below.

Table 4.7 – Kilpatrick Sandhills SAC – Annex I Habitats

Annex I Habitats	
Code	**Description**
1210	Annual Vegetation of Drift Lines
2110	Embryonic Shifting Dunes
2120	Marram Dunes (White Dunes)
2130	Fixed Dunes (Grey Dunes)*
2150	Decalcified Dune Heath*

* *denotes a priority habitat*

Situated on the north Co. Wexford coast, this site comprises a mature dune system which extends south from Kilmichael Point for a distance of about 2 km. There is a fine transition from a sandy beach through various types of dune types, including dune heath. Behind the dunes there is an area of freshwater marsh, a small area of wet woodland and some wet grassland. Part of this area floods at times. At Kilmichael Point there are low cliffs.

Despite its small size, this site is important as an example of a relatively intact sand dune system which shows the various development stages of dunes, with embryonic dunes, white dunes, grey fixed dunes and decalcified fixed dunes all represented. The presence of decalcified dune heath is of particular importance owing to its rarity in Ireland generally and particularly on the east coast. The dunes are mostly intact and of good quality.

The main site vulnerabilities, including any key pressures or trends within and around the Kilpatrick Sandhills SAC that have been identified as impacting upon the site, may be summarised as:

- Outdoor sports and leisure activities;
- Sea defence and coastal protection work;
- Disposal of household / recreational waste;
- Erosion;

- Species composition changes (succession);
- Problematic native species;
- Burning.

4.3.2 Biodiversity

Flora and Habitats

The proposed development is located on the outskirts of Gorey town, at an approximate elevation of 50-60m above sea level. The proposed site is bordered to the south and east by housing estates, to the northeast by Ramsfort Park (a coniferous forest) and to the west by agricultural land comprising of pasture and tillage.

The proposed development site comprises of an area of agricultural grassland and an area of unused / disturbed ground (the previous site of the Walsh Mushrooms facility), bordered by hedgerows and mature trees. A small, man-made drainage ditch is located along the north-eastern site boundary, which joins with an existing drainage pipe and leaves the site at the eastern corner. During the site walkover, eight main habitats were identified.

The area of grassland, encompassing the north and western section of the proposed site, was identified as improved agricultural grassland (GA1) habitat. This habitat, approximately 13 acres in size, is dominated by ryegrasses (*Lolium* spp.), with some Buttercup (*Ranunculus* spp.), Clover (*Trifolium* spp.), Daisy (*Bellis perennis*), Dandelion (*Taraxacum* spp.), Shepherd's-purse (*Capsella bursa-pastoris*) and Sticky Mouse-ear (*Cerastium glomeratum*) also present.

The area of unused / disturbed land contains rubble, scrap metal and other debris from the demolition of the Walsh Mushrooms facility. A number of earth and rubble banks exist at the site, which have been for the most part vegetated. The majority of the waste ground was identified as recolonising bare ground (ED3) habitat, with frequent ryegrasses, Meadow-grasses (*Poa* spp.), Bramble (*Rubus fruticosus*), Buttercup, Daisy, Groundsel (*Senecio vulgaris*), Nettle (*Urtica dioica*), Shepherd's-purse, Speedwell (*Veronica* spp.) and Thistle (*Cirsium* spp.) recorded. Other flora recorded include Cleavers (*Galium aparine*), Colt's Foot (*Tussilago farfara*), Dock (*Rumex* spp.), Great Willowherb (*Epilobium hirsutum*), Marsh Woundwort (*Stachys palustris*), Nipplewort (*Lapsana communis*), Perennial Sowthistle (*Sonchus arvensis*), Ragwort (*Senecio jacobaea*), Ribwort plantain (*Plantago lanceolata*), Rosebay Willowherb (*Chamerion angustifolium*), Scarlet Pimpernel (*Anagallis arvensis*), Scentless Mayweed (*Tripleurospermum inodorum*) and Short-fruited Willowherb (*Epilobium obscurum*).

Some sections of the unused / disturbed land have succumbed to scrub (WS1) habitat, mainly comprised of Willow (*Salix* spp.) with Birch (*Betula* sp.), Gorse (*Ulex europaeus*) and Hawthorn (*Crataegus monogyna*) also present.

Small sections of the waste ground were identified as buildings and artificial surfaces (BL3) habitat, consisting of concrete from the former Walsh Mushrooms buildings.

The development site is bordered to the north-west by hedgerows (WL1) habitat, dominated by Bramble, Ash (*Fraxinus excelsior*), Hawthorn, Ivy (*Hedera helix*) and Nettle. Other flora recorded at this habitat include Cherry (*Prunus* sp.), Elder (*Sambucus nigra*), Gorse, Herb-Robert (*Geranium robertianum*) and Holly (*Ilex aquifolium*). A small number of mature Lime trees (*Tilia* sp.) are quite evenly dispersed along the hedgerow, in addition to a couple of mature ash trees. A small section of Bracken (*Pteridium aquilinum*) is also present along this habitat.

Treelines (WL2) habitat was identified along the south-western boundary bordering the road and along the south-eastern boundary bordering the housing estate. Treelines (WL2) habitat is also present adjacent the north-eastern boundary, however this is outside the development site boundary. The south-western boundary is comprised of abundant Bramble, with frequently recorded Ash, Cleavers, Gorse, Hawthorn, Ivy, Oak (*Quercus* sp.) and Nettle. The south-eastern boundary is dominated by Leyland Cypress (*Cupressus leylandii*), with frequent Bramble and occasionally recorded Hawthorn and Ivy. The north-eastern boundary is mainly comprised of Oak, with some Bramble, Ferns, Hazel (*Corylus avellana*), Holly, Ivy and Willow also present.

The small drain at the north-eastern section of the site, was identified as drainage ditches (FW4) habitat. During the December site assessment only a portion of this drain contained water, while during the August site assessment, the entire drain was dry. Flora recorded include Bramble, Ferns, Ivy, Nettle and Thistle.

A small area of flower bed and borders (BC4) habitat was identified between GA1 and ED3 habitats. Flora comprised mainly of cultivated species, including Leyland Cypress, Privet (*Ligustrum* sp.), Pyracantha (*Pyracantha* sp.), Cabbage Palm (*Cordyline australis*), and Daisy Bush (*Senecio greyi*). Wild flora recorded includes Dandelion, Herb-Robert and Ragwort.

The eight habitats identified as per the Fossitt habitat classification scheme for the proposed development are summarised in Table 4.8, and are shown on a habitat map included as Figure 4.3. A photo log and full list of plants recorded are included in Appendix A.

Table 4.8 – Slaney River Valley SAC – Annex I Habitats Summary of Habitats Identified for the Proposed Development Works at the Proposed Site

Habitat Classification Hierarchy		
Level 1	**Level 2**	**Level 3**
F – Freshwater	**FW** – Watercourses	**FW4 –** Drainage ditches
G – Grassland and marsh	**GA** – Improved grassland	**GA1** – Improved agricultural grassland
W – Woodland and scrub	**WS** – Scrub / transitional woodland	**WS1** – Scrub
	WL – Linear woodland / scrub	**WL1** – Hedgerows
		WL2 – Treelines
E – Exposed rock and disturbed ground	**ED** – Disturbed ground	**ED3 –** Recolonising bare ground
B – Cultivated and built land	**BC** – Cultivated land	**BC4** – Flower beds and borders
	BL – Built land	**BL3** – Buildings and artificial surfaces

Figure 4.3 – Habitat Map of Encountered Habitats at the Proposed Development Site, Gorey

Generally, the habitats identified during the onsite assessment are modified and are of low ecological value. No rare species were noted as present within the proposed development site.

During the walkover of the proposed foul sewer pipeline route, two habitats were identified. The majority of the proposed route was identified as buildings and artificial surfaces (BL3) habitat, consisting of roadways, paths and concrete. An area of recolonising bare ground (ED3) habitat is present along the first 60m (approximately) of the pipeline from the development site. Flora frequently recorded includes various grasses, Bramble, Hedge Bindweed (*Calystegia sepium*), Nettle and young Willow. Other flora encountered includes Buttercup, Cleavers, Dock, Great Willowherb, Ivy, Ragwort, Ribwort Plantain, Rosebay Willowherb, Short-fruited Willowherb and Thistle.

The two habitats identified along the proposed pipeline route are generally modified and of low ecological value. No rare species were noted along the proposed route. The two habitats identified as per the Fossitt habitat classification scheme for the proposed pipeline route are summarised in Table 4.9, with photographs and a full list of recorded flora included within Appendix A.

Table 4.9 – Slaney River Valley SAC – Annex I Habitats Summary of Habitats Identified for the Proposed Foul Sewer Pipeline Route

Habitat Classification Hierarchy		
Level 1	**Level 2**	**Level 3**
E – Exposed rock and disturbed ground	**ED** – Disturbed ground	**ED3 –** Recolonising bare ground
B – Cultivated and built land	**BL** – Built land	**BL3** – Buildings and artificial surfaces

It should be noted that while no invasive plant species were recorded for the proposed development site or proposed pipeline route, Japanese Knotweed (*Fallopia japonica*) has been recorded in the lands immediately adjacent the south-east corner of the development site, under the ownership of Wexford County Council. The proposed foul sewer and stormwater pipelines would be in close proximity to the current range of the Japanese Knotweed.

Fauna (Excluding Bats)

A wide variety of fauna would be expected to be present in the area, especially given the proximity of Ramsfort Park, including bat species, Hedgehog (*Erinaceus europaeus*), Rabbit (*Oryctalagus cuniculus*), Irish Hare (*Lepus timidus hibernicus*), Fox (*Vulpes vulpes*), Badger (*Meles meles*), Pine Marten (*Martes martes*), Stoat (*Mustela erminea hibernica*), Red Squirrel (*Sciurus vulgaris*), Grey Squirrel (*Sciurus carolinensis*), Wood Mouse (*Apodemus sylvaticus*) and the Common Rat (*Rattus norvegicus*).

While no fauna were observed at the development site during the December and August assessments, burrows were noted along some areas of treeline and hedgerow habitats, identified as likely rabbit and rat burrows. No fauna or evidence of fauna was recorded during the walkover of the proposed pipeline route. There was no evidence of Badger, including setts or latrines, at the development site or along the proposed pipeline route.

The only freshwater habitat at the development site is the small drainage ditch, which, given its limited size and water volume, would be unlikely to support any frogs (*Rana temporaria*), smooth newts (*Lissotriton vulgaris*) or fish. Similarly, it is unlikely that Otter (*Lutra lutra*) would be present at the site given the absence of water habitats and given the lack of evidence of Otter, including holts, slides, tracks or spraints.

Bats

Desk Based Review

Records of bat roosts were obtained from BCI for the centre of the proposed development site to a distance of 10km. The full list of records in provided in Appendix A.

In summary 12 known roosts have been recorded within 10km of the proposed development site, the closest known roost is located approximately 2.6km south of the proposed development site close to Knockmullen (Gorey), this roost supported Daubenton's (*Myotis daubentoniid*), Common Pipistrelle (*Pipistrellus pipistrellus*) and Soprano Pipistrelle (*Pipistrellus pygmaeus*). A total of seven species have been recorded within 10km of the proposed development site including:

- Daubenton's;
- Common pipistrelle (Pip45);
- Soprano pipistrelle (Pip55);
- Myotis spp.;
- Leisler's (*Nyctalus leisleri*);
- Brown long-eared (*Plecotus auratus*); and
- Natterer's (*Myotis nattereri*).

Field Survey Results

The site was found to support suitable foraging and commuting habitat for bats particularly associated with treelines/hedgerows along the north/north west of the site and along the woodland edge to the east of the proposed development site (see Figure 4.1 above).

Assessment of Bat Roost Potential

The assessment of trees was based on external surveys undertaken visually from the ground. The buildings on site are open in nature/in disrepair and do not provide suitable roosting opportunities for bats. The majority of trees scheduled for removal (see drawing no. 1706_TS_P_02 prepared by Murray Associates) were considered to have low potential to support a bat roost (see Table 4.10 below). Although no significant potential roost features were observed in the trees for removal, a small number of mature trees within hedgerow 2 (see Figure 4.1 above) were assessed as having moderate potential to support a bat roost, given their size and due to the fact that some had dense ivy cover which could provide suitable roosting opportunities for individual bats or which could hide other suitable features (see Photograph 4.1. below)

Table 4.10 – Slaney River Valley SAC – Annex I Habitats Trees Scheduled for Removal – Bat Roost Potential Categories

Hedge No.	Tree No.	Type	PRF Categories
1	269	Ash (*Fraxinus excelsior*)	Low
	270	Ash (*Fraxinus excelsior*)	Low
	271	Oak (*Quercus sp*.)	Moderate
	272	Ash (*Fraxinus excelsior*)	Low
	273	Ash (*Fraxinus excelsior*)	Low
	274	Ash (*Fraxinus excelsior*)	Low
	275	Ash (*Fraxinus excelsior*)	Low
	282	Ash (*Fraxinus excelsior*)	Low
	283	Ash (*Fraxinus excelsior*)	Low
	284	Oak (*Quercus sp*.)	Low

Hedge No.	Tree No.	Type	PRF Categories
	285	Ash (*Fraxinus excelsior*)	Low
	286	Ash (*Fraxinus excelsior*)	Low
	287	Ash (*Fraxinus excelsior*)	Low
	289	Ash (*Fraxinus excelsior*)	Low
	290	Ash (*Fraxinus excelsior*)	Low
2	291	Ash (*Fraxinus excelsior*)	Low
	292	Lime (*Tilia cordata*)	Low
	293	Lime (*Tilia cordata*)	Moderate
	294	Lime (*Tilia cordata*)	Moderate
	295	Ash (*Fraxinus excelsior*)	Moderate
	296	Lime (*Tilia cordata*)	Moderate
	297	Dead tree	Moderate
	298	Lime (*Tilia cordata*)	Moderate

Photograph 4.1 – Mature ash tree with dense ivy cover on trunk and split limb (red circle)

Bat Roosts

Individual trees within hedgerow 2 assessed as having moderate potential to support a bat roost were the focus of the dusk emergence and dawn re-entry surveys with two surveyors observing the trees for emerging or returning bats. No bat were identified emerging from or returning to any of the trees during the surveys.

Bat Activity

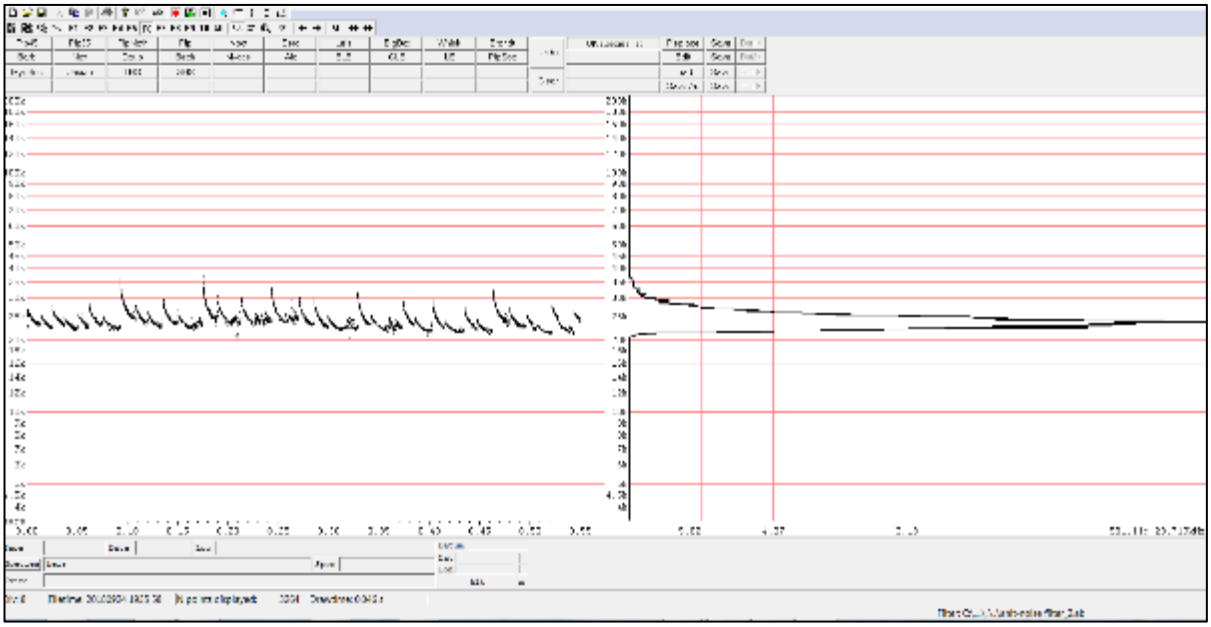
A total of three bat species were recorded using the site these include the following species:

- Common pipistrelle;
- Soprano pipistrelle;
- Leisler's

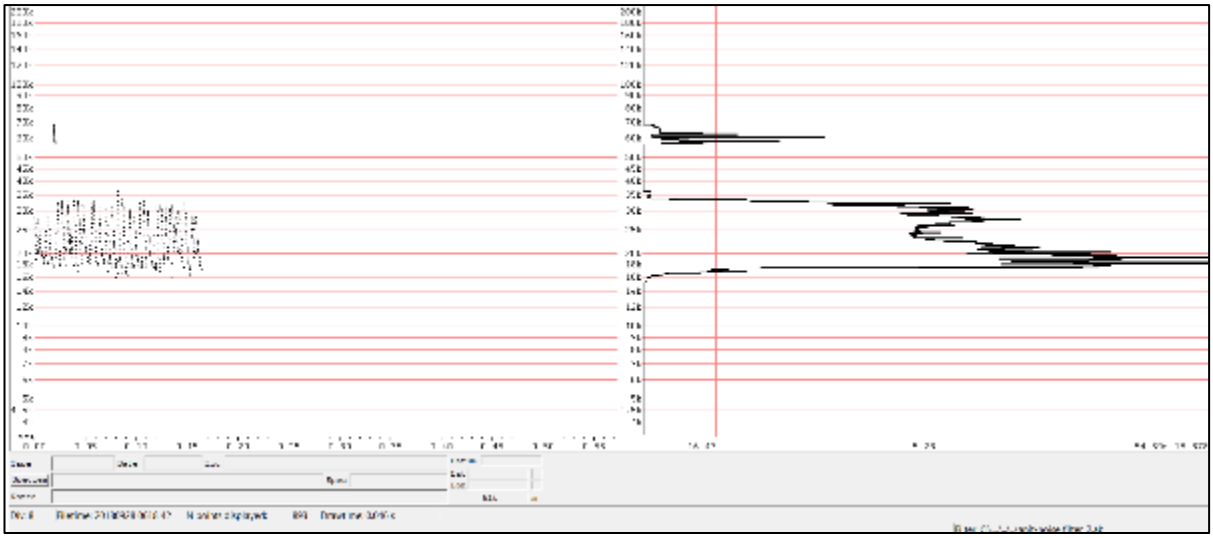
Soprano pipistrelle (Pip55) was the most commonly recorded species during the activity survey. Bat activity was relatively low throughout the surveys which is not uncommon for this time of year when bats are starting to move into hibernation.

During the survey of the 24th of September, the first bat pass was that of a Leislers picked up 15mins after sunset (see Graphic 4.1 below). This species is known for its early emergence and can often be recorded being active before sunset. This was the only record of this species for the survey. A number of common pipistrelle (Pip45) and Pip55 passes were recorded between 20.00 and 20.30, after which activity dropped off. Bat activity was highest at transect point (TP.2 and TP.3, See Figure 4.2) where two individual bats (Pip45 and Pip 55) were recorded foraging up and down the woodland edge, while a single pass of Pip45 was picked up at TP.4 at approximately 20.25. No further bat calls/activity were recorded for the remainder of the survey across the site.

During the dawn survey on the 28th of September, the first Pip55 call was not picked up until 06:16, almost one hour after the survey commenced – this bat was picked up at TP.8 along hedge 2. Pip55 activity was relatively constant between 06:25 and 06:40 when two individual bats were recorded foraging along hedgerow 2 and the woodland edge (TP.1 and TP.2, see Figure 4.2). A Pip55 social call (see Graphic 4.2 below) was picked up during the survey. Pipistrelle bats can social call at any time of year but this is more frequently recorded during the autumn mating season. The final Pip55 pass was recorded at 06:57 approximately 20mins before sunrise.



Graphic 4.1 – Leisler call (sonogram) recorded at 19:35 on the 24.10.18



Graphic 4.2 – Pip55 social calling (sonogram) recorded at 06:18 on the 28.10.18

The static detector recorded passes of all three species (Pip55, Pip45 and Leisler's) although a large number of passes was not recorded (see summary of bat passes in Table 4.11 below) the results still indicate that hedge 1 is also occasionally used by commuting and/or foraging bats. Common pipistrelle and Leisler's were the most frequently recorded species.

Table 4.11 – Summary of Bat Passes (Static Monitoring)

	Pip55	**Pip45**	**Leisler**
No. of passes	3	8	7

Avifauna

Given the agricultural and urban land uses of the surrounding area, it would be expected that common grassland, hedgerow and garden bird species would be present in the area. Bird species noted during the site walkovers on the 21st of December 2017, 14th of August 2018 and 28th of September 2018 included Robin (*Erithacus rubecula*), Blackbird (*Turdus merula*), Blue Tit (*Parus caeruleus*), Coal Tit (*Parus ater*), Great Tit (*Parus major*), Long-tailed Tit (***Aegithalus caudatus***), Chaffinch (*Fringilla coelebs*), Goldfinch (*Carduelis carduelis*), Siskin (*Carduelis spinus*), Wren (*Troglodytes troglodytes*), Woodpigeon (*Columba palumbus*), Hooded Crow (*Corvus cornix*), Magpie (*Pica pica*), Rook (*Corvus frugilegus*), Buzzard (*Buteo buteo*) and Sparrowhawk (*Accipiter nisus*). Table 4.12 details the protection and conservation concern statuses of the bird species noted during the site walkovers. None of the bird species are listed under Annex I of the E.U. Birds Directive. Two species, Robin and Sparrowhawk, are amber listed under the BoCCI classification.

Table 4.12 – Protection and Conservation Concern Statuses for Recorded Birds

Common Name	**Scientific Name**	**E.U. Birds Directive**	**BoCCI* Red List**	**BoCCI* Amber List**
Blackbird	*Turdus merula*	-	-	-
Blue Tit	*Parus caeruleus*	-	-	-
Buzzard	*Buteo buteo*	-	-	-
Chaffinch	*Fringilla coelebs*	-	-	-
Coal Tit	*Parus ater*	-	-	-
Goldfinch	*Carduelis carduelis*	-	-	-
Great Tit	*Parus major*	-	-	-
Hooded Crow	*Corvus cornix*	-	-	-
Long-tailed Tit	*Aegithalus caudatus*	-	-	-

Common Name	Scientific Name	E.U. Birds Directive	BoCCI* Red List	BoCCI* Amber List
Magpie	*Pica pica*	-	-	-
Robin	*Erithacus rubecula*	-	-	√
Rook	*Corvus frugilegus*	-	-	-
Siskin	*Carduelis spinus*	-	-	-
Sparrowhawk	*Accipiter nisus*	-	-	√
Woodpigeon	*Columba palumbus*	-	-	-
Wren	*Troglodytes troglodytes*	-	-	-

**The BoCCI (Birds of Conservation Concern in Ireland) List classifies bird species into one of three lists (Red, Amber or Green) based on their conservation status and conservation priority.*

No additional bird species were recorded along the proposed foul sewer pipeline route.

Records of Protected, Rare and Invasive Species

National Biodiversity Data Centre Records

Flora and fauna records for the previous ten years were reviewed on the National Biodiversity Data Centre website for the footprint of the development site and the immediate area. No protected flora species or invasive species listed under Part 1 of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 were recorded for the ten years previous.

A number of bird records returned were birds favouring wetland habitat. Given the lack of wetland habitat at the site and low conservation / modified habitats, it is unlikely that waterbirds would use the development site. The bird species of note which may be present include Peregrine Falcon (*Falco peregrinus*), Kestrel (*Falco tinnunculus*), Barn Owl (*Tyto alba*), Merlin (*Falco columbarius*), Swift (*Apus apus*), House Martin (*Delichon urbicum*), Sand Martin (*Riparia riparia*), Swallow (*Hirundo rustica*), Skylark (*Alauda arvensis*), Spotted Flycatcher (*Muscicapa striata*), Common Starling (*Sturnus vulgaris*), Yellowhammer (*Emberiza citrinella*), Common Linnet (*Carduelis cannabina*), House Sparrow (*Passer domesticus*), Tree Sparrow (*Passer montanus*) and pigeons (*Columba livia, C. oenas, C. palumbus*).

One mammal of note was recorded in the area for the ten years previous, the invasive Sika Deer (*Cervus nippon*).

National Parks and Wildlife Services Records

Records of protected, rare or threatened flora and fauna species within 10km of the proposed development obtained from the NPWS are included in Tables 4.13 and 4.14 below.

Table 4.13 – Records of Protected, Rare or Threatened Flora Species from the NPWS

Common Name	Scientific Name	Protection[1]	Conservation Status[2,3]
Alder Buckthorn	*Frangula Alnus*	None	Least Concern
Cladonia ciliata	*Cladonia ciliata*	None	Not Assessed
Cladonia ciliate var. tenuis	*Cladonia ciliate* var. *tenuis*	None	Not Assessed
Corncockle	*Agrostemma githago*	None	Not Assessed
Green-Winged Orchid	*Orchis morio*	None	Vulnerable

Common Name	Scientific Name	Protection[1]	Conservation Status[2,3]
Meadow Saxifrage	*Saxifraga granulate*	FPO	Regionally Extinct
Megapolitan Feather-moss	*Rhynchostegium megapolitanum*	None	Near Threatened
Moore's Horsetail	*Equisetum x moorei*	FPO	Near Threatened
Pale Dog-Violet	*Viola lactea*	FPO	Vulnerable
Reindeer Moss	*Cladonia portentosa*	None	Not Assessed
Rib-leaf Moss	*Tortula atrovirens*	FPO	Near Threatened
Sea Stock	*Matthiola sinuata*	None	Regionally Extinct
Small Cudweed	*Filago minima*	FPO	Near Threatened
Yellow Archangel	*Lamiastrum galeobdolon montanum*	None	Least Concern

Notes:

[1] HD II/IV = Habitats Directive Annexes II/IV; FPO = Flora Protection Order.

[2] Vascular flora from the Irish Red Data Book 1 Vascular Plants (Curtis and McGough, 1988; Wyse Jackson et al., 2016);

[3] IUCN Red list http://www.iucnredlist.org/ - accessed November 2018

Table 4.14 – Records of Protected, Rare or Threatened Fauna Species from the NPWS

Common Name	Scientific Name	Protection[1]	Conservation Status[2,3]
Badger	*Meles meles*	WA	Least Concern
Brook Lamprey	*Lampetra planeri*	HD II	Least Concern
Common Frog	*Rana temporaria*	WA	Least Concern
Freshwater Pearl Mussel	*Margaritifera margaritifera*	HD II/IV, WA	Critically Endangered
Hedgehog	*Erinaceus europaeus*	WA	Least Concern
Irish Hare	*Lepus timidus hibernicus*	WA	Least Concern
Irish Stoat	*Mustela erminea hibernica*	WA	Least Concern
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Pine Marten	*Martes martes*	WA	Least Concern
Pygmy Shrew	*Sorex minutus*	WA	Least Concern
River Lamprey	*Lampetra fluviatilis*	HD II	Least Concern
Sea Lamprey	*Petromyzon marinus*	HD II	Least Concern
Sika Deer	*Cervus Nippon*	WA	Not Assessed
Viviparous Lizard	*Lacerta vivipara / Zootoca vivipara*	WA	Least Concern

Notes:

[1] HD II/IV = Habitats Directive Annexes II/IV; WA = Wildlife Acts; BDI = Birds Directive Annex I.

[2] Terrestrial Mammal Red List (Marnell *et al.* 2009); Birds of Conservation Concern in Ireland 2014-2019 (Colhoun and Cummins, 2013); Red-listed Amphibians, Reptiles and Freshwater Fish (King *et al.* 2011); Red-listed Non-marine Molluscs (Byrne *et al.,* 2009).

[3] IUCN Red list http://www.iucnredlist.org/ - accessed November 2018

Water Quality

The proposed site is located in the Owenavorragh Sub-Catchment of the Owenavorragh Catchment area. There is one small area of drainage ditch at the site, in the north-eastern section of the site measuring approximately 280m. This joins with an existing 525mm diameter pipe, which connects with the Ballyowen Stream approximately 145m from the development site. The Ballyowen Stream flows to the River Banoge approximately 0.9km downstream. The River Banoge flows south for approximately 4.3km before converging with the Owenavorragh River, which enters the Irish Sea 5.5km downstream.

Neither the River Banoge or the Owenavorragh River are designated as salmonid waters under the European Commission (Quality of Salmonid Waters) Regulations, 1988 (S.I. 239 of 1988).

The IFI noted in their correspondence, included as Appendix A, that "*the Banoge and its tributaries are an important salmonid catchment and represent some of the best fisheries habitat of the entire Owenavorragh system. The Owenavorragh River catchment supports several species listed in Annex II of the Directive including Salmon, River Lamprey, Brook Lamprey, Sea Lamprey and Otter*."

The rivers Banoge and Owenavorragh have been assigned an "at risk" Water Framework Directive (WFD) Risk Score. The Environmental Protection Agency (EPA) undertake surface water monitoring along the River Banoge. The results for the nearest monitoring stations (as per Table 4.15) for the period 1995 – 2017 are summarised in Figure 4.4 below for indicative purposes. As can be seen in Figure 4.4, the River Banoge is mainly achieving a water quality status of between Q2-3 (poor) and Q3-4 (moderate) at the monitoring locations discussed in Table 4.15.

Table 4.15 – Monitoring Stations of the River Banoge within the Vicinity of the Proposed Development

Station No.	Station Location	Easting	Northing	Approx. Location Relative to Ballyowen Confluence
RS11B020050	Banoge - Br near Killynann	315374	162241	2.5km Upstream
RS11B020200	2 km S of Gorey (Knockduff)	315772	157931	2.2km Downstream
RS11B020300	Br u/s Owenavorragh R confl	315951	156315	4.1km Downstream

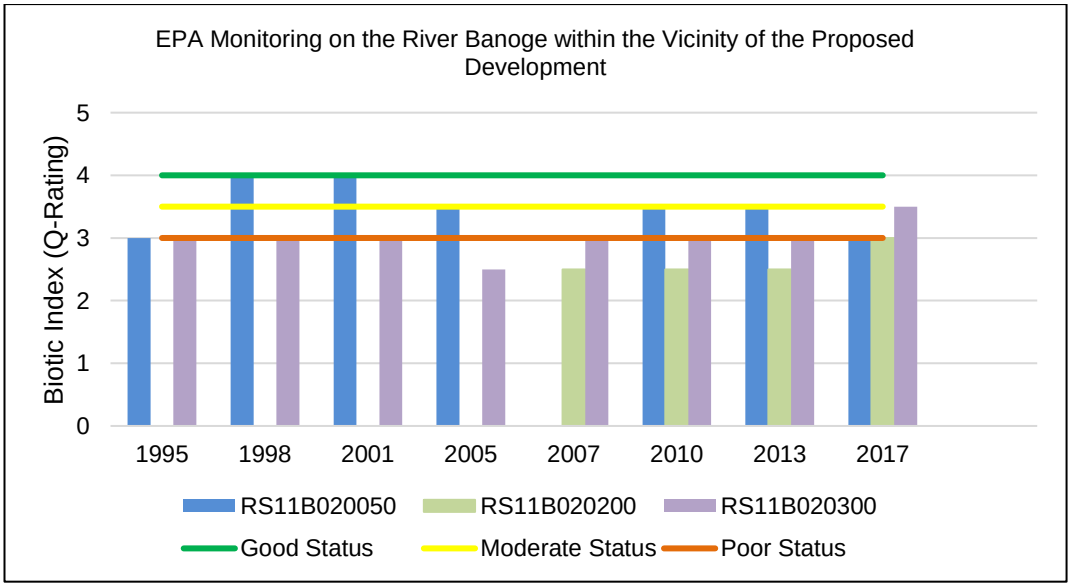


Figure 4.4 – EPA Ecological Monitoring on the River Banoge from 1995 – 2017

Domestic wastewater from the development would be directed to Gorey town's public sewer, for treatment at Courtown-Gorey Waste Water Treatment Plant (WWTP). The Courtown-Gorey WWTP, operated by Irish Water under licence D0046-01 from the EPA, was reported to be operating within its design capacity. The design capacity of Courtown-Gorey WWTP is 23,625 (M3/day) peak, 7,875 (M3/day) DWF, and 36,000 P.E. organic capacity. In the 2017 AER reporting period, the site reported a 18,058 (M3/day) hydraulic capacity and 17,538 P.E. organic capacity remaining. In 2017, Courtown-Gorey WWTP reported no non-compliances with regards the Emission Limit Values set in its wastewater discharge licence.

Further information regarding water quality is included in Chapter 6 of this EIAR.

4.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development would comprise of the construction of a residential estate, with a variety of housing and apartment types and designs, and a childcare facility at Creagh, Gorey, Co. Wexford. Details of the proposed development works are as follows:

Demolition and site clearance works of remaining infrastructure from the previous mushroom facility;

Construction of a total of 297 residential dwellings including:

4 five-bedroom houses;

77 four-bedroom houses;

125 three-bedroom houses;

26 two-bedroom houses;

36 two-bed apartments;

29 three-bed apartments.

Construction of dwellings would be either two or three storeys in height, depending on their location and number of bedrooms;

Construction of stormwater and foul sewer drainage systems;

Construction of a childcare facility, within the area zoned for Community and Education use;

Construction of all ancillary development works including internal road surfacing, boundary construction and provision of outdoor artificial lighting;

Construction of two site access roads;

Landscaping of public amenity areas.

The expected construction timeframe would be approximately five years, with hours of operation from 8am to 6pm, Monday to Saturday. A temporary site compound would be established near the entrance of the proposed site, housing the site offices, storage facilities and staff welfare facilities such as a canteen and toilets.

During the construction phase, site clearance works would be undertaken, which would involve the removal of existing rubble and other infrastructure from the site, earth-moving activities and some vegetation removal, including scrub and sections of boundary hedgerows / treelines. Following site clearance works, construction of the residential dwellings and childcare facility would commence.

To facilitate the proposed development, approximately 120m of treeline (comprised of Leylandii), along the south-eastern boundary would require removal, in addition to the felling of 15 trees (mainly comprised of Ash) along the south-west treeline to facilitate the new access road and new footpath. It would also be necessary to fell 8 mature trees and some immature Cherry trees along the north-western boundary to facilitate the gardens of the proposed houses.

A new stormwater drainage system would be constructed. Storm water, comprised of rainwater run-off from roofs and paved areas, would be collected via a system of gullies and stormwater drains and would pass through a Class I Bypass Separator and Attenuation System prior to connecting with the Ballyowen Stream.

It is proposed to modify the existing drainage channel along the north-eastern and south-eastern boundaries of the site to accommodate the development as proposed, while also maintaining the functionality of the drainage channel to convey surface water runoff from surrounding lands. It is proposed to pipe this drainage channel using a 525mm diameter perforated pipe, surrounded by Type B filter drain material. This pipe has been sized to ensure it has the adequate hydraulic capacity to convey the 1 in 100 year (1% AEP) and calculated additional climate change volumes. It is also proposed that the first 116m section of the channel be re-profiled and vegetated in order to form a swale-type channel.

A new domestic wastewater system would also be constructed. Domestic wastewater would be directed to Gorey town's public sewer, which would undergo treatment at Courtown-Gorey Waste Water Treatment Plant prior to discharge. This would involve the construction of an underground foul sewer pipeline, approximately 1.1km in length, from the proposed site to the public sewer line. The proposed pipeline route would follow the existing road network and would cross the Ballyowen Stream at the R772 roadway via directional drilling. Directional drilling would be 5-8m in length and is the only stream crossing of the proposed route. No instream works would be required as part of the proposed works.

Artificial outdoor lighting would be installed along the internal access network.

A landscaping plan has been prepared by Murray and Associates for the proposed development, which includes planting of both native and garden-variety species. While some mature tree removal works are required along the north-western and south-western boundaries, the remainder of vegetation along these boundaries would be retained. Areas of felled trees would be replanted with native hedgerow species such as Hawthorn.

4.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

Determination of Ecological Value

The ecological value of the habitat types and species identified at the proposed development site and the proposed foul sewer pipeline route have been assessed following the criteria outlined in the National Roads Authority (NRA) guidelines (2009). Table 4.16 below details the habitats recorded and their associated ecological value.

Table 4.16 – Ecological Value of Identified Habitats at the Proposed Development Site and Proposed Pipeline Route

Habitat Type	Habitat Rating	Key Ecological Receptor?
Proposed Development Site		
Improved Agricultural Grassland (GA1)	Local importance, lower value	No. Species poor habitat. Low ecological value.
Recolonising Bare Ground (ED3)	Local importance, lower value	No. Area of disturbed ground with recolonising vegetation. Low ecological value.
Buildings and Artificial Surfaces (BL3)	Local importance, lower value	No. Open areas of concrete with some vegetation. No suitable bat roosting areas. Low ecological value.
Scrub (WS1)	Local importance, higher value	Yes. Area of semi-natural habitat, comprising mainly of native species. May provide opportunities for bird nesting and foraging for bats.
Hedgerows (WL1)	Local importance, higher value	Yes. Area of semi-natural habitat, comprising mainly of native species. Provides connectivity to Ramsfort Park

Habitat Type	Habitat Rating	Key Ecological Receptor?
		forest. May provide opportunities for bird nesting and foraging for bats.
Treelines (WL2)	Local importance, higher value	Yes. Area of semi-natural habitat, comprising of native and non-native species. Provides connectivity to Ramsfort Park forest. May provide opportunities for bird nesting and foraging for bats.
Drainage Ditches (FW4)	Local importance, lower value	No. Small in extent with limited volume. Modified. Low ecological value.
Flower Beds and Borders (BC4)	Local importance, lower value	No. Small in area, comprising primarily of non-native species. Low ecological value.
Proposed Pipeline Route		
Recolonising Bare Ground (ED3)	Local importance, lower value	No. Area of disturbed ground with recolonising vegetation. Low ecological value.
Buildings and Artificial Surfaces (BL3)	Local importance, lower value	No. Low ecological value.

With regards the ecological value of bats at the site, bats are considered as Key Ecological Receptors (KERs). Although no bat roosts were identified during bat surveys, it has been established that the treelines/hedgerow to the north (hedgerow 2) and the woodland edge to the east provides a commuting and foraging corridor for common bat species. Although the hedgerow itself will be retained a number of the mature individual trees will be removed as part of the proposed development.

Badger, Otter and Pine Marten are not considered as key ecological receptors, as sightings or evidence of these species were not recorded within the vicinity of the proposed development site. Furthermore, given that the majority of the site is comprised of modified habitats of low ecological value, the site has limited potential to support these species.

Breeding birds are considered to be KERs, as all birds, their nests, eggs and young are protected in Ireland under the Wildlife Act 1976, as amended. The proposed development would result in a loss of scrub habitat and sections of hedgerow / treeline habitats, which may support breeding bird species. The nesting season in Ireland is from the 1st of March until the 31st of August inclusive.

Table 4.17 – Ecological Value of Species at the Proposed Development Site and Proposed Pipeline Route

Species	Species Rating	Key Ecological Receptor?
Badger	Local importance, higher value	No. Not recorded within the vicinity of the proposed site.
Otter	Local importance, higher value	No. Not recorded within the vicinity of the proposed site. Site has limited potential to support this species.
Pine Marten	Local importance, higher value	No. Not recorded within the vicinity of the proposed site. Site has limited potential to support this species.

Species	Species Rating	Key Ecological Receptor?
Bats (foraging and commuting habitat only – no bat roosts identified)	Local importance, higher value	Yes. The hedgerows / treelines are utilised by bats for both foraging and commuting.
Other Mammals	Local importance, low to high value	No. Limited sightings / evidence of other mammals. Site has limited potential to support other mammal species.
Breeding Birds	Local importance, higher value	Yes. All birds, their nests, eggs and young are protected under the Wildlife Act.
Aquatic Fauna	Local importance, low to high value	No. Site has limited potential to support aquatic fauna species, in the absence of any aquatic habitat of note.
Common Lizard	Local importance, higher value	Yes. Presumed present, but likely in low numbers. Protected under the Wildlife Act.

4.5.1 Construction Phase

Designated Sites

The proposed development and foul sewer pipeline route do not directly impinge on any part of a Natura 2000 site, and as such construction works would not be expected to impact upon a protected site through destruction or fragmentation of habitat, disturbance of habitat or direct reduction in species density during the construction phase.

The closest protected sites to the proposed development are the Slaney River Valley SAC (Site Code: 000781) and Kilpatrick Sandhills SAC (Site Code: 001742), located approximately 2.4km and 10.9km from the development site respectively.

The proposed development site and proposed foul sewer pipeline route do not contain the habitats or species for which these two sites have been designated. The proposed site and pipeline route are not coastal in nature, and are located a considerable distance (greater than 5km) from the coast. Any watercourses or aquatic features within the area are freshwater in origin. Therefore, the proposed development would not be considered to support any qualifying interests associated with coastal, saltwater or tidal conditions. No aquatic habitats of note are present at the development site itself. Therefore, there would be no direct impacts upon designated aquatic species, due to works being outside of any potential habitat for these species. No areas of woodland exist on the development site or along the proposed pipeline route, therefore the site and route do not contain any habitat which would have potential links to Old Oak Woodlands [91A0] or Alluvial Forests [91E0].

The potential disturbance to designated sites due to noise and dust during construction works would be considered unlikely, given the distance to the nearest designated sites (2.4km and 10.9km) and the transient nature of construction works.

It is not considered that there would be a significant risk to protected habitats and species during the construction phase of the proposed development as a result of invasive species from the site. While Japanese Knotweed was identified in the lands immediately adjacent the south-east corner of the development site, under the ownership of Wexford County Council, it is considered that the presence of this invasive species would not have an adverse impact upon either the Slaney River Valley SAC or Kilpatrick Sandhills SAC, given the distance to the designated sites (2.4km and 10.9km respectively).

Activities as part of the construction of the development would not have the potential to impact upon designated sites due to invasive species. There would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping where possible. Should topsoil may be required to be imported to the site for landscaping purposes, this

would be considered a low risk material, as vector materials containing invasive species are a “controlled waste” and would not be brought onto the site.

The development site is located within the Owenavorragh River Catchment, and thus is not hydrologically connected to the Slaney River Valley SAC. The proposed development may be considered to have a hydrological connection with the Kilpatrick Sandhills SAC, given that existing drainage ultimately drains to the Irish Sea (via the Rivers Banoge and Owenavorragh). However the Sandhills SAC is located approximately 9-10km from this SAC site. Therefore, the proposed development would not have an adversely affect the integrity of the site or upon the listed habitats of the Kilpatrick Sandhills SAC due to deleterious effects on water quality, owing to the nature of the development, the considerable hydrological distance to the SAC site (approximately 20km), the indirect nature of hydrological link (if any) and the considerable dilution of the site’s drainage within the Owenavorragh River and Irish Sea.

During the construction phase of projects, a deterioration in water quality can arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils). A potential deterioration in water quality could arise as part of the proposed development due to works on and within close proximity to an existing drainage ditch at the proposed development site.

It is not considered that the proposed foul sewer pipeline route would have the potential to impact upon water quality, given the that the majority of the route is not located within the vicinity of watercourses, and given that the one crossing of the Ballyowen Stream would be achieved by directional drilling.

The risk of the proposed development impacting upon water quality would be minimal, given that construction works would be confined to the proposed development footprint, there is only one water feature at the site, a drainage ditch of limited size and volume, and given that the proposed development would be located a considerable distance, approximately 20km, upstream of the Kilpatrick Sandhills SAC site.

Even in the unlikely event suspended solids become entrained in surface water run-off, there is considered to be no significant risk of impact on water quality as suspended solids would be retained on site as run-off percolates to the ground. With regards the proposed works on the drainage ditch, the potential impact due to suspended solids would be minimal, given the limited size and water volume of the drainage ditch.

The potential impacts upon water quality are further discussed in the “Water and Biodiversity” section below.

Flora and Habitats

The construction phase of the development would result in a direct and permanent loss of the existing habitats improved agricultural grassland, recolonising bare ground, buildings and artificial surfaces, flower beds and borders and a small section of drainage ditches at the site. These habitats can be described as modified and of low ecological value. Therefore, the loss of these habitats would not be considered significant.

The construction phase of the development would also result in a direct and permanent loss of some sections of habitats of local importance (higher value): scrub (WS1), hedgerows (WL1) and treelines (WL2).

As outlined in the *“Arboricultural Impact Assessment”* prepared by Murray and Associates, 15 mature trees would require removal along the south-western boundary and seven mature trees and one dead tree would require removal along the north-west boundary, as outlined in Table 4.10, in addition to a small section of immature Cherry trees requiring removal along the north-western boundary. A section of treeline comprised of Leylandii, measuring approximately 120m, would also require removal along the south-eastern boundary.

Given that the south-eastern boundary is comprised primarily of Leyland Cypress, a non-native species of limited benefit to wildlife, the removal of this treeline would not be considered significant. The removal of scrub and mature trees along the north-western and south-western boundaries can be considered a moderate impact upon the flora and habitats of the area. However, the landscaping plan prepared by Murray and Associates includes for the planting of 340 native trees within the open spaces of the proposed development and along the boundaries, which would off-set the moderate impact of tree removal upon flora and habitats. The proposed landscaping plan includes for the planting of approximately 134m of native hedgerow along the south-western boundary and approximately 307m of new native hedgerow along the north-eastern boundary with Ramsfort Park Forest.

No rare plant species or protected flora under the Flora (Protection) Order 2015, were recorded within the proposed development area. Therefore the proposed development would not be considered to impact upon any rare or protected flora species.

The proposed construction of the foul sewer pipeline would result in a temporary loss of buildings and artificial surfaces habitat and recolonising bare ground habitat, which are of low ecological value. Therefore, the temporary loss of these habitats would not be considered significant. The outfall for the new surface water drainage connection to the Ballyowen Stream would result in a minor loss of habitat. However, this would not be considered significant, given that the habitat along this section of the Ballyowen Stream is modified, comprising of a mix of amenity grassland and recolonising bare ground.

During construction works, there is potential for invasive species to be introduced to the site and along the proposed pipeline route through the movement of materials, such as soil and stone, and the arrival of construction plant and equipment from an area with invasive species. The potential for invasive species to be introduced to the proposed development site may also arise due to the presence of Japanese Knotweed, immediately adjacent the south-east corner of the proposed development site, in lands under ownership of Wexford County Council.

Under Regulation 49(2) of the European Communities (Birds and Natural Habitats) Regulations 2011, save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to any plant which is included in Part 1 of the Third Schedule shall be guilty of an offence.

Materials containing invasive species such as Japanese Knotweed are considered “controlled waste” and, as such, there are legal restrictions on their handling and disposal. Under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011, it is a legal requirement to obtain a license to move “vector materials” listed in the Third Schedule, Part 3.

During the construction phase, there would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping where possible, to reduce the volume of material imported to the site. Where materials, such as topsoil, may be required to be imported to the site, this would be considered a low risk material, as vector materials containing invasive species are a “controlled waste” and would not be brought onto the site.

The area of Japanese Knotweed located outside the development site boundary would be addressed by Wexford County Council. This would be undertaken by Wexford County Council as part of development works to landscape the area in conjunction with the proposed integrated landscape design with the south-east portion of the proposed development site. It is understood that these works would be undertaken prior to any proposed development works taking place within the immediate vicinity.

While the control and removal of Japanese Knotweed in the area would be undertaken by Wexford County Council, given the proximity of this invasive species to the proposed development, control and mitigation measures for the prevention of spread of invasive species would need to be undertaken as part of the proposed development, as outlined in Section 4.7.1. Such measures would include the regular site inspections, the inspection and washing of equipment and machinery prior to arriving at the site and the training of all relevant construction personnel in invasive flora species identification and control. In the event an invasive flora species, such as Japanese Knotweed, appears within the development site, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011.

Dust emissions may arise during construction activities, in particular during earth-moving works, which may have the potential to impact upon photosynthesis, respiration and transpiration processes of flora due to the blocking of leaf stomata. However, given the transient nature of construction works and standard working practices including dust control, the potential impact to flora would not be considered significant.

The potential impact upon flora due to a deterioration in water quality is discussed in detail below.

Fauna (Excluding Bats)

As noted above, the majority of habitats at the proposed development site would be lost due to site clearance. As the proposed development would take place primarily within habitats of low ecological value, the potential impact upon fauna due to habitat loss or habitat fragmentation would be reduced.

The loss of scrub habitat and sections of hedgerows and treelines habitat along the north-western and south-western boundaries, as discussed in the section above, would be considered as having a moderate impact upon fauna species. However, the landscaping plan prepared by Murray and Associates (discussed above) includes for the

planting of 340 native trees within the open spaces of the proposed development and along the boundaries, which would considerably reduce the impact of vegetation removal upon fauna.

Direct mortality of fauna may occur due to the removal of vegetation at the site, in addition to the use of heavy construction plant and machinery. Mortality of fauna is most likely to occur during the mammal and bird breeding season, when young are at their most vulnerable. As treeline / hedgerow removal would not take place during the bird nesting season (1st of March – 31st of August), the potential for mortality would be greatly reduced.

The proposed construction of the foul sewer pipeline would not be considered to impact upon fauna due to habitat loss, given that the route would be primarily located within man-made habitats (roadways and paths), with only a small section of the route passing through an area of recolonising bare ground habitat. Furthermore, any loss of recolonising bare ground habitat would be temporary, given that the pipeline would be located underground.

No protected fauna, or evidence of protected fauna, were noted as present on the proposed development site or along the proposed foul sewer pipeline route. There was no evidence of Badger, including setts or latrines, or evidence of Otter including holts, slides, tracks or spraints. As the majority of the site and proposed pipeline route are modified and of low ecological value, the potential for these areas to support protected fauna species is reduced. In the unlikely event a protected species is encountered during demolition, construction or vegetation removal works, an officer of the NPWS would be notified prior to the resumption of construction works.

No amphibians were recorded during the assessment of the proposed development site and proposed foul sewer pipeline route. The National Biodiversity Data Centre has records for the Common Frog for the proposed development and immediate area in 2003. The development site is unlikely to be of significance for amphibians, given that the only aquatic habitat at the site is a small drain, which limited in size and water volume, and was recorded as dry during the August 2018 site visit. Therefore, any works within the vicinity of the drain likely to cause disturbance would not be considered to significantly impact upon amphibians. However, in the unlikely event amphibians are present in the drain during construction works, works would cease until a NPWS Officer has been notified and their recommendations followed.

Construction work has the potential to disturb fauna due to the generation of construction noise. However, construction noise would not be considered to pose a significant risk to fauna owing to the transient nature of works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice. Where possible, no construction works would be conducted outside of normal working hours, therefore there would be no disturbance to nocturnal species. Furthermore, given the site's proximity to adjacent housing developments and Gorey town, it would be considered that fauna would be somewhat accustomed to an urban noise environment.

The potential impact upon fauna due to a deterioration in water quality is discussed below.

Bats

Construction of the proposed development has the potential to result in direct and indirect impacts on local populations of bats through habitat loss (vegetation clearance, tree felling) and disturbance (increased lighting) potentially affecting existing foraging areas and commuting routes.

Most Irish bat species, other than high-flying species such as Leisler's, tend to fly close to linear features (e.g. hedgerows) and close to tree canopies. An approximate length of 120m of Leylandii treeline and 23 No. trees are due to be cleared from the site, therefore the loss of such habitats during construction could lead to a loss of foraging resource for bats locally in the short-term. Artificial lighting can also alter bats foraging behaviour. For example, insects on which bats feed are known to be attracted to artificial lighting which can result in this prey resource being drawn away from darker areas in which bats like to forage. Some bat species such as pipistrelle spp. and Leisler are more tolerant of artificial lighting when foraging and will actively feed in areas where insects have congregated. However, bat species less tolerant of artificial lighting such as Daubentons are therefore put at a competitive disadvantage due to reduced foraging resource locally.

In terms of commuting habitat (e.g. hedgerow/tree lines that bats utilise to go between their roosts and foraging areas), it has been shown that artificial lighting can be particularly harmful if used along river corridors, near woodland edges and near hedgerows (BCT, 2018). A number of bat species will alter their commuting route to actively avoid artificially lit areas, even common species such as common pipistrelle have been shown to avoid gaps that are well lit which could create a barrier effect, essentially cutting off key commuting routes between roosting sites and good foraging sites.

In the absence of mitigation, impacts from loss of habitat and lighting impacts during construction is considered to be significant at the local geographic scale.

There would be no loss of any known bat roosts during the construction period. However, mitigation measures (see Section 4.7.1) have been proposed to ensure trees assessed as having moderate bat roost potential are re-assessed prior to felling (given the limitations to survey set out in Section 4.2.5).

Water Quality and Biodiversity

Construction works have the potential to impact upon flora and fauna due to a deterioration in water quality. Risks to water quality could arise via the existing drainage ditch onsite due to the potential release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils).

It is not considered that the construction of the foul pipeline route would have the potential to cause a deterioration in water quality, given that the majority of the route is not located within the vicinity of any watercourses, and given that the only crossing of the Ballyowen Stream would be achieved by directional drilling.

Suspended solids could become entrained in surface water run-off and could affect aquatic habitats through deposition. An increase in sediments has the potential to impact upon fish by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. An increase in suspended solids has the potential to reduce water clarity, which can impact the light penetration of water and may also affect certain behaviours of aquatic fauna such as foraging success. Aquatic flora and fauna could also be impacted upon by an increase in nutrients which are bound to suspended solids. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

In the event of uncured concrete entering a waterbody, the pH would be altered locally, potentially leading to the death of aquatic flora, fish and macroinvertebrates and alteration to the river substrate. There is also a potential for releases of hydrocarbons from the operation of heavy construction plant and associated equipment. Hydrocarbons can affect water quality, potentially resulting in toxic and / or de-oxygenating conditions for aquatic flora and fauna.

The potential for construction works at the proposed development site to impact upon flora and fauna due to a deterioration in water quality is minimal, given that the only waterbody / water feature at the site comprises of a small man-made drainage ditch, with limited volume and which has been noted to be dry on occasions, including the site assessment in August 2018. It is therefore unlikely that this drain would support any aquatic species of note due to its limited size and water volume.

In the event suspended solids become entrained in surface water run-off, there is considered to be no significant risk of impact on water quality as suspended solids would be retained on site as run-off percolates to the ground. Furthermore, as excavated soils would be used in site levelling and landscaping activities, disturbed soils would be exposed for a limited period of time only. The risk of water quality deterioration as a result of uncured concrete would be further reduced, given that precast concrete would be used where possible (including at the new surface water outfall) and surplus concrete would be returned to the batching plant.

Standard construction control methods for the protection of surface waters, such as silt barriers if required, and supervised concrete works, would be implemented during the construction phase of the development. These measures have also been included with the Construction Environmental Management Plan prepared for the project.

This is also a potential for works on the drainage ditch to impact upon flora and fauna due to the potential release of suspended solids. However, as noted above, the potential impact would be minimal, given the limited size and water volume of the drainage ditch. Where possible works would be timed around dry / no flow conditions. Alternatively, the drain would be temporarily dammed during works and the water pumped to silt control features prior to discharge to ground.

During works on the drainage channel, a CCTV survey would be undertaken to ensure that any potential misconnections from nearby dwellings would be identified and addressed.

The potential impacts of construction works at the proposed development on water quality and the recommended mitigation measures are discussed in detail in Chapter 6 of this EIAR.

4.5.2 Operational Phase

Designated Sites

As discussed in Section 4.6.2 above, the proposed development does not directly impinge on any part of a Natura 2000 site, nor does it contain any habitats or species for which the Natura 2000 designations have been made. Therefore, the use of the proposed site as a housing development and childcare facility would not impact upon a protected site due to the alteration in habitat type at the proposed site.

Given the nature of the housing and childcare facility development and distance to the nearest designated sites, there would be no anticipated adverse impacts on any Natura 2000 site due to disturbance, including noise and human activity.

The development site is located within the Owenavorragh River Catchment, and thus is not hydrologically connected to the Slaney River Valley SAC. The proposed development may be considered to have a negligible, indirect hydrological connection with the Kilpatrick Sandhills SAC, given that proposed stormwater drainage and proposed treated domestic wastewater from Courtown-Gorey WWTP would discharge to the Irish Sea, located approximately 9-10km from this SAC site.

The proposed development would not have an adverse affect the integrity of the site or upon the listed habitats of the Kilpatrick Sandhills SAC during the operational phase due to deleterious effects on water quality, owing to the nature of the development, the proposed drainage system, the considerable hydrological distance to the SAC site (approximately 20km), the indirect nature of hydrological link (if any) and the considerable dilution of the site's drainage within the Owenavorragh River and Irish Sea.

No significant impact on water quality would take place due to drainage from the site. Storm water from the proposed site would comprise of clean rainwater run-off from roofs and paved areas, and would be directed through a Class I Bypass Separator and Attenuation System prior to connecting with the Ballyowen Stream, approximately 20km upstream from Kilpatrick Sandhills SAC. It is proposed to discharge domestic wastewater to the town's foul sewer line, which would be treated at Courtown-Gorey WWTP prior to discharge to the Irish Sea, approximately 10km from the Kilpatrick Sandhills SAC site. The discharge of treated effluent from Courtown-Gorey WWTP would undergo considerable dilution within the Irish Sea. The proposed development would not have a significant impact upon the loading of the WWTP, as the WWTP has sufficient remaining capacity to accommodate domestic wastewater discharges from the proposed development. Furthermore, Courtown-Gorey WWTP is currently complying with the standards set under the Urban Wastewater Treatment Directive and within its EPA licence.

Flora and Habitats

The proposed development would result in a change of habitat use at the development site, with the proposed development resulting in buildings and artificial surfaces (BL3) habitat comprising of the new dwellings and internal roadways, and amenity grassland (improved) (GA2), scattered trees and parkland (WD5), ornamental / non-native shrub (WS3) and flower beds and borders (BC4) associated with the proposed site landscaping.

The loss of the existing habitats improved agricultural grassland, recolonising bare ground and a small section of drainage ditches at the site would not be considered significant, given that these habitats are modified and of low ecological value.

As noted in Section 4.6.2, while the proposed development would result in a loss of scrub (WS1) habitat, and would require the removal of 23 trees, the removal of a small section of immature Cherry trees along the north-west boundary and the removal of a 120m section of Leylandii treeline, it is considered that the proposed measures, including the planting of 340 native trees, outlined within the Landscaping Plan prepared by Murray and Associates would considerably reduce the potential impact upon flora and habitats.

Fauna (Excluding Bats)

The alteration in habitat type at the proposed development site would not be anticipated to have a significant impact upon fauna of the area, given that the majority of existing habitats are modified and of low ecological value. The loss of mature trees and hedgerow / treeline habitat may result in a displacement of fauna, however, this would not be considered to have a significant impact upon fauna given that replacement planting would be undertaken as part of the Landscaping Plan prepared by Murray and Associates. This plan includes for the replacement planting of approximately 134m of native hedgerow along the south-western boundary and the planting of new hedgerow,

approximately 307m in length along the north-eastern boundary. In total, it is proposed to plant 340 native trees within the open spaces of the site and along the boundaries.

It is not envisaged that fauna would be significantly impacted upon by the housing development and proposed childcare facility due to disturbance, including noise, traffic and human activity. Given the site's proximity to adjacent housing developments and Gorey town, it would be considered that fauna would be somewhat accustomed to the urban environment.

Bats

Operational phase impacts on bats would be associated with permanent lighting associated with the new housing development. As noted above (Section 4.6.2) lighting impacts on retained habitats could cause a barrier affect severing commuting routes between roosts and foraging areas. In the absence of mitigation impacts on foraging and commuting bats from lighting during operation are likely to result in a permanent impact on bats at the local geographic scale.

Water Quality and Biodiversity

It is not anticipated that there would be any significant impacts upon biodiversity during the operational phase of the development arising from the proposed drainage networks.

Storm water from the proposed site would comprise of clean rainwater run-off from roofs and paved areas, and would be directed through a Class I Bypass Separator and Attenuation System prior to connecting with the Ballyowen Stream.

Domestic wastewater would be directed to Gorey town's public sewer, with treatment occurring at Courtown-Gorey WWTP. The WWTP would provide secondary treatment of foul water, with phosphorous removal, prior to discharge to the Irish Sea. The proposed development would not have a significant impact upon the loading of the WWTP, as the WWTP has sufficient remaining capacity to accommodate domestic wastewater discharges from the proposed development. Furthermore, Courtown-Gorey WWTP is currently complying with the standards set under the Urban Wastewater Treatment Directive and within its EPA licence.

The potential impacts of the proposed development upon water quality are discussed in detail in Chapter 6 of this EIAR.

4.5.3 Potential Cumulative Impacts

Considering the nature of the proposed development and the adjacent residential developments, it is considered that the main potential cumulative impact would be a deterioration in water quality, resulting in an impact upon aquatic flora and fauna species.

However, given that the proposed development is not anticipated to result in a significant impact upon water quality during either the construction or operational phases, and considering the nature of the development and adjacent residential developments, it is considered that there would be no cumulative water quality impacts which would pose a significant risk to aquatic biodiversity.

It is considered that the treatment and removal of Japanese Knotweed from lands adjacent the proposed development site undertaken by Wexford County Council as part of landscaping works, in conjunction with the proposed integrated landscape design of the proposed development site, would be a positive impact upon the biodiversity of the area.

4.5.4 'Do Nothing' Impact

The proposed development site is mainly comprised of habitats which are highly modified and of low ecological value. Should the development not proceed, the improved grassland area would continue to be used for pasture, while it is probable that the disturbed ground area of the site would eventually succumb to scrub habitat. Given the site's proximity to Gorey town and adjacent housing developments, in addition to the presence of artificial surfaces, it is unlikely that the proposed site would be of significant ecological value in the future.

4.5.5 Potential Impacts Pre-Mitigation

Table 4.18 below provides a summary of the potential impacts of the proposed development pre-mitigation, during the construction and operational phases.

Table 4.18 – Summary of Predicted Impacts Pre-Mitigation

Impact	Development Phase	Direct / Indirect	Likelihood	Duration	Reversible	Significance	Impact Type
Habitat Loss	Construction & Operational	Direct	Certain	Permanent	No	Slight to Moderate significance	Negative
Introduction of Invasive Flora Species	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
Fauna Disturbance	Construction	Indirect	Likely	Temporary	Yes	Slight significance	Negative
	Operational	Indirect	Likely	Permanent	Yes	Not significant	Neutral
Fauna Mortality	Construction	Direct	Dependent upon timing of works relevant to breeding season	Permanent	No	Moderate significance	Negative
Bats – Disturbance / Severance of Habitat	Construction	Direct & Indirect	Certain	Temporary	Yes	Adverse significance	Negative
	Operational	Indirect	Certain	Permanent	Yes	Adverse significance	Negative
Surface Water Quality Deterioration	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
	Operational	Direct	Unlikely	Permanent	Yes	Not significant	Neutral

Impact	Development Phase	Direct / Indirect	Likelihood	Duration	Reversible	Significance	Impact Type
Designated Sites	Construction & Operational	None	N/A	N/A	N/A	N/A	Neutral

4.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

4.6.1 Construction Phase

The mitigation measures outlined below would be implemented to ensure there is no significant impact upon the biodiversity of the area and designated sites during the construction phase of the development. These measures have also been incorporated into the Construction Environmental Management Plan, which has been prepared for the project.

General Mitigation Measures

All construction works would be confined to the development footprint;

All plant machinery and equipment would be maintained in good working order and regularly inspected;

Where possible, no construction works would be conducted outside of normal working hours (8am to 6pm).

Flora and Habitats

Planting of 340 native trees would be undertaken within the open spaces of the site and along the boundaries;

Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place;

The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to the development site. All construction plant would pass through a wheel-wash system prior to entering or leaving the development site;

All relevant construction personnel would be trained in invasive flora species identification (main species of concern, including Japanese Knotweed) and control measures;

In the event any soils excavated as part of the proposed development, in particular in the south-eastern portion of the site, require removal off-site, they must first be confirmed to be free of Japanese Knotweed;

In the event of any invasive species listed in Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011;

Cognisance would be taken of National Roads Authority's Guidelines on "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*".

Fauna (Excluding Bats)

As a minimum, the construction work contractor would comply with all legislative provisions relating to hedgerow / tree removal and the protection of birds, and would have regard to reducing impacts on nesting birds;

In the unlikely event a protected fauna species such as badger or the common frog is found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of construction works.

Bats

Habitat loss

To mitigate the loss of foraging and commuting habitat significant tree and hedgerow planting has been proposed as part of the final scheme design including the following:

340no. new trees will be planted within the open spaces and along the boundaries.

134 metres (431 sq.m.) of new and replacement native hedgerow will be provided within the new development along the boundary with Fort Road, and approximately 307 metres of new native hedgerow to the boundary with Ramsfort Park Forest.

Lighting Impacts

All areas of hedgerows and treelines not previously identified for removal will be protected from site operations. The majority of existing hedgerow to the north and woodland to the east will be retained. The lighting design principles will be avoidance of lighting within particularly sensitive areas. Measures to mitigate the impact of lighting disturbance on bats during the construction period will include:

Avoid lighting of retained habitats i.e. boundary treelines/hedgerows, mature trees and the woodland edge. This will ensure that important foraging and commuting corridors are maintained;

Lighting if required shall be of a low height (as low as possible without compromising safe working standards) to ensure minimal light spill and, where practicable, timers or motion sensors shall be used to ensure areas are retained in darkness as much as possible. Lighting shall be directed to where it is required only and this can be achieved by fitting louvres to the lighting; and

White Light Emitting Diode (LED) will be used as this is considered to be relatively low impact in comparison to other lighting types, as it is less attractive to insects, has a sharp cut-off and is of lower intensity.

Construction works in the hours of darkness when bats are active (April – October) will be kept to a minimum.

Loss of potential roosts

Given that the initial daytime assessments of the trees for bat roost potential was undertaken when the trees were in full leaf (potentially obstructing a view of the entire tree trunk/branches which could support potential roost features) and given that a number of the mature trees were covered in dense ivy, which could also obscure potential roost features, it is recommended that all trees classed as having moderate potential (7 No. trees) to support a bat roost are either:

- re-assessed by a suitably qualified ecologist prior to felling;
- soft-felled under supervision of a suitably qualified ecologist.

It is recommended that the ivy on these trees is cut and killed off at the earliest convenience and well in advance of any feeling/re-assessment, to enable all or any potentially features to be fully observed. If the ecologist identifies further potential suitable features they will advise on whether further survey is required prior to felling.

Water Quality and Biodiversity

- Regular visual inspections of the Ballyowen Stream would be undertaken during construction works;
- Silt control features would be employed where appropriate, such as silt fencing adjacent the existing drainage ditch;
- Regular inspection and maintenance would be undertaken of any silt control features;
- Where spoil is generated, this would only be stored temporarily and away from the existing drainage ditch onsite. Where possible, spoil would be covered or alternatively, graded to avoid ponding or water saturation;
- If necessary, silt fencing would be placed around spoil areas;

- Where possible, surface water run-off would be diverted from areas of bare / exposed ground;
- In the event that pumping would be required during excavation works, the pumped water would be directed to silt control features, such as settlement ponds or silt traps, prior to discharge;
- The proposed works to the existing drainage ditch would be preferably undertaken when the drain is dry. If it is not possible to undertake works when the drain is dry, the drain would be temporarily dammed and the water pumped to silt control features, such as settlement ponds of silt traps, prior to being discharged to ground. Daily inspections of the Ballyowen Stream would be undertaken during drainage ditch works;
- During works on the drainage channel, a CCTV survey would be undertaken to ensure that any potential misconnections from nearby dwellings would be identified and addressed;
- The associated run-off from any wheel-wash facilities would be collected via a constructed settlement pond;
- Pre-cast concrete would be used where possible;
- The delivery and pouring of concrete would be supervised at all times;
- Concrete would be poured directly into the shuttered formwork from the Ready Mix Truck, reducing the risk of spillage;
- The wash-out of Ready Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;
- The disposal of excess uncured concrete would be removed from site by an authorised waste contractor;
- A temporary compound would be established by the construction work contractor for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;
- Should bagged cement be stored on site during construction work, it would be stored within the temporary site compound, in a dry and secure area;
- The re-fuelling of machinery would take place within a bunded area. Re-fuelling would not take place within the immediate vicinity of the existing drainage ditch;
- Any fuels or oils would be stored in designated bunded areas, with adequate bund provision to contain 110% of the largest drum volume;
- Fuels / oils would be handled and stored with care to avoid spillage or leakage;
- Where appropriate, small plant equipment would be placed on drip trays;
- Any waste fuel / oils would be collected in bunded containers at designated areas (i.e. temporary construction compound) and properly disposed of to an authorised waste contractor;
- Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be available onsite;
- In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material would be properly disposed of to an authorised waste contractor;
- Cognisance would be taken of Inland Fisheries Ireland's "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- In the event of a suspected deterioration in water quality, works would immediately cease, an investigation into the cause undertaken and the relevant NPWS and IFI personnel informed.

4.6.2 Operational Phase

The following mitigation measures would be implemented to ensure there would be no significant impact upon the biodiversity of the area and designated sites during the operational phase of the development:

- Native flora species would be incorporated in the landscaping plan as much as possible;

Bats

Similarly to construction phase mitigation procedures the lighting design principles will be avoidance of light spill into sensitive areas. Avoid lighting of all retained treelines/hedgerow as these have been confirmed as important foraging and commuting corridors within the site, in particular hedgerow 2 to the north and the woodland edge to the east of the site. Private gardens along these boundaries are likely to provide a sufficient buffer to retained habitats, with only low levels of lighting emitted from the houses. For lighting of public open spaces, lighting shall be directed to where it is required only, and lighting set as low as possible (e.g. bollards along pathways) to the ground to avoid any unnecessary light spill.

4.6.3 'Worst Case' Scenario

If the proposed development proceeded without the mitigation measures outlined in Section 4.7.1 and 4.7.2, there would be a potential adverse impact upon bat species due to the removal of commuting and foraging habitat, in addition to lighting impacts during the construction phase. There would also be a potential moderate impact upon fauna, should vegetation clearance be undertaken during the mammal and bird breeding season. However, this is unlikely to occur, given that there are legal restrictions under the Wildlife Act 1976 as amended, with regards the removal of vegetation from uncultivated land.

In the absence of mitigation measures during the construction phase, there would be a potential risk of a deterioration of water quality of the small drainage ditch and associated surface water system due to earth-moving activities and the operation of construction plant. However, the impact would be considered slight, given the absence of any significant drainage feature or watercourse in the area and standard work practices employed by the construction works contractor.

During construction works, there would be potential to inadvertently introduce invasive species to the area. However, even in the absence of mitigation measures, this would be considered unlikely given that there would be no significant import of materials to the site and given that delivery of materials would be inspected prior to removal from the site of origin. Where invasive species are confirmed, the loads would be required to be adequately treated or disposed of appropriately and therefore, would not be transported to the proposed development site. While Japanese Knotweed has been recorded outside the site boundary, the control and removal of this invasive species would be undertaken by Wexford County Council.

4.6.4 Predicted Impacts with Mitigation

The following table provides a summary of the residual effects the proposed development may have, once recommended mitigation measures are implemented. It is not envisaged that there would be any considerable adverse impacts upon biodiversity due to the proposed development.

Table 4.19 – Summary of Residual Impacts Post-Mitigation

Impact	Development Phase	Significance	Mitigation Measures	Residual Significance	Residual Impact Type
Habitat Loss	Construction & Operational	Slight to Moderate significance	Planting of 340 native trees would be undertaken within the open spaces of the site and along the boundaries Works on hedgerows and treelines would not take place during the bird nesting season (1st of March – 31st August inclusive)	Not significant	Neutral
Introduction of Invasive Flora Species	Construction	Slight significance	Construction plant would be inspected and washed prior to arriving onsite Regular site inspections for the presence of invasive species would be undertaken Should invasive species appear onsite, works would immediately cease until the plant was appropriately treated and disposed of	Not significant	Neutral
Fauna Disturbance	Construction	Slight significance	Where possible, no construction works would be conducted outside of normal working hours All plant machinery and equipment would be maintained in good working order and regularly inspected	Slight significance	Minor Negative
	Operational	Not significant	None required	Not significant	Neutral
Fauna Mortality	Construction	Moderate significance	No works on hedgerow and treeline habitats would take place during the bird nesting season (1st March to 31st August), coinciding with the breeding season of many fauna	Slight significance	Minor Negative
Bats – Disturbance /	Construction	Adverse Significance	340 native trees would be planted within open spaces and along boundaries	Not significant	Neutral

Impact	Development Phase	Significance	Mitigation Measures	Residual Significance	Residual Impact Type
Severance of Habitat			New and replacement hedgerows would be planted along the south-west and north-east boundaries Measures would be implemented to reduce the potential for light pollution Construction works in the hours of darkness would be kept to a minimum Trees classed as having moderate potential to support a bat roost would be re-assessed by a qualified ecologist prior to felling or soft-felled under supervision of a qualified ecologist		
	Operational	Adverse Significance	Lighting design measures would be implemented to reduce the potential for light pollution	Not significant	Neutral
Surface Water Quality Deterioration	Construction	Slight significance	Standard construction control measures for the protection of surface waters would be implemented Concrete works would be supervised Appropriate storage and handling of fuels and oils Provision of spill kits	Not significant	Neutral
	Operational	Not significant	None required	Not significant	Neutral
Designated Sites	Construction & Operational	N/A	None required	N/A	Neutral

4.7 MONITORING

4.7.1 Construction Phase

There are no anticipated significant impacts associated with the construction phase of the proposed development, following the implementation of the recommended mitigation measures outlined in Section 4.7.1, which are considered sufficient in reducing the potential for adverse impacts. As noted in Section 4.7.1, monitoring by a qualified ecologist would be required for the scheduled removal of mature trees which were classed as having a moderate potential to support a bat roost. Monitoring would involve either the re-assessment of trees for bat roost potential prior to felling or the supervision of soft-felling.

4.7.2 Operational Phase

There are no anticipated significant impacts associated with the operation of the proposed development. Mitigation measures, where recommended in Section 4.7.2, are considered sufficient in reducing the potential for adverse impacts. Therefore, monitoring is not required as part of the development during the operational phase.

4.8 DIFFICULTIES ENCOUNTERED IN COMPILING

Survey limitations are discussed in detail in Section 4.2.5. No other difficulties were encountered in compiling this chapter.

5.0 LAND AND SOILS

5.1 INTRODUCTION

This chapter of the EIAR describes the land and soils in the existing environment beneath the proposed development site and surrounding area. The objective of this chapter is to determine the likely significant impacts on the land and soils arising from the proposed development and to propose measures to mitigate these impacts, if required. A detailed description of the proposed development is outlined in Chapter 2 of this EIAR.

5.2 STUDY METHODOLOGY

The works undertaken to complete the assessment for this land and soil chapter comprised the following:

- Desk study review of information for the proposed development including details on the construction and operational phases.

- Desk study to identify, collate and review the existing soil and geology information for the site and with a 2 km radius of the surrounding area including a review of the following:

  - *Site Investigation for a Proposed Development at Ballyowen, Ramsfortpark, Gorey – Interpretative Report'*. Site Investigations Ltd., December 2007. Contract No. 4681.

  - D. Tietzsch-Tyler & A.G. Sleeman, 1995. *Bedrock Geology 1:100,000 Scale Map Series, Sheet 19, Carlow - Wexford*. Geological Survey of Ireland.

  - Geological Survey of Ireland's online map viewers www.gsi.ie

  - Environmental Protection Agency's online map viewer https://gis.epa.ie/EPAMaps/

  - Ordnance Survey of Ireland's online map viewer. www.osi.ie/publicviewer/

- Site visit to walkover the site and surrounding area on 8/1/18;

- Interpretation of all data, assessment and preparation of this report.

This chapter was prepared in accordance with the following national guidance documents on environmental impact assessment:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports draft (Environmental Protection Agency, August 2017);

- Advice Notes for Preparing Environmental Impact Statements (Environmental Protection Agency, 2015);

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

The IGI's and EPA's recommended methodology for assessing impacts was used. Each potential impact was described in terms of its Type, Quality, Significance and Duration.

5.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

This section describes the existing baseline environment in terms of the land and soils underlying the proposed development site and the surrounding area. Based on this information, the potential impacts of the proposed development are identified, as are the measures required to mitigate any identified negative impacts on the soils and geology environment.

5.3.1 Regional Soils/Subsoils

Soil is the top layer of the earth's crust. The formation of soil is dependent upon geology, climate, vegetation, altitude, landform shape and finally management over time. Soil landscapes found in Ireland are a consequence of the changing climatic conditions over the last 100,000 years (with periods of glaciation, the last of which was c.12,000 years ago) and the management of land by farmers.

Soils can be subdivided into topsoil and subsoil. Topsoil is the active layers at ground level where living organisms occur. In soil science this is referred to as the 'A' and 'B' horizons. Subsoil is the loose uncemented (unlithified) sediments present between the soil 'B' horizon and bedrock. In soils science this is termed the 'C' horizon.

GSI online mapping indicates that the soils underlying the majority of the site are classed as 'Made Ground' (see Figure 5.1). The term 'made ground' covers all deposits that have accumulated through human activity and may consist of natural materials (e.g. clay) or man-made materials (e.g. hardstanding, refuse etc). The north-eastern area of the site (and the majority of the surrounding area) is underlain by 'Deep well drained mineral topsoil derived from mainly acidic parent material' (AminDW) belonging to the Acid Brown Earths, Brown Podzolics Soils Group.

The two main deposits of Quaternary subsoil in Ireland are glacial till, deposited at the base of the ice sheets and sand and gravel deposits associated with the melting of the ice sheets, which are generally called glaciofluvial outwash sands and gravels.

The subsoils beneath the majority of the site are mapped as '*Made Ground'*. The subsoils in the north-eastern area of the site (and the majority of the surrounding area) are mapped as 'Till derived from Lower Palaeozoic Shales' (TLPS) (see Figure 5.2). The GSI groundwater recharge map indicates that the till is expected to be of Moderate (M) permeability. There are some areas of '*Bedrock outcrop/subcrop'* (Rck) mapped in the surrounding area mainly associated with small hilltops (e.g. the hills at Creagh Upper and Lower and Gorey Hill). The nearest area of mapped outcrop/subcrop is c. 160 m to the south/southeast of the site.

5.3.2 Site Specific Information on Soils/Subsoils

Site specific information on subsoils was available from investigations undertaken at the site in 2007 (Site Investigations Ltd., 2007). The investigations comprised 9 No. trial holes and 10 No. cable percussion boreholes (see report in Appendix 5.1). In general, the subsoils encountered comprised MADE GROUND underlain by stiff brown sandy gravelly CLAY with some cobbles.

A summary of the subsoils encountered in each trial hole and borehole is provided in Tables 5.1 and 5.2 below.

The material and subsoils encountered during the site investigation are in line with the classification of 'Made Ground' and 'Till' as indicated on the GSI's on line map viewer. The 'Made Ground' comprised 'concrete over hardcore' in places and 'sandy gravelly clay with cobbles and various inclusions of wood, bricks and concrete blocks' in other places. The CLAY subsoils encountered indicates generally low permeability subsoils rather than moderate permeability subsoils as indicated on the GSI's recharge map.

Table 5.1 – Summary of Trial Hole Information

Trial Hole Ref.	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9
Date Excavated	31/07/2007	31/07/2007	31/07/2007	31/07/2007	31/07/2007	31/07/2007	31/07/2007	31/07/2007	31/07/2007
Total Depth (mbgl)	3.60	3.00	3.30	2.90	3.00	2.95	2.50	2.90	2.90
Trial Hole Summary Details	**0 – 0.6 m** MADE GROUND **0.6 – 1.0 m** Sandy gravelly CLAY **1.0 – 1.8 m** Gravelly SAND **1.8 – 3.6 m** Sandy gravely CLAY	**0 - 0.2 m** Topsoil **0.2 – 3.0 m** Sandy gravelly CLAY	**0 –0.5 m** MADE GROUND **0.5 – 3.3 m** Gravelly CLAY	**0 – 0.4 m** MADE GROUND **0.4 – 2.9 m** Sandy gravelly CLAY	**0 – 0.4 m** MADE GROUND **0.4 – 1.7 m** Sandy gravelly CLAY (mottled) **1.7 – 2.5 m** CLAY (mottled) **2.5 – 3.0 m** Sandy GRAVEL	**0 – 0.4 m** MADE GROUND **0.4 – 2.95 m** Sandy gravelly CLAY	**0 – 0.15 m** MADE GROUND **0.15 – 1.4 m** Sandy gravelly CLAY **1.4 – 2.5 m** Very sandy very gravelly CLAY	**0 – 0.2 m** MADE GROUND **0.2 – 0.8 m** Clayey sandy GRAVEL **0.8 – 2.9 m** Sandy gravelly CLAY	**0 – 0.6 m** Topsoil **0.6 – 1.0 m** Sandy gravelly CLAY **1.0 – 1.5 m** Clayey Sandy GRAVEL **1.5 – 2.9 m** Sandy gravelly CLAY
Depth Water Seepage/Ingress (mbgl)	1.6 - 1.8	DRY	DRY	DRY	DRY	DRY	2.3	DRY	DRY
Water Level (mbgl)	1.6	DRY	DRY	DRY	DRY	DRY	-	DRY	DRY

Table 5.2 – Summary of Borehole Information

Borehole Ref.	BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH10
Date Drilled	19/07/2017	25/07/2017	24/07/2017	19/07/2017	20/07/2017	22/07/2017	23/07/2017	23/07/2017	26/7/2017	31/07/2017
Drilled Diameter	200	200	200	200	200	200	200	200	200	200
Total Depth (mbgl)	10.0	10.0	6.10	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Borehole summary details	0 – 0.2 m Hardcore fill 0.2 – 10.0 m Sandy gravelly CLAY with cobbles	0 – 1.0 m MADE GROUND 1.0 – 10.0 m Sandy gravelly CLAY with cobbles	0 - 0.5 m MADE GROUND 0.5 – 3.5 m Sandy gravelly CLAY 3.5 – 6.0 m Sandy gravelly CLAY with cobbles 6.0 – 6.1 m Obstruction presumed boulders	0 – 0.4 m MADE GROUND 0.4 – 10.0 m Sandy gravelly CLAY with cobbles	0 – 0.3 m MADE GROUND 0.3 – 10.0 m Sandy gravelly CLAY with cobbles	0 – 0.6 m MADE GROUND 0.6 – 10.0 m Sandy gravelly CLAY with cobbles	0 – 1.0 m MADE GROUND 1.0 – 4.0 m Sandy gravelly CLAY with cobbles 4.0 – 10.0 m Sandy gravelly CLAY	0 – 1.0 m MADE GROUND 1.0 – 10.0 m Sandy gravelly CLAY with cobbles	0 – 1.0 m MADE GROUND 1.0 – 5.7 m Sandy gravelly CLAY with cobbles 5.7 – 10.0 m Sandy gravelly CLAY	0 – 0.2 m Topsoil 0.2 – 3.2 m Sandy gravelly CLAY 3.2 – 10.0 m Sandy gravelly CLAY with cobbles
Depth water strikes (mbgl)	-	2.90 (subsequently sealed off)	3.90 (assumed subsequently sealed off	-	-	-	4.10 (subsequently sealed off)	3.70 (subsequently sealed off)	4.70 (subsequently sealed off)	-
Water Level (mbgl)	DRY	2.40 (20 mins after strike)	DRY (at end drilling of borehole)	DRY	DRY	DRY	3.90 (20 mins after strike)	3.70 (20 mins after strike)	4.70 (20 mins after strike)	DRY

Borehole Ref.	BH01	BH02	BH03	BH04	BH05	BH06	BH07	BH08	BH09	BH10
							DRY (at end drilling of borehole)			

5.3.3 Regional Bedrock & Structural Geology

The Geological Survey of Ireland's (GSI's) online web viewer indicates that the proposed development site is underlain by **Ordovician Metasediments (OM)** and more specifically the **Oaklands Formation (OA)** which is described as green, red or purple, buff and occasionally grey slate, usually interbedded with siltstones (GSI, 1995) (see Figure 5.3).

Younger **Ordovician Volcanics (OV)** are mapped c. 100 m to the south of the southern boundary of the proposed development site. Here the unit is the **Campile Formation (CA)** which is described as comprising rhyolitic volcanics, grey and brown slates.

These rocks were subsequently subject to deformation and there are a number of faults and folds in the Gorey area. Faulting generally trends NNW-SSE. The nearest mapped fault is located c. 100 m to the southwest of the southern site boundary where it trends NW-SE.

5.3.4 Site Specific Information on Bedrock Geology

No site-specific information on bedrock characteristics was available. No bedrock outcrop was observed on the site or surrounding area during the site walkover on 8/1/18. During the site investigation undertaken in 2007 (Site Investigations Ltd., 2007), boreholes were advanced to a maximum depth of 10 m and bedrock was not encountered. Therefore, depth to bedrock beneath the site is >10 m.

5.3.5 Geological Heritage

The Irish Geological Heritage (IGH) Programme identifies and selects a complete range of sites that represent Ireland's geological heritage under sixteen themes ranging from Karst features to Hydrogeology. The IGH Programme is a partnership between the GSI and the National Parks and Wildlife Service (NPWS) and sites identified as important for conservation are conserved as Natural Heritage Areas (NHA).

Reference to the GSI online database confirms there are no geological heritage sites within the perimeter of the site or within a 2 km radius of the site. The nearest geological heritage site is Ballymoney Strand, located c. 6 km to the east of the site. This site is designated under the Cambrian-Silurian IGH 4 theme. The site is classified as a County Geological Site (CGS) and may be recommended for NHA designation.

5.3.6 Historic Land Use

The available historic maps, aerial images and Wexford Co. Co. online planning files were reviewed. The proposed development site was previously used as a mushroom growing facility. Mushroom growing commenced on the site in the 1970's and ceased operations in August 2006. Demolition of the facility commenced in mid-2007 when most of the associated buildings and infrastructure were demolished. The remains of some structures and some demolition waste (inert, rubble and concrete) still remain on the site.

As part of the demolition works in 2007 it is understood an asbestos survey was undertaken and any asbestos identified was removed and disposed to a licensed waste facility.

The mushroom growing facility included an on-site ESB electrical substation and on-site septic tank (located close to the north-eastern area of the proposed development site). Polychlorinated Biphenyls (PCBs) are substances that may occur in older electrical equipment such as transformers, capacitors and fluorescent lighting ballasts. PCBs are and are extremely harmful to the environment and at higher levels, human health. The EPA were contacted to check if there were any historical records of PCB's being used or permitted on the site, and there were no records on the National database..

There is anecdotal evidence that lands to the south of the site, may have been infilled. However, the lands have not been identified on the register of historic landfills under the 2008 waste legislation and no application for a certificate of authorisation of a historic landfill has been made by Wexford County Council, which suggests that the site is either a very low risk priority or is not considered a landfill.

5.3.7 EPA Licensed Sites

The site at Ramsfort Park were not part of a historic landfill site. There are also no EPA licensed sites within the immediate vicinity of the site. The nearest licensed site is a waste transfer station (IED licence no. W0220-01) operated by Starrus Ecco Holdings Ltd. at Ramstown c. 1.8 km to the south/southwest of the proposed development site.

5.3.8 Economic Geology

There are no operational quarries in the immediate vicinity of the site. The nearest active quarry recorded on the GSI's online database is Coolishall Quarry c. 3 km southwest of the site where volcanic rock is quarried for crushed stone.

5.3.9 Geohazards

5.3.9.1 Landslides

The GSI's online landslide database indicates there are no historic landslides recorded on the site or within a 2km radius of it. The nearest recorded landslide is c. 10 km north of the site at Glenoge where there was a large rotational earth failure induced by drainage.

5.3.9.2 Karst

The GSI's karst database indicates there are no karst features mapped within the proposed development site or surrounding area. Karstification is a process which occurs in soluble rocks such as limestone, dolomite and gypsum. Thus, karst would not expect to be present given that the bedrock underlying the proposed development site and surrounding area is non-calcareous.

5.3.9.3 Radon

Radon is a naturally occurring radioactive gas formed by the radioactive decay of uranium and thorium which may be present in varying quantities in rocks, soils and groundwater. Classified by IARC (International agency for research on cancer) as *Group 1 - carcinogenic to humans* - Radon is second only to smoking as the leading cause of lung cancer. It is estimated that some 250 lung cancer cases each year in Ireland are linked to radon exposure and accounts for more than half of the total radiation dose received by the Irish population (EPA, 2016). The acceptable level, or Reference Level, for homes and schools in Ireland is 200 becquerel per cubic metre (Bq/m^3). For workplaces the Reference Level is 400 Bq/m^3

Consultation with the EPA's online Radon Map shows a prediction of the number of homes in a given grid square that exceed the national Reference Level (200 bequerel per cubic metre (Bq/m^3)). Grid squares in which the predicted percentage of homes is 10% or greater are called High Radon Areas.

The EPA's Radon Map shows that the site is not located a High Radon area. In the vicinity of the site <20% of homes are estimated to have radon levels above the Reference Level.

5.3.10 Type of Geological Environment

Based on the available regional and site-specific information described in the preceding sections of this chapter, a schematic cross section of proposed development site and surrounding area has been developed and is shown on Figure 5.4.

A summary of the geological conditions underlying the proposed development site is illustrated on the cross section and is outlined thus:

- Made ground ranging in depth from 0.15-1.0 m
- Underlying subsoils comprise stiff brown sandy gravelly CLAY with some cobbles (Till derived from Lower Palaeozoic Shales' (TLPS)). Subsoils are at least 10 m thick beneath the site;
- Lenses of perched water appeared to be present in the subsoils at depth ranging from 2.9m to 4.70 m;
- There is potential for contaminated soils/subsoils in the area of the former ESB substation on the proposed development site;

- The underlying bedrock is green, red or purple, buff and occasionally grey SLATE, usually interbedded with siltstones (**Oaklands Formation (OA)).**

Based on the above and the IGI's Guidelines (IGI, 2013) the geological/hydrogeological environment of the proposed development site is classified as a **Type A - Passive geological /hydrogeological environment.**

5.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

There are a number of elements associated with both the construction and operation of the proposed development including the main site, the proposed adjacent Community and Education zoned land and the proposed line of the foul and storm sewers off-site to connect with an Irish Water Manhole and discharge to a receiving surface water respectively, which have the potential to impact on the environment with respect to land and soils. However, the construction phase holds the greatest number of activities which could potentially impact on land and soils.

The proposed development of the site will require the cut and fill of certain area of the site to develop the site at the proposed topographic levels. It is proposed to excavate soils/subsoils on the main site to a maximum depth of 2.5 m (drainage infrastructure) below ground to facilitate installation of building foundations etc. It is proposed to re-use the excavated material on-site where possible.

An outline cut and fill plan has been drawn up to estimate the cut and fill materials mass balance. The plan outlines that there is a net requirement for the Article 27 by-product designation or potential disposal of 4,470 m^3 of soil and subsoil to be exported from the site.

There are currently no significant barriers that would prevent the excess 4,470 m^3 of soil and subsoil from being classified as a by-product under the under the Article 27 of the Waste Directive Regulations 2011. If a local use for the material could be identified, if use was certain, and if the proposed end use site met the requirements of the Article 27 Regulations, there would be no need to send this material to a waste facility.

The cut and fill report outlines that there is a balance of 4,288 m^3 of soil/fill required for the levelling of the site to suitable topographic levels. An excess of 8,758 m^3 of soil will be generated from the construction of off-site drainage infrastructure which shall generate a balance of 4,470 m3 of soil for Article 27 or Off-Site Disposal

Further information on the cut/fill operations in relation to construction phase can be found in Appendix C of the supporting document: *IE Consulting, Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Excavation Plan Report No. IE1739-3031).*

In addition there are existing stockpiles of crushed stone, crushed concrete and topsoil/subsoil on the site (above ground level and not part of the cut and fill activities), that will be assessed for their suitability prior to construction. Their use will depend on the specification required, and how this material meets the required specification. A methodology for the assessment of material has been included in the excavation plan report.

The proposed scheme will have a requirement for imported materials, primarily comprising high standard fill and stone for pipeline construction, hardstanding areas, concrete for foundations, reinforced concrete structures (Table 5.3). The fill material will comprise primarily of Cl.804 material. Granular bedding and surrounds to pipes shall consist of free draining hard clean and chemically inert gravel or crushed stone.

The majority of new material brought to site, will be used immediately or will be stored within the site boundary. Other materials such as asphalt or concrete will be brought directly to the construction site when required and immediately placed.

Table 5.3 – Estimate of Principal Quantities of Imported Materials For Construction

Description	Community & Education Area		Pipelines	
Concrete	2,000	m3	<tbc>	m3
Structural Steel	500	tonnes	<tbc>	tonnes
Blocks	250,000	No.	<tbc>	No.
Stone Fill	5,000	tonnes	<tbc>	tonnes
Dense Bitumen Macadam/Asphalt	2,500	tonnes	<tbc>	tonnes

5.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

5.5.1 Construction Phase

The construction phase holds the greatest number of activities which could potentially impact on the soils and geological environment. Potential construction phase impacts are detailed below and summarised in *Table 5.4.* The proposed excavation method is 'cut and fill'.

5.5.1.1 Soil Removal

The construction of the proposed development will require the permanent removal of soils and subsoils within the footprint area of the new site buildings. It is estimated that subsoil will need to be excavated to a maximum depth of 2.5 m. While it is proposed to re-use as much of the excavated soils and subsoils on the site (for landscaping etc.) in line with relevant Waste and Planning Legislation, there will be permanent removal of soil and subsoils from areas of the proposed development site.

The vast majority of excavations will be < 2.5 mgbl and extending into the MADE GROUND/CLAY subsoils. Subsoils are at least 10 m deep on the site so excavation of bedrock will not be required.

It is estimated that a total of approximately c. 20,000 m^3 of subsoil material will require excavation. The foul sewer pipeline will involve the excavation of soils/subsoils along the length of its route. This will be replaced with a 250 mm diameter pipeline and the granular fill surrounding it. The top of the trench will comprise backfilled natural excavated soil.

There will be some excavation for the underground storm water attenuation tanks to an average depth of 1.0m

The permanent removal of natural soils is a *negative slight permanent impact* on the soils and geology aspect of the environment.

The removal of soils and subsoil will also impact on the vulnerability of groundwater in the underlying aquifer. This is dealt with in Chapter 6 Water.

5.5.1.2 Bedrock Excavation

The vast majority of the excavation and construction of the proposed development will be within the MADE GROUND/ low permeability CLAY. In addition, it is not expected that the 1.2 m deep excavation for the off-site pipeline to connect to the main sewer will encounter bedrock. If this occurs it will likely be limited to the upper weathered bedrock zone. The impact associated with any removal of weathered bedrock is considered to be a *negative slight permanent impact*. Exposure of the underlying bedrock to the atmosphere can result in weathering of the bedrock, which is considered to be a *negative slight short-term effect.*

5.5.1.3 Excavation & Re-Use of Potentially Contaminated Soils/Subsoils

There is potential for excavation and re-use of potentially contaminated soils/subsoils during the construction stage. There is the slight possibility of the presence of residual contamination of made ground/soils/subsoils by PCBs in the area of the former ESB substation, However the EPA were contacted and advised that there are no records of the proposed development site in the National Inventory of Confirmed PCB holdings and Suspect PCB Holdings. However this cannot give 100% confidence that no PCB contamination may exist.

There may also be some occasional contamination by hydrocarbons as these would have been used on the site.. If contaminated material is not correctly identified, segregated, classified and appropriately handled, there may be inappropriate handling and reuse of the material off-site which could impact negatively on the soil environment. In the absence of mitigation, this considered to be a *negative moderate long-term impact* on the soil environment on the site (if it is re-used on-site) and at any off-site location (if it is not correctly identified and disposed of appropriately as contaminated material).

5.5.1.1 Vehicular Movement & Soil Compaction

Soil compaction can occur due to movement of construction and maintenance traffic on the site. This is considered to be a *negative slight-moderate short-term impact* on the soil and *in-situ* earth materials.

For the proposed housing development and the associated surface water and foul water pipeline connection to the site, it is estimated that 1,332 truck movements will be required to transport the net soil and fill required to the site. This estimate includes the fill required to be moved to the proposed pipelines to form the pipeline beds as well as the excess soil/subsoil that shall be hauled through the gates of the development site to be placed as filled soil.

It is estimated that 1,858 truck movements will be required to transport the cut and filled soil within the site boundary (does not leave the site).

It is estimated that 447 truck movements will be required to transport the soils and stones by-product away from site.

All assumptions assume a soil density of 1.8 and average truck tonnage load of 18 tonnes.

Further information on the associated traffic movements in relation to construction phase can be found in the supporting document: *IE Consulting, Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Excavation Plan Report No. IE1739-3031*).

5.5.1.2 Potential Hydrocarbon Leakage/Spillage

Possible contamination of soil and subsoil and bedrock by leakage or spillage from machinery and associated equipment may occur during the construction phase. An accidental hydrocarbon spillage would have a *negative moderate short-medium term impact* on soil and bedrock quality.

5.5.2 Operational Phase

During the operational phase of the proposed development there is limited potential for impact on soils and geology.

5.5.2.1 Soil Sealing

The ongoing presence of the proposed buildings and associated internal roads, footpaths and hardstanding will result in sealing of the soil. This sealing effect can impact on natural exchanges occurring between soils and the atmosphere which influence the natural function and associated biodiversity of soils. This will have a *negative slight permanent impact* on the soil.

This sealing also has an impact on drainage and groundwater recharge to the underlying aquifer and this is dealt with in Chapter 6 Water.

5.5.2.2 Accidental Leakage/Spillage of Hydrocarbons

Possible localised contamination of soils and subsoils by accidental leakage or spillage of hydrocarbons from vehicles, other machinery or on-site fuel/heating oil tanks may occur during the operational phase. Leakages or spillages associated with these activities would have a *negative moderate medium term impact* on the soils and subsoils if mitigation measures are not put in place. Because of the significant depth (at least 10 m) of low permeability clay subsoils it is unlikely that contamination of the underlying bedrock materials from any such leaks/spills will occur.

5.5.2.3 Accidental Leakage from the Foul Water Sewer

Possible localised contamination of soils and subsoils by accidental leakage from the foul sewer pipeline may occur during the operational phase. If mitigation measures are not put in place, such a leakage would have a *negative moderate short-term impact* on the soils and subsoils. Because of the significant depth (at least 10 m) of low permeability clay subsoils it is unlikely that contamination of the underlying bedrock materials from any such leaks would occur.

5.5.2.4 Accidental Leakage/Spillage of Chemicals or Other Potentially Polluting Substances Used or Stored On-site

Possible localised contamination of soils and subsoils by accidental leakage or spillage of any chemicals or other polluting material stored or used in the proposed medical centre may occur during the operational phase. However, it is anticipated that only small controlled quantities of any chemicals or hazardous substances will be used in the medical centre. Leakages or spillages associated with these activities would have a *negative moderate medium term impact* on the soils and subsoils if mitigation measures are not put in place. Because of the significant depth (at least 10 m) of low permeability clay subsoils it is unlikely that contamination of the underlying bedrock materials from any such leaks/spills will occur.

5.5.3 Potential Cumulative Impacts (in the absence of mitigation)

Given the scale of the proposed development, the surrounding existing residential developments and the capacity of the surrounding environment to accommodate a development of this nature, it is considered that the overall cumulative development in the area will have a *negative slight long-term impact* on the land, soils and geology of the area, through the additional buildings, infrastructure and hardstanding required for the development on the subject lands

5.5.4 'Do Nothing' Impact

Under the 'Do Nothing' scenario there would be no change to the current land use of the site. An investigation into potential PCB contamination will be undertaken prior to the construction stage of the proposed development and if required remediation works will be undertaken. However, this is planned to be undertaken anyway in line with EPA guidance (EPA, 2017) irrespective of whether the proposed development takes place or not.

5.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

This section describes a range of mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the impacts of any emissions on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

With reference to radon, while the proposed site is not located within a High Radon area, standard radon barriers will be used in the construction of the proposed dwellings.

5.6.1 Construction Phase

5.6.1.1 Construction Management Plan

In order to reduce the impacts on the soils and geology environment a number of mitigation measures will be adopted as part of the construction works on site. An Outline Project Specific Construction Management Plan is included with the SHD application and will be maintained by the contractor during the construction phase. The PCMP will include mitigation measures to address the main potential impacts on soils and geology as follows:

- Existing topsoil will be retained on site to be used for the proposed development. Topsoil will be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works.

- Top-soiling and landscaping of the works will take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties.

- Stockpiled material will be covered/dampened during dry weather to prevent spreading of sediment/dust;
- In order to prevent the accidental release of hazardous materials (fuels, paints, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the project.
- Controls for storage of any other potentially polluting materials/chemicals on-site e.g. any chemicals used on site will be required to be stored in designated bunded areas and the site manager will be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at storage locations as well as the site office.
- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads. In addition to this road washing machinery will be employed where possible.
- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter watercourses.
- Where feasible, excavated material will be reused as part of the site development works (e.g. for landscaping works and for backfill in trenches under non-trafficked areas).
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.

5.6.1.2 Controls on Damage to Underlying Geological Materials

The removal of soils and subsoil's/bedrock is an unavoidable impact of the development. One of the primary mitigation measures already employed at the preliminary design stage has been the minimisation of volumes of subsoil and bedrock that will be excavated. It is proposed that all of the excavated subsoils removed during construction will be re-used on site in the form of landscaping. Any subsoils that cannot be re-used on-site will be treated, recycled or disposed of where suitable using a licenced waste contractor.

Specialist machinery (such as tracked machinery) will be used to minimise compaction of the subsoils.

5.6.1.3 Control and Re-use of Potentially Contaminated Material On-site

Prior to any site works an investigation of the area of the former ESB substation will be undertaken to assess for the presence of any contamination from Polychlorinated Biphenyls (PCB's). An initial site inspection, sampling and assessment will be undertaken as per EPA guidance on PCBs (EPA, 2017). After the initial assessment if confirmed or suspected PCB contamination is present then an appropriate level of site investigation and corrective action will be undertaken as per EPA guidance (EPA, 2017). If remediation and removal of PCB contaminated material is required this will be undertaken using an appropriately licensed waste contractor and treatment facility. The site investigation and assessment will be undertaken by a suitably qualified environmental consultant with specific experience in the assessment and remediation of PCB contamination. Each stage of the process will be rigorously recorded from initial site inspections to completion and verification of any remedial actions required.

During construction works, all excavated materials including existing stockpiles will be visually assessed for signs of contamination. Should material appear to be contaminated, soil samples will be analysed by an appropriate testing laboratory. All potentially contaminated material will be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material will be appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

All operations in relation to the declaration of Article 27 by-product during the cut and fill activities will be completed in a controlled environment. As the intention is to re-use soils on-site and to declare the excess soils as a by-product, some relevant site investigations and soil analytical data must be gathered to demonstrate that the soils of both the

greenfield and the former factory area of the development are situatable for re-use and that these soils are uncontaminated with respect to naturally occurring concentrations. An Excavation Plan report prepared by IE Consulting, is included with the SHD application.

5.6.1.4 Control on Sources of Fill and Aggregates

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

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

5.6.2 Operational Phase

No significant long-term impact on the soil resulting from the proposed operational phase of the development is predicted. Once the development is completed, risks to the land and soils will be from pollutants deriving from the use of the dwellings and/or from contaminated surface water run-off.

The only mitigating measures envisaged during the operational phase are to ensure regular maintenance of SuDS features.

Ensuring appropriately designed, constructed and maintained site services will protect the soils and geology from future contamination arising from operation of the developments.

The surface water run-off from the development should be collected by an appropriately designed system. This system should ensure that contaminants are removed prior to discharge e.g. via a light liquids separator or by an appropriate treatment train of Sustainable Urban Drainage Systems as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Any separators and drainage systems should be maintained and operated by the facilities management company (prior to taking in charge by the Local Authority) in accordance with the manufacturers recommendations.

All new oil storage facilities will be designed and maintained in accordance with best practice and standards (BS 5410 and BS799-5). All waste storage areas will be designed to afford adequate containment for any liquid or solid waste. These measures combined with best practice will prevent any contamination of surrounding soil/bedrock.

A programme of inspection and maintenance of the foul sewer rising main pipeline will ensure that any damage, blockages etc. are identified and remedied.

5.6.3 'Worst Case' Scenario

Under a 'worst case' scenario, the accidental release of fuel, oil, paints or other hazardous material occurs on site during the construction phase, through the failure of secondary containment or a materials handling accident on the site. If this were to occur over open ground then these materials could infiltrate through the soil contaminating the soil zone. If the materials were not recovered promptly, then the contaminants may contaminate the down gradient groundwater and surface water receptors.

The contractor must adhere to the Construction Management Plan to ensure that all containment is kept in working order should result in this scenario is considered to be unlikely.

The proposed mitigation measures are considered adequate are not considered contentious and come with a low level of risk. The risk from potential PCB contamination from the former ESB substation will be dealt with by an appropriate site investigation undertaken by a suitably qualified environmental consultant as per EPA Guidance (EPA, 2017). Any remediation works will be undertaken using a waste licensed contractor and documented in detail by a suitably qualified environmental consultant.

5.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The predicted residual impacts of the proposed development are outlined in the detailed assessment Tables 5.4 and 5.5 below

5.7.1 Construction Phase

The proposed development will alter the current land use from agricultural to a residential development and associated public open space and landscape areas. The impact on land, soil, geology and hydrogeology from accidental spillages of fuel and lubricants used during the construction phase of the development is predicted to be minimal when stored and used in a responsible manner. After implementation of the mitigation measures recommended above for the construction phase, the proposed development will not give rise to any significant long term adverse impact. Moderate negative impacts during the construction phase will be short term only in duration.

Implementation of the measures outlined in Section 5.6 will ensure that the potential impacts of the development on soils and the geological environment are minimised during the construction phase and that any residual impacts will be short term.

The predicted impacts of the construction phase are described in Table 5.4 in terms of quality, significance and duration. The relevant mitigation measures are detailed and the corresponding residual impacts are determined which take account of these mitigation measures.

The principal residual impact from the construction phase is the removal of soil and minor rock volumes from the proposed development site and along the route of the foul water pipeline. This impact is unavoidable given the nature, requirement and design of the proposed development.

Table 5.4 – Summary of Predicted Construction Phase Impacts

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
Earthworks	Soils	Natural soil excavation for building foundations	Negative	Slight	Permanent	Material will be reused on site where possible	Negative slight
Earthworks	Bedrock	Potential bedrock excavation for foul effluent pipeline	Negative	Slight	Permanent	The excavation of rock will be kept to a minimum and is likely to be limited to the upper weathered zone only.	Imperceptible
Earthworks	Made Ground/Soils	Excavation and reuse of Potentially Contaminated Made Ground/Soils (PCBs)	Negative	Moderate	Long Term	Prior to commencement of construction a site investigation and assessment into potential PCB contamination will be to be undertaken by a competent professional in accordance with EPA guidance on PCBs (EPA, 2017). Any identified contaminated material will be sent to appropriately licensed facilities for treatment/disposal.	Positive slight
Earthworks	Soils	Vehicular movement and soil compaction.	Negative	Slight-moderate	Short-term	Specialist machinery (such as tracked machinery) will be used to minimise compaction of the subsoils.	Slight
Storage of potentially polluting materials	Soils / Bedrock	Potential leak or spillage from vehicles/machinery or construction related liquids on site resulting in soil/bedrock contamination	Negative	Moderate	Short-medium term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas will be used and maintained. Designated refuelling areas will be used. Spill kits retained on-site.	Imperceptible

5.7.2 Operational Phase

The predicted impacts of the operational phase are described in Table 5.5 below in terms of quality, significance and duration.

The relevant mitigation measures are detailed and the residual impacts are determined which take account of these mitigation measures.

During the operational phase of the project there will be no residual impact on the geology of the area. The potential impacts relate to the storage and handling of potentially deleterious substances. Mitigation measures include properly designed and maintained storage infrastructure and areas combined with good housekeeping practices will remove any risk of contamination to the local geological environment. The Construction Compound will be reinstated once construction is complete.

5.7.1 Cumulative Impacts

Should any other developments arise in the vicinity of the proposed development, significant impacts are not anticipated as long as appropriate mitigation measures are implemented.

Significant impacts are not anticipated for the adjoining Community & Education lands and the route of the foul water sewer as long as the appropriate mitigation measures are implemented.

Table 5.5 – Summary of Predicted Operational Phase Impacts

Activity/Source	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual impact
Oil/Hydrocarbons from Vehicles. Machinery or Fuel/Heating Oil Tanks	Accidental leakage/spillage of hydrocarbons resulting in localised contamination of soils/subsoils	Negative	Slight-Moderate	Medium term	All new oil/hydrocarbon storage facilities will be designed and maintained in accordance with best practice and standards (BS 5410 and BS799-5).	Imperceptible
Foul Water Pipeline	Accidental leakage of untreated effluent from the foul sewer resulting in localised contamination of soils/subsoils.	Negative	Moderate	Short term	Programme of inspection and maintenance of the foul sewer rising main pipeline will ensure that any damage, blockages etc. are identified and remedied.	Imperceptible
Storage/use of potentially polluting materials/chemicals	Accidental leakage or spillage resulting in localised contamination of soils/subsoils.	Negative	Moderate	Medium term	All potentially pollution/waste storage areas will be designed to afford adequate containment for any liquid or solid waste	Imperceptible

5.8 MONITORING

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 5.6 including the project specific Construction Management Plan (PCMP). Soil removed during the construction phase is to be monitored to maximise potential for re-use on site. Monitoring of any hazardous material stored on-site will form part of the proposed Construction & Waste Management Plan. A dust management/monitoring programme should be implemented during the construction phase of the development. The quantities of topsoil, subsoil and rock removed off site will be recorded.

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

Adherence to the appointed contractors "*Construction and Demolition Waste Management Plan*".

- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road sub-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 from contamination for removal from site)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Soil removed during the construction phase will be monitored to maximise potential for re-use on site
- Protection of topsoil stockpiled for re-use;
- Adequate protection from contamination of soils for removal;
- Cleanliness of adjoining road network;
- Prevention of oil and petrol spillages;
- Dust control;
- Representative soil samples will be taken of the excavated material to confirm its suitability for re-use on the site and/or to facilitate classification for disposal;
- The on-site interceptors and silt traps will be maintained and inspected on a regular basis.

5.9 REINSTATEMENT

5.9.1 Construction Phase

The proposed development will incorporate landscaping where required.

5.9.2 Operational Phase

In the event that the community and education development is discontinued with a view to reinstatement this would likely require a new planning permission and potentially an assessment of impacts.

5.10 INTERACTIONS

There is an interaction between soil and waste management as there may be the requirement for removal of contaminated soil off site to a suitable licensed facility. This is dealt with in Chapter 11 Waste Management.

There is an interaction between geology for the site and hydrogeology, as discussed above and in the Water chapters of this EIAR.

There is a potential for dust from excavations or stockpiles to impact on air quality/human beings and this is dealt with in Chapter 3 Population and Human Health and Chapter 7 Air and Climate.

5.11 DIFFICULTIES ENCOUNTERED IN COMPILING

No significant difficulties were encountered in the preparation of this assessment of the impact on the soil and land environment.

Figure 5.1 – Soils Map

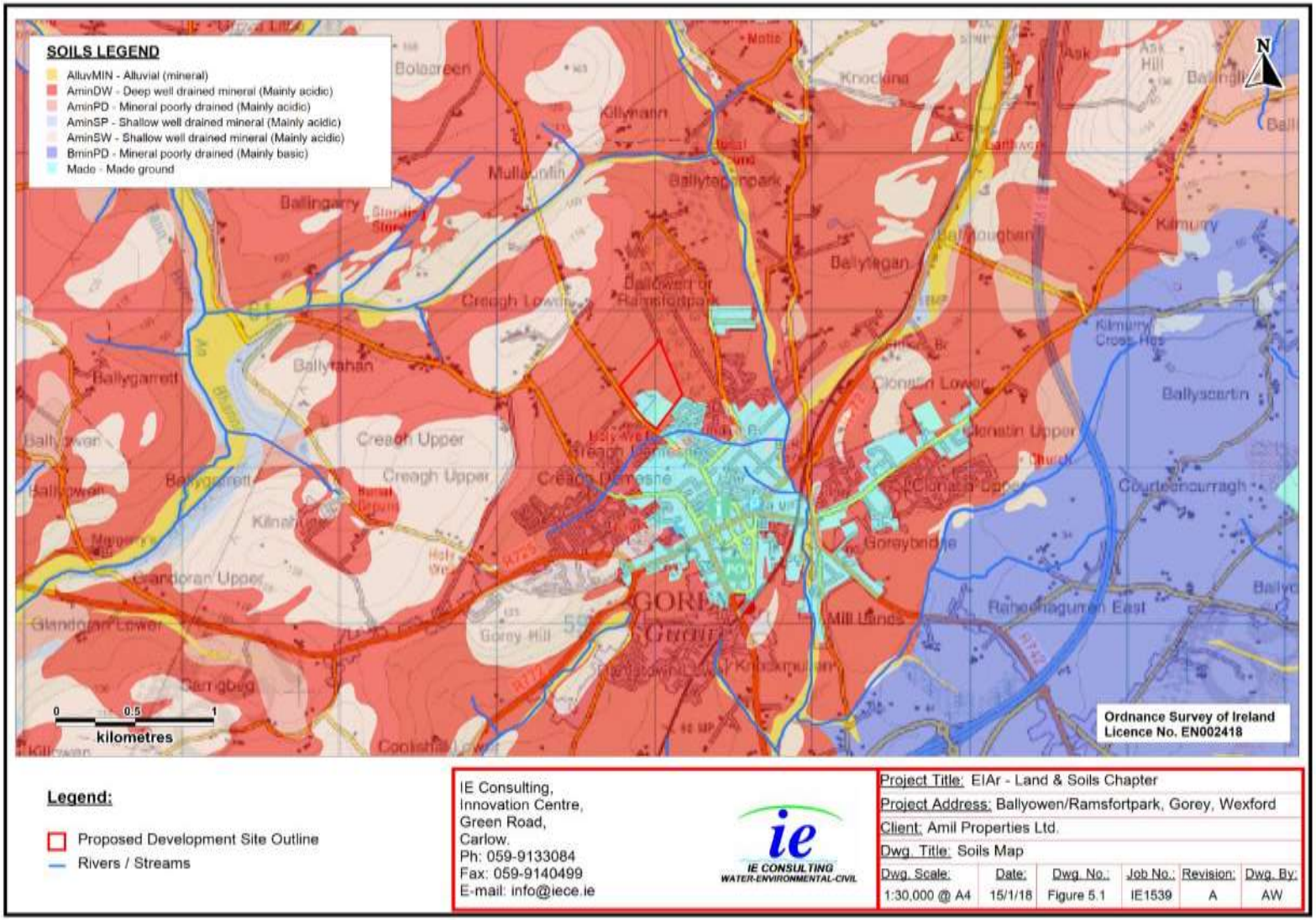


Figure 5.2 – Subsoils Map

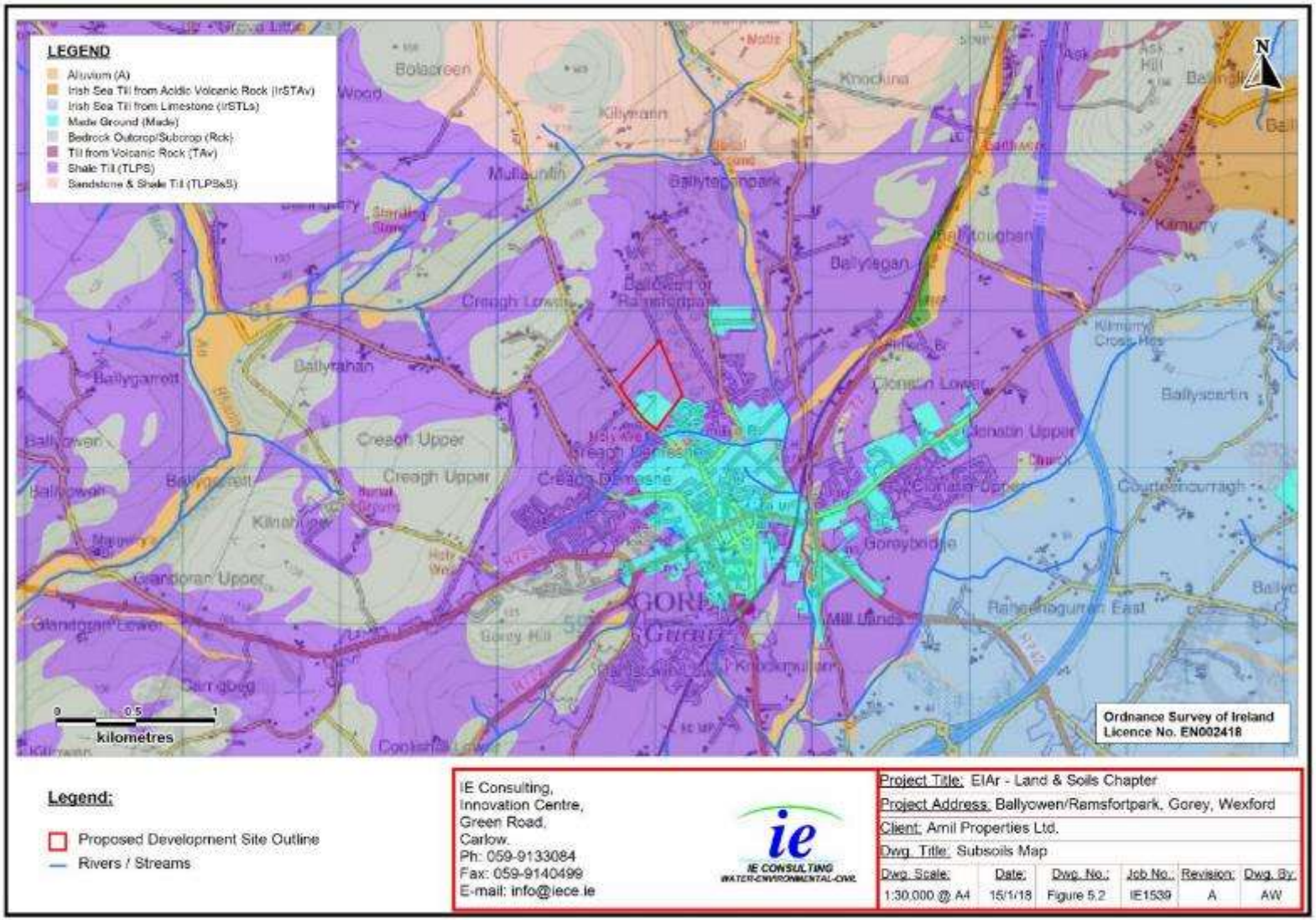


Figure 5.3 - Bedrock Geology Map

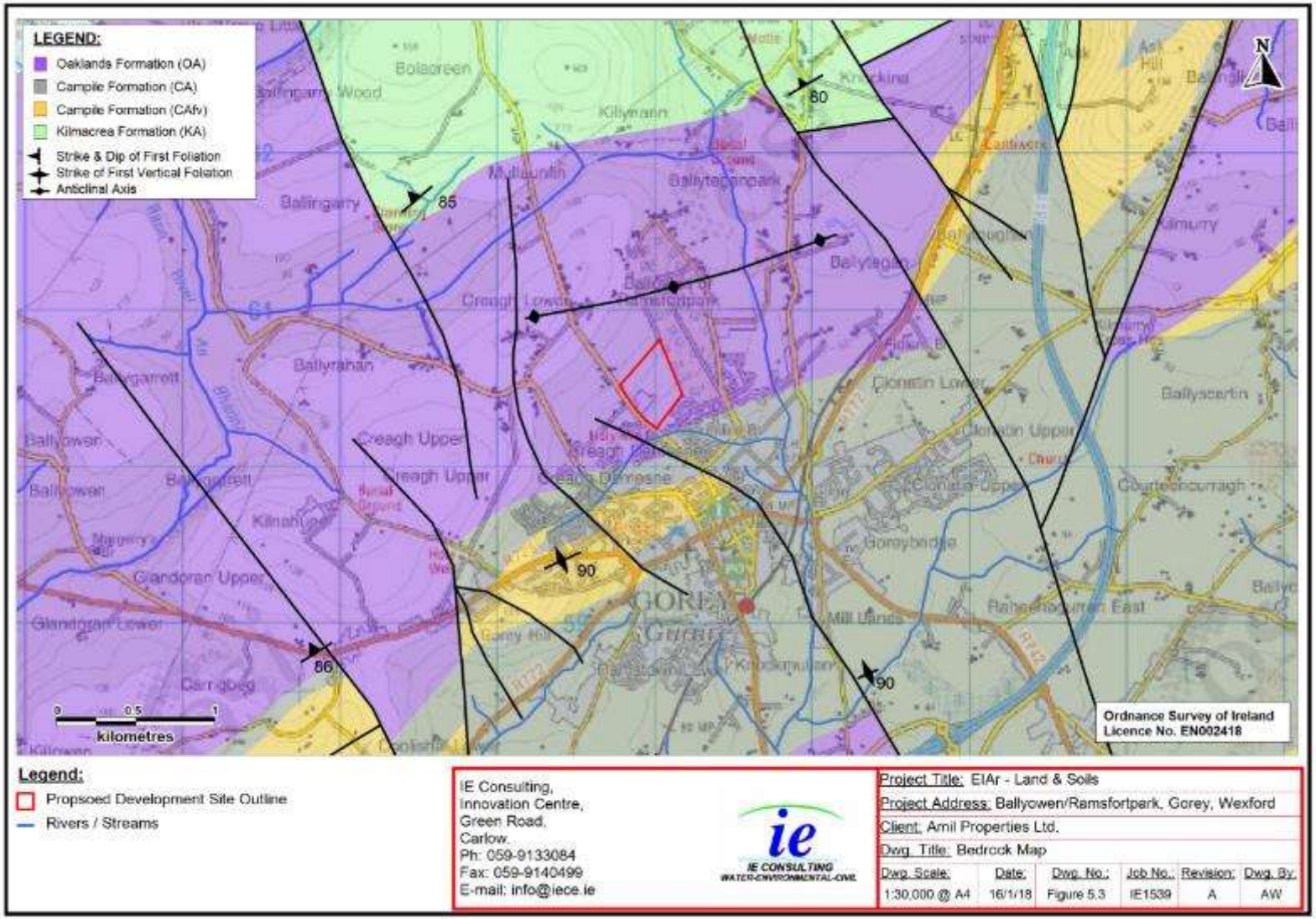
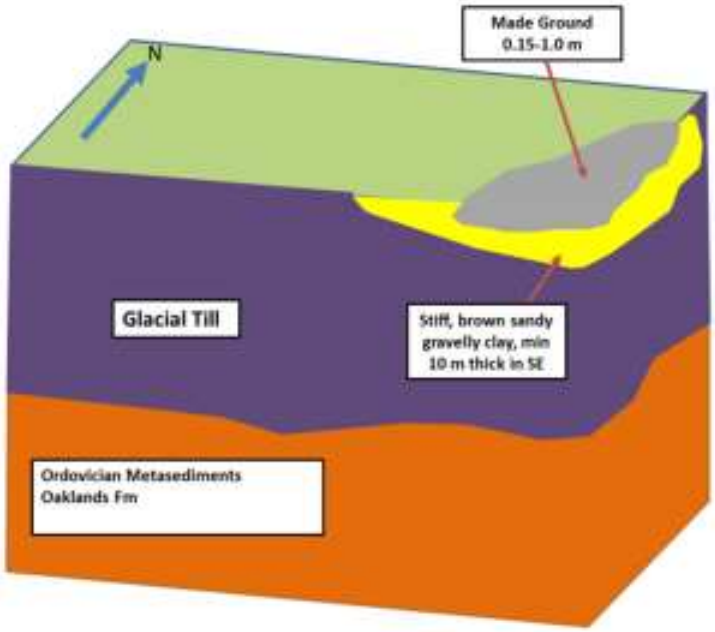


Figure 5.4 – Geological Cross Section



IE Consulting, Innovation Centre, Green Road, Carlow Ph: 059 913 3084 Fax: 059 914 0459 Email: info@iece.ie	IE CONSULTING WATER-ENVIRONMENTAL-CIVIL	Project Title: EIAR – Water				
		Project Address: Ballyowen/Ramsfort Park, Gorey, Wexford				
		Client: Amil Properties Ltd.				
		Drawing Title: Geological Conceptual Model of Site				
		Drg. Scale: Not to scale	Date: 05-12-18	Dwg No: Figure 5.4	Job No: IE1539	Revision: A	Dwg. By: KM

6.0 WATER

6.1 INTRODUCTION

This chapter of the EIS describes the existing water environment on and surrounding the proposed development site. The objective of this chapter is to determine the likely significant impacts on the water environment arising from the proposed development and to propose measures to mitigate these impacts, if required. A Site Specific Flood Risk Assessment (SSFRA) has been completed by IE Consulting Engineers and is included as a standalone report with this application.

A detailed description of the existing and proposed development is outlined in Chapter 2 of this EIAR.

6.2 STUDY METHODOLOGY

The works undertaken to complete the assessment for this water chapter comprised the following:

- Desk study review of information for the proposed development including information on proposed water supply and proposed management of foul water and surface water drainage;
- Desk study to identify, collate and review the existing hydrological and hydrogeological, information for the site and surrounding area (within a 2 km radius of the site) including a review of the following:
  - D. Tietzsch-Tyler & A.G. Sleeman, 1995. *Bedrock Geology 1:100,000 Scale Map Series, Sheet 19, Carlow - Wexford*. Geological Survey of Ireland.
  - Geological Survey of Ireland's online map viewers. www.gsi.ie
  - Environmental Protection Agency's online map viewer. https://gis.epa.ie/EPAMaps/
  - Ordnance Survey of Ireland's online map viewer. www.osi.ie/publicviewer/
  - EPA's online catchment maps www.catchments.ie/maps/
  - *'Site Investigation for a Proposed Development at Ballyowen, Ramsfortpark, Gorey – Interpretative Report'*. Site Investigations Ltd., December 2007. Contract No. 4681.
- Additionally, the information and assessment undertaken in the following reports commissioned for the proposed development were also reviewed and incorporated into this chapter:
  - IE Consulting, March 2018. *Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Stormwater, Foul & Water Supply.* Report No. 1505-2630.
  - IE Consulting, March 2018. *Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Site Specific Flood Risk Assessment.* Report No. 1544-2556.
- Site visit to walkover the site and surrounding area on 8/1/18;
- Interpretation of all data, assessment and preparation of this report.

This chapter was prepared in accordance with the following national guidance documents on environmental impact assessment:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports draft (Environmental Protection Agency, August 2017);
- Advice Notes for Preparing Environmental Impact Statements (Environmental Protection Agency, 2015);
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (Institute of Geologists of Ireland, 2013).

The IGI's and EPA's recommended methodology for assessing impacts was used. Each potential impact was described in terms of its Type, Quality, Significance and Duration.

This chapter also encompasses knowledge obtained from site visits, drainage and water services record information received from Irish Water and the Local Authority. Additionally, information from the EPA and GSI websites has been utilised. IE Consulting met with the Wexford County Council Planners and Drainage personnel for pre-planning meetings and all comments have been incorporated into the proposed design. The content of the An Bord Pleanála Opinion has also been incorporated.

6.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

This section describes the existing baseline environment on and surrounding the proposed development site in terms of hydrology and hydrogeology. Based on this information, the potential impacts of the proposed development are identified, as are the measures required to mitigate any identified negative impacts on the water environment.

6.3.1 Topography

The proposed development site is located in the northern outskirts of Gorey Town and approximately 6 km from the coast which lies to the east. The surrounding land slopes from the hilly area at Creagh Lower (at 120 mOD approximately 1 km to the northwest) towards the valley of the Banogue River located at 40 mOD approximately 750 m to the southeast. The proposed development site itself slopes from c. 75 mOD in the northwest to 55 mOD in the southeast.

6.3.2 Hydrology

River Basin & Nearby Surface Water Features

The site lies within the South Eastern River Basin District (SERBD). The SERBD is one of Irelands largest river basin districts in Ireland covering 13,000 km2 of land and a further 1,000 km2 of marine waters. The SERBD covers counties Carlow, Kilkenny, Wexford, most of Waterford, Tipperary and Laois, parts of Kildare, Offaly and Wicklow and a small part of Limerick and Cork.

The proposed development site lies within the Owenavorragh River catchment. The Banogue River (a tributary of the Owenavorragh River) lies c. 580 m directly east of the proposed development site. The Banogue River flows in a southerly direction through Gorey Town and discharges to the Owenavorragh River c. 3 km south of the town.

The Owenavorragh River discharges to the Owenavorragh Estuary (a transitional water body) c.5.5 km southwest of the site just north of Courtown. This estuary in turn discharges to the Southwestern Irish Sea Coastal Water Body (HAs 11:12).

The nearest surface water feature to the proposed development site is the Ballyowen Stream located c.80 m to the south where it flows in an easterly direction and discharges to the Banogue River. This stream appears to be culverted along a section of the stream upstream of the site. Downstream of the site the stream generally flows in an open channel.

Surface Water Body Status, Pressures & Water Quality

For the purposes of the Water Framework Directive (WFD) the water quality 'status' of the nearby surface water bodies has been categorised (2010-2015). In addition, the 'risk' of each water body not achieving 'good status' has also been assessed. The status and risk of the nearby surface water features are shown in Table 6.1 below.

The EPA's catchment website indicates that the Banogue River is subject to *'anthropogenic'* and '*river urban run-off'* pressures upstream of Gorey town. Downstream of Gorey town the Banogue and Owenavorragh Rivers are subject to pressure from *'river urban wastewater'*.

Table 6.1 – Status & Risk of Nearby WFD Surface Water Bodies

River Water Body	Water Body Type	Status (2010-2015)	Risk
Ballyowen Stream (c. 80 m south of proposed development site)	River	Moderate	At risk
Banogue River	River	'Moderate' in vicinity of proposed development site. 'Poor' further downstream in Gorey.	At risk
Owenavorragh River	River	Moderate	At risk
Owenavorragh Estuary	Estuary	Unassigned	Review
Southwestern Irish Sea (HAs 11:12).	Coastal	'Good'	Not at risk

The Banogue River and Ballyowen Stream are not indicated as being salmonid on the EPA Envision website.

6.3.2.1 Site Drainage

An existing open surface water drainage channel (c. 3-4 m deep) is located within the proposed development site where it runs along the eastern and southern site boundary. This channel currently takes drainage from the proposed development site itself, adjacent forested land to the east and agricultural land to the north). This drainage channel discharges to the Ballyowen Stream via a 525 mm diameter pipe that runs from the southern boundary of the site into the stream.

6.3.2.2 Flood Risk

A Site-Specific Flood Risk Assessment was conducted to identify the risk of flooding on the proposed development site (see separate report submitted with the SHD application - IE Consulting, *Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Site Specific Flood Risk Assessment. Report No. 1544-2556*). This was completed in accordance with '*The Planning System and Flood Risk Management Guidelines –DoEHLG-2009*'. The proposed site was screened and scoped for flood risk in accordance with the above guidelines. Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA indicative flood map number 2019/MAP/157/A illustrates indicative flood zones within this area of County Wexford. The OPW PFRA indicative flood mapping indicates no indicative fluvial, pluvial or groundwater flood zones within the boundary of the proposed development site. Although it is noted that the extent of flooding illustrated on these maps was developed using a low-resolution digital terrain model (DTM) and illustrated flood extents are intended to be indicative only. The flood extents mapped on the PFRA maps are not intended to be used on a site-specific basis.

The OPW Flood Maps Website indicates there are no recorded or anecdotal instances of flooding at or in the immediate vicinity of the proposed development site. Additionally, historic 6 inch and 25-inch mapping does not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the proposed development site.

The South Eastern Region Catchment Flood Risk & Management Study (CFRAMS) has been undertaken by the OPW and the Final version of the flood maps were issued in July 2016. Flood risk extent and depth maps for further assessment areas within the general area of the proposed development site have also been produced. OPW CFRAMS predictive flood map number *O11GOR_EXFCD_F0_05* illustrates predictive extreme fluvial flood extent

zones associated with the Ballyowen Stream in the vicinity of the proposed development site. The maps show that the proposed development site is outside the 0.1% AEP (1 in 1000 year) flood extents of the Ballyowen Stream.

The site-specific Flood Risk Assessment for the proposed development concluded that in the context of *'The Planning System & Flood Risk Management Guidelines – 2009'* the proposed development site falls within Flood Zone 'C' where the probability of flooding from rivers or the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). In accordance with the 'Planning System & Flood Risk Management Guidelines, DOEGLG, 2009' development proposals for this area of the site are therefore not subject to the requirements of the Justification Test.

The proposed foul water pipe located outside the ownership of the applicant falls within Flood Zone 'A' and Flood Zone 'B' in two locations. In accordance with the 'Planning System & Flood Risk Management Guidelines, DoEGLG, 2009' development proposals for area of the site may be to requirements of the Justification Test.

The proposed development is considered to comply with the requirements of the Justification Test for development management.

The main area of the site where development is proposed is not at risk of fluvial, pluvial or groundwater flooding.

6.3.3 Hydrogeology

Bedrock & Structural Geology

The Geological Survey of Ireland's (GSI's) online web viewer indicates that the proposed development site is underlain by **Ordovician Metasediments (OM)** and more specifically the **Oaklands Formation (OA)** which is described as green, red or purple, buff and occasionally grey slates, usually interbedded with siltstones (GSI, 1995).

Younger **Ordovician Volcanics (OV)** are mapped c. 100 m to the south of the southern boundary of the proposed development site and beneath the route of the proposed foul pipeline. Here the unit is the **Campile Formation (CA)** which is described as comprising rhyolitic volcanics, grey and brown slates.

The Ordovician rocks were subsequently subject to deformation and there are a number of faults and folds in the Gorey area. The faults generally trend NNW-SSE. The nearest mapped fault is located c. 100 m to the southwest of the southern site boundary where it trends NW-SE.

No site-specific information on bedrock characteristics was available. No bedrock outcrop was observed on the proposed development site or surrounding area during the site walkover on 8/1/18. During the site investigation undertaken in 2007 (Site Investigations Ltd., 2007), boreholes were advanced to a maximum depth of 10 m and bedrock was not encountered. Therefore, depth to bedrock beneath the site is >10 m.

Aquifer Classification & Characteristics

The metasedimentary bedrock beneath the proposed development site is classified by the GSI as a **Locally Important bedrock (Ll) aquifer – bedrock which is moderately productive in local zones only.** This type of aquifer has a limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres. Figure 6.3 shows the Aquifer distribution in the area.

The Ll aquifer forms part of the **Inch Groundwater Body (GWB**). The groundwater body (GWB) is the management unit under the WFD that is necessary for the subdivision of large geographical areas of aquifer in order for them to be effectively managed. The Inch GWB has the following characteristics as described by the GSI (*GSI, 2004*):

- There is no information available on the hydrogeological properties of these rocks. Estimated transmissivities can be considered to range 1 – 10 m^2/d.
- The effective thickness of this aquifer may only be about 15 m to 30 m.
- Recharge is considered to enter the bedrock through the sandier parts of the Clogga Till and also through exposed bedrock in the elevated areas. The Macamore Marl is considered almost impermeable and largely

seals the underlying bedrock from diffuse recharge. There is likely to be significant recharge along the southern boundary of the elevated areas of the Duncannon Group volcanics although the throughput into the poorer aquifer of this groundwater body should be small.

- Discharge in this groundwater body is to the surface water bodies and also the sea. Discharge is not expected to be large as much of the area is considered to be a poor aquifer.

- The bedrock strata of this groundwater body are considered to be siliceous. No hydrochemical data are available.

- Groundwater flow paths through this groundwater body are short. The travel time of any recharging waters will be small and therefore the age of these groundwaters is young. The distance travelled will be short and will most likely be the distance to the closest surface water body. Most groundwater flow will take place in the top 15 to 30 metres.

- The surface topography and the degree of fracturing of the underlying rock principally control the movement of groundwater through this area.

The volcanic bedrock to the south of the proposed development site (beneath the route of the prosed foul pipeline) is classified by the GSI as a **Regionally Important Fissured Bedrock (Rf) aquifer.** A small area of this volcanic bedrock aquifer is hydraulic downgradient of the proposed development site**.** This is a more productive type of aquifer than the Ll aquifer immediately beneath the proposed development site, in which the network of fractures, fissures and joints, through which groundwater flows, is well connected and widely dispersed, resulting in a relatively even distribution of highly permeable zones. There is good aquifer storage and groundwater flow paths can be up to several kilometres in length. There is likely to be substantial groundwater discharge to surface waters ('baseflow').

The Rf aquifer forms part of the Gorey Groundwater Body (GWB). The Gorey GWB has the following characteristics as described by the GSI (*GSI, 2004*):

- This rock contains areas of felsic volcanic rock which are believed to be the main water bearing components.

- The rock is highly fractured and broken due to folding and faulting.

- The effective thickness of this aquifer could be quite large. Well logging data from Kilkenny shows large fractures open at depths of 50 m.

- The main discharge is to the Owenavorragh River. There is also a considerable discharge to the boreholes at Barnadown,

- The volcanic rocks are mostly insoluble and the water does not become mineralized by from ion exchange with the rock itself.

- These rocks are devoid of intergranular permeability; therefore, groundwater flow must occur in fractures caused by deformation.

- The water table is controlled by the Owenavorragh River: an annual fluctuation of 2-4 m is observed in the natural water table.

- A cone of depression exists, with a drawdown of 1 m extending 1.5 km from the Barnadown boreholes.

- There appears to be a regional groundwater flow regime present: groundwater can move from the uplands in the west to the east coast. Groundwater flow paths would be considerably longer than in the surrounding aquitards.

- There is unlikely to be saltwater intrusion because there are no major abstractions near the coast.

Springs /Holy Wells

The historic 6" OSI maps show '*boiling wells'* located c. 30 m from the southern corner of the proposed development site in an area which is currently a small open grassed area. The OSI 1:30,000 scale discovery series mapping also shows a '*holy well'* mapped at the location of the '*boiling' wells*. During the site visit on 8/1/18 a tap (see Photo 6.1 below) was noted in this area. It is assumed this corresponds to the '*holy well'* which was preserved thus for cultural reasons.

Photo 6.1 – Tap at Location of 'Holy Well'

Wells and springs are sometimes colloquially termed 'boiling' because of visible gas bubbles rising in the groundwater as it emerges at the surface but not because the water is at boiling point. This suggests that the location of the '*boiling wells'/'holy spring'* is or was a discharge zone for groundwater. No evidence of groundwater discharge was observed during the site visit on 8/1/18 although the ground underfoot was quite soggy when ground in the surrounding area and on the proposed development site was relatively dry. The area of the '*boiling wells/holy well'* is located close to the mapped location of a geological fault. The faulting has resulted in the lower permeability rocks of the Oaklands Formation (to the north) being juxtaposed against the higher permeability rocks of the Campile Formation (to the south). It is possible that the '*boiling'* springs are related to this fault. Where faults are filled with low permeability fault 'gouge' they can act as a barrier to groundwater flow. General groundwater flow direction in the area is expected to be to the southeast (see Section 6.3.3.6 below). As groundwater flows to the southeast some of it may be forced upwards where it encounters the low permeability fault zone and it emerges at surface as a spring or discharge at this location.

WFD Groundwater Body Status

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface and groundwater. The overall aim for groundwater was to achieve at least 'good quantitative status' and 'good chemical status' by 2015, as well as preventing deterioration in those waters that have been classified as 'good' status. The EC Environmental Objectives (Groundwater) Regulations 2010 (S.I No. 9 of 2010) as amended by Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. No. 366 of 2016) give effect to the criteria and standards to be used for classifying groundwater in accordance with the requirements of the WFD.

Both the Inch and Gorey GWB which underlies the proposed development site are classified as being at **'Good**' groundwater quality status (2010-2015 status classification). The Inch GWB is assessed as 'not at risk' of achieving 'good status' while the risk of the Gorey GWB of not achieving 'good' status is under review (as of information on EPA www.catchments.ie viewed 14/3/18).

Site Specific Information on Hydrogeology

Site specific information on the subsoils underlying the proposed development site was available from investigations undertaken in 2007 (Site Investigations Ltd., 2007). The investigations comprised 9 No. trial holes and 10 No. cable percussion boreholes. In general, the subsoils encountered comprised MADE GROUND underlain by stiff brown sandy gravelly CLAY with some cobbles. A summary of the subsoils encountered in each trial hole and borehole is provided in Tables 5.1 and 5.2 in Chapter 5 - Land and Soils. Bedrock was not encountered in any of the boreholes which were advanced to a maximum depth of 10 m.

The material and subsoils encountered during the site investigation are in line with the classification of 'Made Ground' and 'Till' as indicated on the GSI's on line map viewer. The '*Made Ground'* comprised *'concrete over hardcore*' in places and 'sandy gravelly clay with cobbles and various inclusions of wood, bricks and concrete blocks' in other places. The CLAY subsoils encountered indicates generally low permeability subsoils rather than moderate permeability subsoils as indicated on the GSI's recharge map.

Perched groundwater was encountered in the subsoils at depths ranging from 2.9 m to 4.7 m below ground level (bgl).

Groundwater Levels & Flow Direction

Insufficient information on groundwater levels was available to assess actual groundwater flow direction beneath the proposed development site. Based on topography and the position of nearby surface water features groundwater flow is expected to flow south-eastwards towards the tributary stream of the Ballyowen Stream.

Groundwater Abstractions & Source Protection Areas

There are no wells on the proposed development site itself. It is understood the old mushroom growing facility sourced its water from the mains supply.

Reference to the Geological Survey of Ireland's (GSI) well database indicates a small number of wells and springs are recorded in the Gorey area. Details of all well/springs records within a 2 km radius of the proposed development site are provided in *Table 6.2* below.

Table 6.2 – Records from GSI Well Database

GSI Reference	Easting Northing	Well Type	Position Relative to Proposed Development Site	Drill Date	Depth (m bgl)	Depth to Rock (m bgl)	Well Use	Yield (m3/d)	Abstraction (m3/day)
2915SEW045	315010 159130	Borehole	1.1 km SSW	18/4/2001	7.6	-	Industrial	-	-
2915SEW046	315960 159220	Borehole	1.3 km SE	18/4/2001	5.4	-	Industrial	-	-
2915SEW044	315990 159170	Borehole	1.3 km SE	9/4/2001	6.1	-	Industrial	-	-

There are no Groundwater Source Protection Areas (SPAs) mapped by the GSI within 2 km radius of the proposed development site. The nearest SPA is for the Knockina Group Water Scheme (GWS) located 2.2 km to the north-northeast.

A group water scheme operates c.2.5 km to the north of the site in the townland of Knockina. Further north Kilanerin group water scheme operates 2 boreholes for a local supply.

The Gorey public water supply is sourced from two surface water intakes at Kilmichael and Pallis on the river Bann and eight boreholes. This water is treated at the Creagh Water Treatment Plant before being distributed to the Gorey Region.

Groundwater Vulnerability

Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Where the subsoil thickness is <3 m, the vulnerability is rated as Extreme (the highest risk situation). Where the subsoil thickness is >3 m, the vulnerability is rated as High, Moderate or Low (depending on the permeability and thickness of the subsoil). The GSI's criteria for classifying vulnerability are shown in Table 6.3 below.

Table 6.3 – Vulnerability Mapping Guidelines

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

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

The GSI's online web viewer indicates the vulnerability of groundwater beneath the proposed development site is High (H) (Appendix C Figure 5). The 2007 site investigation data indicates the subsoils comprise low permeability clays to a depth of at least 10 m. Based on this spite specific information the vulnerability beneath the proposed development site is revised to Low (L).

The vulnerability along the majority of the route of the proposed foul pipeline is mapped as High (H). A section of the route (c. 240 m long) is mapped as being of Extreme (E and X) vulnerability. No site-specific information on depth to bedrock along the route of the pipeline is available to confirm these vulnerability ratings. Based on an assumed moderate permeability subsoil (as indicated by the GSI National Recharge map) and a High (H) vulnerability rating this suggests depth to bedrock is 3-10 m along the majority of the length of the pipeline. Where vulnerability is Extreme (E) depth to bedrock would be expected to be between 1- 3 m and where vulnerability is Extreme (X) depth to bedrock is expected to be between <1 m.

Karst Features

The GSI's karst database indicates there are no karst features mapped within the proposed development site or surrounding area. Karstification is a process which occurs in soluble rocks such as limestone, dolomite and gypsum. Thus, karst would not expect to be present given that the bedrock underlying the proposed development site and surrounding area is non-calcareous.

Groundwater Quality

The description for the Inch GWB indicates no hydrochemical data is available for this GWB and there are no EPA WFD groundwater monitoring points in the area.

Hydrometeorology & Groundwater Recharge

The GSI website indicates the effective rainfall in the vicinity of the proposed development site is 594 mm/yr.

The proportion of effective rainfall that recharges the underlying aquifer is based on a number of factors including soil and subsoil permeability and depth, groundwater vulnerability and bedrock permeability.

The GSI have developed a model to estimate the percentage of effective rainfall that will recharge groundwater using regional information on these factors. The GSI's National Recharge Map indicates the recharge coefficient varies across the proposed development site as follows:

- 20% - where made ground currently exists in the southwestern area of the site. This equates to a recharge rate of 119 mm/yr.

- 60% - the remaining areas of the site where moderately permeable subsoils are overlain by well-drained soil with a moderate vulnerability rating. However, the underlying low permeability Ll aquifer cannot accept all of the available recharge and the recharge is capped at 200 mm/yr.

Made Ground is present along the route of the proposed foul pipeline so the percentage of effective rainfall that will recharge groundwater in this area is 20% which equates to 119 mm/yr.

6.3.4 Designated Sites & Groundwater Dependent Terrestrial Ecosystems (GWDTE's)

There are no known protected groundwater dependant ecosystems within 2 km of the proposed development site.

The sites considered to be within the potential zone of influence of the development are the Slaney River Valley SAC (Site Code: 000781) and Kilpatrick Sandhills SAC (Site Code; 001742), located at their closest 2.42km and 10.86km from the proposed development site respectively. The hydrological connectivity between the proposed development site and the Kilpatrick Sandhills SAC can be considered negligible, given the considerable hydrological distance to the SAC site (approximately 10km) and the considerable dilution of the site's drainage within the Owenavorragh River and Irish Sea

While the Slaney River Valley SAC is not hydrologically connected to the proposed development, it has been included within the potential zone of influence given its proximity to the development site.

The Courtown Dunes and Glen pNHA (000757) is located at the coast c. 6 km to the east of the proposed development site. There may be an indirect groundwater connection with the Courtown Dunes and Glen pNHA., but there is not considered to be any significant risk, due to distance from the site (c. 6 km to the south east).

6.3.5 Potentially Contaminated Land & EPA Licensed Sites

The proposed development site was previously used as a mushroom growing facility. Mushroom growing commenced on the site in the 1970's. It was subsequently closed and most of associated buildings and infrastructure were demolished in 2007. The mushroom growing facility included an on-site ESB electrical substation and on-site septic tank (located close to the north-eastern area of the proposed development site). Polychlorinated Biphenyls (PCBs) are substances that may occur in older electrical equipment such as transformers, capacitors and fluorescent lighting ballasts. PCBs are persistent organic pollutants and are extremely harmful to the environment and at higher levels, human health. No reports on the presence, or not, of any PCB containing equipment/contamination, or of the decommissioning/remediation of same was available.

There are no EPA licensed sites within the immediate vicinity of the site. The nearest licensed site is for a waste transfer station (IED licence no. W0220-01) operated by Starrus Ecco Holdings Ltd. at Ramstown c. 1.8 km to the south/southwest of the proposed development site.

6.3.6 Conceptual Model

The hydrological and hydrogeological conceptual model for the site is described below and presented graphically in Figure 6.4.

- Made ground is located in the south-eastern area of the proposed development site where the former mushroom facility was located. The depth of Made Ground ranges from 0.15-1.0 m.

- The subsoils underlying the Made Ground comprises stiff brown sandy gravelly CLAY with some cobbles Subsoils are at least 10 m thick in the south-eastern area of the site.

- The subsoils in the remaining undeveloped area are mapped as Till derived from Lower Palaeozoic Shales' (TLPS) and are assumed to be similar in composition to those investigated in the south-eastern area of the site.

- Some perched groundwater/seepages was recorded in the clay subsoils in the south-eastern are of the site at depths ranging from 2.9m to 4.70 m;

- The bedrock immediately beneath the site is green, red or purple, buff and occasionally grey slates, usually interbedded with siltstones (**Oaklands Formation (OA)).** Volcanic rocks comprising are located c. 100 m to the south of the proposed development site.

- The slates/siltstone bedrock immediately beneath site is classified as a **Locally Important bedrock (Ll) aquifer.** Groundwater flow in this type of aquifer is expected to be confined to the fractured/weathered zone in the top 15-30 m of the bedrock. Groundwater flow paths will be short and groundwater is expected to discharge to the nearest stream or river.

- The volcanic rock to the south is classified as a **Regionally Important bedrock (Rf) aquifer**.

- Groundwater flow direction will be to the southeast towards the Ballyowen Stream (which is a tributary of the Banogue River). Therefore, a small area of the Rf aquifer will be hydraulically downgradient of the site.

- A spring occurs to the south of the site along the mapped location of the fault. It is considered likely that the spring is related to this fault, with groundwater being forced upwards where it encounters the fault which acts as an impermeable hydraulic barrier.

- The groundwater vulnerability in the south-eastern area of the site (where the former mushroom facility was) proposed extension area of the site is mapped by the GSI as High (H), although site investigation indicates that it is in fact **Low (L).**

- Diffuse recharge occurs over most of the land surface through the permeable till. Estimates are in the order of 315 mm yr-1.

- There is the possible presence of PCB contaminated soils/subsoils in the area of the former ESB substation on the proposed development site. Given the thick, low permeability subsoils there is unlikely to be a pathway for PCB contamination to percolate downwards into the bedrock aquifer. PCBs could be transmitted via overland run-off to nearby surface water bodies (the drain on the site and the nearby Ballyowen Stream).

6.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

This section describes the aspects of the proposed development that relate to the water environment including water usage, management of foul water and surface water management. The water and waste water infrastructure will be delivered before the completion of Phase 1 of the housing development. Irish Water will approve the design of this infrastructure as part of the overall proposed drainage design proposed. This infrastructure will be delivered as part of this application by the applicant on approval from Irish Water. An open cut trench located in the road and one area of green space is required to accommodate the proposed development and integrate it into the existing drainage infrastructure. Detailed design for these aspects of the proposed development has been prepared (*IE Consulting, Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Stormwater, Foul & Water Supply Report No. 1505-2630*).

6.4.1 Water Supply

It is proposed that the residential development and the lands zoned as 'Community & Education' will obtain all its water supply from a connection to the mains supply. The estimated total water demand for the proposed development is 281.395 m3 This breaks down to: Residential Development – 181.65 m3/d; Crèche – 5.5 m3/d; Community/Education Area – 94.245 m3/d. It is proposed to connect to an existing mains line which runs along the outside of the south-western site boundary. The Gorey public water supply is from Creagh Water Treatment Plant

and a number of borehole wells. Irish Water currently have a project out to tender to increase the production of these borehole wells to increase the water supply into Gorey. This project is expected to be completed early to mid-2019.

6.4.2 Foul Water

It is proposed that all wastewater effluent arising from the proposed residential development and lands zoned as Community and Education centre will discharge to mains sewer. The total volume of effluent that will be generated is estimated at 341.945 m^3/day. This breaks down to Residential Development – 242.2 m3/d; Crèche – 5.5 m3/d; Community/Education Area – 94.245 m3/d. Foul effluent within the public sewer is ultimately transferred to Courtown Wastewater Treatment Plant for treatment. Treated effluent discharges through an outfall pipeline from the plant via a long-sea outfall to the Irish Sea east of Breanoge Head in Courtown Harbour.

The lands to the north of the site hold the potential for future development. The drainage system was hydraulically examined in order to determine the ability of the network to accommodate foul water discharges from the lands to the north. Further details are outlined in (*IE Consulting, Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Stormwater, Foul & Water Supply Report No. 1505-2630*).In order to prevent fluvial flood waters from the Ballyowen Stream from flowing into the proposed 225 mm foul pipe in the two areas where it passes through a flood zone, the manholes in these locations will be constructed using sealed flood proof covers. There are no proposed local connections to this foul pipe within these locations and therefore there is no residual flood risk posed to people or property beyond that of the existing scenario.

The foul water pipeline will require planning permission and this is included as part of this application. The waste water treatment infrastructure will be delivered over five phases. Construction of the foul water pipeline from the Ramsfort Park site to the existing waste water network will be completed prior to the completion of Phase 1 of the housing development.

It is proposed to connect to the existing mains sewer line at a connection point located c. 850 m to the southeast of the proposed development site on the Arklow Road (R772) opposite the Lidl site. This will require construction of an approximately 1 km length of 225 mm diameter pipe from the site to the point of connection. Laying of the pipe will involve excavations between 0.7 m and 5.5 m deep along the proposed route. The existing waste water treatment plan for Gorey has capacity to accommodate the proposed development.

6.4.3 Surface Water Management

A surface water management system for the proposed development and 'Community & Education Zone' has been designed in accordance with the *Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies (Volume 2 New Development).* The surface water management system incorporates attenuation to restrict runoff for the site to the greenfield runoff rate. The attenuation system includes two modular chamber attenuation tanks of 1,900 m^3 and 993 m^3 capacity. The stormwater will pass through two Class I Bypass Interceptors upstream of the attenuation tanks and it is proposed that the stormwater network will discharge to the Ballyowen Stream at a location c.60 m from the southern site boundary.

The proposed surface water management system for the resident development and 'Community & Education Zone' shall not result in any displacement of flood waters and is completely separate from the existing drainage infrastructure in the area. As such there will be no increase in runoff from the site beyond the 'greenfield' runoff rate and therefore the development as proposed will not pose an increase flood risk to the area.

There is potential for future development of the lands to the north of the site, in addition to the 'Community & Education Zone'. The proposed stormwater pipework and attenuation system was hydraulically examined in order to determine the ability of the network to accommodate additional attenuated runoff from the lands to the north. Further information is provided in the supporting document *IE Consulting,. Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Stormwater, Foul & Water Supply Report No. 1505-2630*).

6.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

6.5.1 Construction Phase

The construction phase holds the greatest number of activities which could potentially impact on the water environment. Potential construction phase impacts are detailed below.

Sediment Laden Run-off

The construction of the proposed development will involve stripping and removal of a large part of the topsoil and extensive significant earthworks to facilitate construction of the dwellings, infrastructure service provision, road construction, surface water management system etc. on the proposed development site. There is potential for erosion of exposed soil during this period and consequently the generation of run-off with high levels of silt/sediment. If uncontrolled, this run-off would enter the site drain and the downstream Ballyowen Stream and Banogue River.

Additionally, construction of the proposed foul water system will require laying of an approximately 1 km length of 225 mm diameter pipeline from the proposed development site to the point of connection to the existing mains sewer on the R772 road to the southeast of the site. The proposed route of the pipeline runs immediately adjacent the Ballyowen Stream for approximately half of its length. During excavation works for the pipeline there is potential for entry of sediment laden run-off to the Ballyowen Stream and downstream Banogue River, if appropriate mitigation measures are not put in place.

In the absence of mitigation, such uncontrolled entry of sediment laden run-off would have a *negative temporary slight to moderate impact* on water quality in the Ballyowen Stream and downstream Banogue River.

Increased Groundwater Vulnerability

The removal and disturbance of soil during the construction phase will temporarily increase the risk to groundwater as the protective soil/subsoil layer is removed and the vulnerability of the groundwater to surface contaminants is increased.

The majority of excavations on the proposed development site itself will be < 2.5 m bgl extending into the MADE GROUND/CLAY subsoils. Any excavations will be filled with foundations for buildings or other infrastructure or will be backfilled and reprofiled with fill, aggregate or re-used in-situ soils/subsoils. The existing subsoils are at least 10 m deep beneath the site. Assuming a 10 m deep subsoil, the excavation of 2.5 m would increase the vulnerability from Low (L) to Moderate (M). Thus, the removal of soil/subsoil cover during the construction phase would have a *negative slight to moderate temporary impact* on groundwater vulnerability on the proposed development site.

The excavations required along the route of the proposed foul pipeline range from 0.7 m to 5.5 m deep. After excavation and installation of the pipeline the area will be backfilled with fill and granular material and road and pavement surfaces will be reinstated. The vulnerability is currently mapped as High (H) along the majority of the route of the pipeline with a small section in the Old Garden City area mapped as Extreme (E and X) and this would not change following backfilling and reinstatement. The removal of soil/subsoil cover during the construction phase would have a *negative slight to moderate temporary impact* on groundwater vulnerability in the small area of the proposed pipeline.

Excavation of Bedrock Aquifer

The excavations required along the route of the proposed foul pipe line range from 0.7 m to 5.5 m deep. Groundwater vulnerability mapping suggests depth to bedrock is 3-10 m along the majority of the route. Vulnerability mapping suggests depth to bedrock is <3 m along a section of the pipeline in the Old Garden City area. The range of depth of excavations required in this area is c. 3.0 - 5.5 m which suggests it is likely that excavation of bedrock will be required. The bedrock beneath the site is classified as a Regionally Important (Rf) aquifer and thus a proportion of the aquifer will be removed. The volume of bedrock that would require removal would be extremely small given the overall size of the aquifer. Therefore, the removal of this very small area of bedrock will be a *negative imperceptible long-term impact* on the Rf aquifer.

Accidental Hydrocarbon Leakage/Spillage from Mobile Plant & Equipment

Possible contamination of surface water and groundwater by accidental leakage or spillage of hydrocarbons from mobile plant and associated equipment may occur during the construction phase. Because of the significant depth (c. 10 m) of low permeability clay subsoils beneath the site it is unlikely that contamination of the underlying groundwater or the nearby holy well from any such leaks/spills will occur. Any uncontrolled spillages/leaks would likely migrate via surface run-off to enter the site drain and then the downstream Ballyowen Stream and Banogue River.

Depending on the magnitude of any uncontrolled leakages or spillages they would have a *negative slight-moderate short-medium term impact* on surface water quality in the site drain, Ballyowen Stream and Banogue River, if not quickly contained and removed.

Spillage of Concrete/Cement Material

The spillage of concrete/cement material poses a potential risk to surface water and groundwater quality as this material is alkaline and corrosive. During the construction phase this risk may be realised during the construction of buildings and equipment washdown. However, because of the significant depth (c. 10 m) of low permeability clay subsoils beneath the site it is unlikely that contamination of the underlying groundwater or nearby holy well from any such spills would occur. Any spillages would likely migrate via surface run-off to enter the site drain and then the downstream Ballyowen Stream and Banogue River.

Depending on the magnitude of any spills, the release of such cement material into nearby surface water would have a *negative slight-moderate short-term impact* on surface water quality in the site drain and then the downstream Ballyowen Stream and Banogue River, if not quickly contained and removed.

Excavation & Re-Use of Potentially Contaminated Soils/Subsoils

There is potential for excavation and re-use of contaminated soils/subsoils from the area of the former ESB substation during the construction stage. There is the possibility of the presence of residual contamination of made ground/soils/subsoils by PCBs in the area of the former ESB substation. If contaminated material is not correctly identified, segregated, classified and appropriately handled, there may be inappropriate handling and reuse of the material off-site which could impact negatively on the water environment. Because of the significant depth (c. 10 m) of low permeability clay subsoils beneath the site it is unlikely that there is a pathway for PCB to percolate downwards into the underlying groundwater or nearby holy well. However, it is possible for any PCB contamination to migrate via surface run-off to enter the site drain and then the downstream Ballyowen Stream and Banogue River. This is considered to be a *negative moderate long-term impact* on surface water features on and in the vicinity of the site (if contaminated material is re-used on-site) and on the water environment at any off-site location (if it is not correctly identified and disposed of appropriately as contaminated material).

This also has potential impacts for humans and health and this are discussed separately in Chapter 3 respectively.

Pumping of Groundwater Ingress to Excavations

It is not anticipated that there will be any need for significant pumping of groundwater from excavations during the construction phase as the excavations are generally to a depth of 2.5 m only. Perched groundwater was encountered in the subsoils at depths ranging from 2.9 m to 4.7 m below ground level (bgl). Some very localised pumping may be required to prevent ingress of any minor flows of shallow perched groundwater encountered. This will be discharged to the temporary storm water management system implemented during construction. Such pumping of groundwater can lower groundwater levels but as there are no groundwater users in the area the impact on groundwater levels will be *negative temporary slight impact.*

6.5.2 Operational Phase

During the operational phase of the proposed housing development the main potential impacts on the water environment relate to foul water and potentially contaminated stormwater.

Flood Risk

The proposed development will involve constructing buildings and hardstanding areas in what is now a largely green field site. Thus there is the potential for increased flood risk in the downstream area as unattenuated run-off from impermeable areas will be greater than from a greenfield site.

However, the proposed drainage system has been designed in accordance with the relevant standards and regulations and incorporates attenuation to restrict run-off for the proposed development site to greenfield run-off rates.

It is proposed to modify the existing drainage channel adjacent to the eastern and southern boundaries of the site in order to accommodate the development as proposed, whilst also maintain the functionality of the drainage channel to convey surface water runoff from surrounding lands. A hydrological analysis has been undertaken to estimate predicted 1 in 100-year (1% AEP) and 1 in 1000-year (0.1% AEP) flood volumes in the drainage channel within the boundary of the proposed development site.

It is proposed to construct a 525mm diameter perforated pipe within the channel surrounded by Type B filter drain material within the existing drainage channel, which has adequate hydraulic capacity to convey the 1 in 100 year (1% AEP) + Climate Change flood volume of 0.774 m^3/s.

The existing drainage channel above the 525mm diameter pipe shall be re-profiled and vegetated in order to form a swale type channel along the eastern boundary to capture any surface water runoff from the forest area to the east. Potential surface water runoff volumes in excess the 1 in 100 year flow rate of 0.744 m3/s and up to the 1 in 1000 year flow rate of 1.022 m3/s shall be conveyed within the profiled swale channel.

A detailed description of the design of the proposed stormwater management system is provided in a separate report submitted with the planning application - IE Consulting,. *Proposed Residential Development at Ballyowen/Ramsfortpark, Gorey, Co. Wexford – Engineering Report – Stormwater, Foul & Water Supply.* Report No. 1505-2630.

Overall it is assessed that will be no increased risk of flooding on the site itself or downstream of the site arising from the proposed development and risk. Thus, the impact will be a *neutral long-term imperceptible impact* and no further mitigation is required.

Overall, the flood risk to the proposed development site is LOW. In consideration of the analysis in the SSFRA, the development of the site is not expected to result in an adverse impact to the hydrological regime of the area or to increase flood risk elsewhere and is therefore considered to be appropriate from a flood risk point of view.

Potentially Contaminated Surface Run-off

Run-off from impermeable trafficked areas on the proposed development site such as roads and car parking areas may contain potentially polluting substances such as hydrocarbons, heavy metals and polycyclic aromatics hydrocarbons (PAHs). Run-off from these areas will be diverted to the proposed storm water collection system which will ultimately discharge to the Ballyowen Stream at an outfall located c. 60 m from the southern site boundary. The proposed stormwater management system incorporates two Class I Bypass Oil Interceptors. All stormwater on the site will be passed through these interceptors prior to discharge to the Ballyowen Stream to remove the majority of heavy hydrocarbons. There will be a *negative long-term slight impact* on water quality in the Ballyowen Stream and the downstream Banogue River and no further mitigation is required.

Foul Water

It is proposed that foul water from the proposed development will be discharged to the mains sewer system. The impact on the public foul sewerage system will be to increase the loading on the Courtown Wastewater Treatment Works. The volume of foul water generated from the proposed development is calculated to be 341.945 m^3/day. Irish Water has indicated in their pre-planning proposal that there is capacity available to accommodate the proposed development. Figure 6.2 shows the route of the foul water pipeline.

There is potential for leakage of untreated foul water from the sewers on the site if not constructed or maintained appropriately. Because of the presence of significant depth of low permeability soils beneath the site it is unlikely that any leaking foul water would migrate to the underling bedrock aquifer. Any leakage would likely migrate along permeable backfill material surrounding the sewer pipes and migrate into the site drain and downstream Ballyowen Stream and Banogue River. Thus, there is potential for adverse impact (pathogens, elevated ammonia, nitrate, phosphorous etc.) on surface water quality in the site drain, Ballyowen Stream and Banogue River. Such leakages would have a *negative slight to moderate short-term impact* on water quality in these surface water bodies.

Disruption of Groundwater Flow Paths

Subsurface structures have the potential to impact on groundwater flow regimes if they are built in the aquifer's flow path. Theoretically, groundwater mounding can occur where large impermeable structures are placed perpendicular to groundwater flow paths. The average depth of the proposed excavations and permanent foundation structures is 2.5m below ground in the clay subsoils. The majority of groundwater flow beneath the site is in the bedrock aquifer - only minor groundwater inflows/seepages were encountered in the clay subsoils during site investigations. Installation of the proposed foul pipeline will be undertaken to a maximum depth of 5.5 m and may be required in the top of the Rf bedrock aquifer in the Old Garden City area. However, the depth of the pipe in the bedrock aquifer will be relatively shallow compared with the overall effective depth of the aquifer. Additionally, the pipe trench will be backfilled with fill and granular material so there will only be a very minor localised diversion of groundwater flow

paths around the impermeable pipe itself. Therefore the will be *neutral slight imperceptible impact* on groundwater flow paths.

Water Usage

It is proposed to obtain water from the Irish Water mains supply. Irish Water has indicated in their pre-planning proposal that there is capacity available to accommodate the proposed development. The total water usage for the development is calculated to be 281.395 m3/d. Therefore, the impact will be to increase the demand on the public water supply by this amount. It is assumed that the impact of the increased abstraction on the aquifer has been addressed by Strategic Environmental Assessment (SEA) and the EIA for the public abstraction itself and therefore it is not addressed here.

6.5.3 Potential Cumulative Impacts

Given the scale of the proposed residential development along with Community & Education development zone, the surrounding existing residential developments and the capacity of the surrounding environment to accommodate a development of this nature, it is considered that the overall cumulative development in the area will have a *negative slight long-term impact* on the water environment of the area, through the additional buildings, infrastructure and hardstanding required for the development on the subject lands.

6.5.4 ***'Do Nothing'*** **Impact**

If the proposed development does not proceed there would be no additional impact on the local water systems. The current rate of surface water run-off would continue to operate in its natural state.

Under the 'Do Nothing' scenario there would be no change to the current land use of the site. An investigation into potential PCB contamination will be undertaken prior to the construction stage of the proposed development and if required remediation works will be undertaken. However, this is planned to be undertaken anyway in line with EPA guidance (EPA, 2017) irrespective of whether the proposed development takes place or not.

Fluvial flooding events would continue as they have historically in this area with the existing floodplains.

Groundwater status would also remain unchanged if the existing land use continued.

6.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

This section describes a range of recommendations and mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the impacts of any emissions on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

6.6.1 Construction Phase

Construction Management Plan

In order to reduce the impacts on the water environment a number of mitigation measures will be adopted as part of the construction works on site. A Construction Management Plan will be prepared and will include measures to address the main potential impacts on surface water and groundwater as follows:

- Existing topsoil will be retained on site to be used for the proposed development. Topsoil will be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works. Stockpiles of topsoil/soils will be covered/dampened during dry weather to prevent spreading of sediment/dust;

- During construction of the foul water pipeline adjacent the Ballyowen Stream silt fences will be employed to prevent entry of sediment laden run-off to the stream;

- Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer;
- Top-soiling and landscaping of the works will take place as soon as finished levels are achieved, in order to reduce weathering and soil erosion and limit the generation of sediment laden run-off;
- A temporary site drainage system will be established for the duration of the construction works. All run-off from the site will be directed to settlement ponds and oil interceptors prior to discharge to existing site drain. This temporary system will throttle run-off and allowed suspended solids to settle out prior to entry to the site drain. The discharge to the site drain will be designed to prevent erosion and scour in the vicinity of the discharge. The discharge will be visually inspected regularly for any signs of contamination. Where any suspected contamination is observed, the discharge will cease immediately and will be treated and disposed of appropriately.
- Any minor volumes of groundwater required to be pumped during excavations will be passed through the temporary drainage system settlement prior to discharge to the existing site drain.
- Handling, transport and storage of fuel and chemicals will be controlled e.g. oil and fuel stored on site will be stored in designated areas. These areas will be bunded and located away from any surface water drainage.
- Refuelling of construction machinery will be undertaken in designated areas located away from surface water drainage.
- All machinery will be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas will be inspected on a daily basis for evidence of hydrocarbons leaking from machinery.
- All potentially polluting materials will be stored in bunded areas, the capacity of which will be 110% the volume of the largest volume of material OR 25% of the total volume of liquid to be stored, whichever is greater. The site manager will be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at storage locations as well as the site office.
- The washing of any plant equipment will be carried out in designated areas constructed to prevent potentially polluting material from entering surface or groundwater.
- Spill kits shall be kept in the machinery refuelling areas and any chemical/fuel storage areas in the event of spillages. The spill-kits will comprise suitable absorbent material, refuse bags etc. to allow for the appropriate clean-up and storage of contaminated material in the event of a spillage or leak occurring.
- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads. In addition to this road washing machinery will be employed where possible;
- There will be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities will be stored for removal off site for disposal and treatment;
- If concrete mixing is carried out on site, the mixing plant will be sited in a designate area with impervious surface. Washwaters from cement mixing equipment will not be disposed of the surface
- The Contractor will be obliged to ensure no deleterious discharges are released from the site to surrounding watercourses during the construction stage. Throughout the works the Contractor will also take account of relevant legislation and best practice guidance including but not limited to the following:
    - C532 Control of water pollution from construction sites: guidance for consultants and contractors.
    - C648 Control of water pollution from linear construction projects
    - SP156 Control of water pollution from construction sites – guide to good practice

Measures to Prevent Pollution of Ballyowen Stream during Construction of Foul Pipeline

The route of foul water pipeline will cross underneath the Ballyowen Stream at a single crossing. Inland Fisheries Ireland (IFI) will be informed in advance of works and will be welcome to inspect the site at any time. Silt fences will be employed where excavation works are required in the vicinity of the stream. These will be erected in advance of works along the stream and remain in place until after landscaping elements have become established. It will be inspected on a daily basis during works to ensure it is functioning correctly. Because the timing of works is uncertain at this stage it is not possible to define when this might be. It is therefore proposed that the silt fence will be removed only following consultation with IFI personnel.

Control and Re-use of Potentially Contaminated Material On-site

Prior to any site works an investigation of the area of the former ESB substation will be undertaken to assess for the presence of any contamination from Polychlorinated Biphenyls (PCB's). An initial site inspection, sampling and assessment will be undertaken as per EPA guidance on PCBs (EPA, 2017). After the initial assessment if confirmed or suspected PCB contamination is present then an appropriate level of site investigation and corrective action will be undertaken as per EPA guidance (EPA, 2017). If remediation and removal of PCB contaminated material is required this will be undertaken using an appropriately licensed waste contractor and treatment facility. The site investigation and assessment will be undertaken by a suitably qualified environmental consultant with specific experience in the assessment and remediation of PCB contamination. Each stage of the process will be rigorously recorded from initial site inspections to completion and verification of any remedial actions required.

During construction works, all excavated materials will be visually assessed for signs of contamination. Should material appear to be contaminated, soil samples will be analysed by an appropriate testing laboratory. All potentially contaminated material will be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material will be appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

Control on Sources of Fill and Aggregates

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

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

6.6.2 Operational Phase

Attenuation and Treatment of Stormwater

As indicated above the proposed stormwater management system for the development incorporates two attenuation tanks and hydrobrake flow controls to limit run-off from the site to the greenfield run-off rate to prevent increased flood risk. The run-off will pass through two Class I By-pass Interceptors prior to entry to the attenuation tanks and discharge to the Ballyowen Stream. The hydrobrake flow controls and oil interceptors will be inspected and maintained as per manufacturer's guidelines to ensure they are working to prevent contamination and increased run-off from the site. The two attenuation systems have been designed for no flooding up to the 1 in 100-year rainfall event including 10% climate change.

Foul Water

In order to reduce the risk of defective or leaking foul sewers, all new sewers will be laid in accordance with the relevant standards, pressure tested and CCTV surveyed to ascertain any possible defects.

A programme of inspection and maintenance of the foul sewer rising main pipeline will ensure that any damage, blockages etc. are identified and remedied.

In order to prevent fluvial flood waters from the Ballyowen Stream from flowing into the proposed 225mm foul pipe, the manholes in Flood Zones A & B along the foul water pipe route will be the manholes in these locations are constructed with sealed flood proof covers.

The proposed foul pipe will not result in any loss in flood plain storage as a result of its construction. There will be no local connections to the foul water pipeline downstream of the main development site area and therefore there is no flood risk posed to any existing or future residents as a result of the connection to the foul pipe.

Water Use

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce volumes and associated abstraction and treatment costs for the proposed development.

6.6.3 '*Worst Case'* Scenario

The proposed mitigation measures are considerate adequate and come with a low level of risk. The risk from potential PCB contamination from the former ESB substation will be dealt with by an appropriate site investigation undertaken by a suitably qualified environmental consultant as per EPA Guidance (EPA, 2017). Any remediation works will be undertaken using a waste licensed contractor and documented in detail by a suitably qualified environmental consultant.

6.7 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The predicted residual impacts of the proposed development are outlined in Tables 6.4 and 6.5 below.

6.7.1 Construction Phase

Implementation of the measures including the Site Specific Construction and Environmental Management Plan outlined in Section 6.6 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 short term.

The predicted impacts of the construction phase are described in Table 6.4 in terms of quality, significance and duration. The relevant mitigation measures are detailed and the corresponding residual impacts are determined which take account of these mitigation measures.

Table 6.4 – Summary of Predicted Construction Phase Impacts

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
Earthworks	Surface Water (site drain, Ballyowen Stream & Banogue River)	Erosion of exposed soils/subsoils and entry of sediment laden run-off to nearby surface water	Negative	Slight to moderate	Temporary	A CEMP will be designed & implemented. Stockpiles of topsoil/soils will be covered/dampened during dry weather to prevent spreading of sediment/dust. Run-off from the site will pass through settlement ponds prior to discharge to the site drain. Top-soiling and landscaping of the works will take place as soon as finished levels are achieved. Silt fences will be erected adjacent the Ballyowen Stream during construction of the foul pipeline.	Temporary slight Negative s
Earthworks/ Excavations	Groundwater in the Ll and Rf aquifer	Temporary removal of part of the protective soil/subsoil cover thus increasing groundwater vulnerability to contamination	Negative	Slight to moderate	Temporary	Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.	Negative slight
Earthworks/ Excavations	Rf aquifer	Removal of small part of Rf aquifer	Negative	Imperceptible	Permanent	None required	-
Hydrocarbons from construction vehicles/ machinery/ equipment	Surface Water (site drain, Ballyowen Stream & Banogue River)	Potential accidental leakage or spillage of hydrocarbons from vehicles/machinery resulting in surface water contamination	Negative	Slight-moderate	Short-term	A CEMP will be designed & implemented. Oil and fuel will be stored on-site in designated bunded areas located away from any surface water drainage. Refuelling of construction machinery will be undertaken in designated areas located away from surface water drainage. All machinery will be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas will be	

Activity/ Source	Environmental Receptor	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
						inspected on a daily basis for evidence of hydrocarbons leaking from machinery. Spill kits will be kept on-site.	
Cement material of other potentially polluting substances	Surface Water (site drain, Ballyowen Stream & Banogue River)	Potential leakage or spillage of cement or other potentially polluting substances resulting in soil/bedrock/groundwater contamination	Negative	Slight-Moderate	Short Term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas will be used and maintained. Spill kits retained on-site. Cement mixing will take place in designated areas on-site with impervious surface.	Negative slight
Earthworks/ Excavations	Surface Water (site drain, Ballyowen Stream & Banogue River)	Excavation and reuse of Potentially Contaminated Made Ground/Soils (PCBs)	Negative	Moderate	Long-term	Prior to commencement of construction a site investigation and assessment into potential PCB contamination will be to be undertaken by a competent professional in accordance with EPA guidance on PCBs (EPA, 2017). Any identified contaminated material will be sent to appropriately licensed facilities for treatment/disposal.	Negative slight
Pumping of Groundwater Ingress	Soils / Bedrock	Localised lowering of perched groundwater levels in the subsoils.	Negative	Slight	Temporary	No impact, therefore no residual impact	No residual impact

6.7.2 Operational Phase

The predicted impacts of the operational phase are described in Table 6.5 below in terms of quality, significance and duration.

The relevant mitigation measures are detailed and the residual impacts are determined which take account of these mitigation measures.

During the operational phase of the proposed development there will be no residual impact on hydrology or hydrogeology.

As surface water drainage design has been carried out in accordance with the GDSDS, and SUDS methodologies are being implemented as part of a treatment train approach, there are no predicted impacts on the water and hydrogeological environment arising from the operational phase. Implementation of the measures outlined in Section 6.6 will ensure that the potential impacts of the proposed development on water and the hydrogeological environment do not occur during the operational phase and that any residual impacts will be short term and imperceptible

Table 6.5 – Summary of Predicted Operational Phase Impacts

Activity/Source	Impact/Effect Description	Quality	Significance	Duration	Mitigation	Residual Impact
Conversion of part of greenfield to impermeable roads, hardstanding, buildings etc.	Increased flood risk on downstream of the proposed development if stormwater is not attenuated	Negative	Moderate	Long term	Proposed stormwater management system designed in accordance with relevant standards and incorporates two attenuation tanks and hydrobrake flow controls to limit run-off from the site to the greenfield run-off rate to prevent increased flood risk. Hydrobrakes will be inspected and maintained to ensure they are working to prevent increased run-off from the site.	Neutral imperceptible
Stormwater Discharge	Discharge of potentially contaminated surface run-off to the Ballyowen Stream	Negative	Slight-Moderate	Short term	Run-off will pass through two Class I By-pass Interceptors prior to entry to the attenuation tanks and discharge to Ballyowen Stream. Oil interceptors will be inspected and maintained to ensure they are working to prevent contamination from the site.	Negative slight
Foul Water Pipeline	Accidental leakage of untreated effluent from the foul sewer resulting in localised contamination of soils/subsoils.	Negative	Slight - moderate	Short term	All new sewers will be laid in accordance with the relevant standards, pressure tested and CCTV surveyed to ascertain any possible defects. Programme of inspection and maintenance of the foul sewer rising main pipeline will ensure that any damage, blockages etc. are identified and remedied. It is proposed to seal the foul manholes that are located within the flood risk area. This will ensure that the foul waters are not susceptible to inundation from fluvial flooding and therefore ensure there is no spillage from the proposed foul water network due to fluvial flood waters entering the piped system	Negative slight
Subsurface Structures	Localised disruption of groundwater flow paths	Neutral	Imperceptible	Long term	No impact, therefore no residual impact	No residual impact

6.8 MONITORING

6.8.1 Construction Phase

The Site Specific Construction and Environment Management Plan will incorporate mitigation measures as outlined in section 6.6, this will include monitoring of construction related activities during the construction phase.

The construction phase will be monitored, in particular in relation to the following;

- The taking in charge of the water infrastructure will ensure the system is regularly inspected and maintained.
- The performance of all Suds features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed Hydrobrake and gullies will be required to prevent contamination and increased runoff from the site.
- Protection of topsoil stockpiled for re-use;
- Adequate protection from contamination of soils for removal;
- Cleanliness of adjoining road network;
- Prevention of oil and petrol spillages;
- Dust control;
- Representative soil samples will be taken of the excavated material to confirm its suitability for re-use on the site and/or to facilitate classification for disposal;

6.8.2 Operational Phase

The on-site interceptors and hydrobrake flow controls will be maintained and inspected on a regular basis as per manufacturer's requirements.

6.9 REINSTATEMENT

6.9.1 Construction Phase

No specific reinstatement measures are required. However, if it should be required, normal post construction reinstatement of sewer trenches etc., will be completed as part of the proposed development. Where such works arise, all existing roads will be reinstated in accordance with Wexford County Council's requirements.

6.10 INTERACTIONS

There is an interaction between land/soils on the site and groundwater, where removal of soil/subsoils can increase groundwater vulnerability and result in sediment run-off. There is also an interaction between land/soils and water where potentially PCB contaminated soils/subsoils could contaminate surface water and groundwater. This is dealt with in Chapter 5 Land & Soils.

There is an interaction between the water environment and waste management as there may be the requirement for removal of contaminated soil off site to a suitable licensed facility to prevent contamination of water. This is dealt with in Chapter 11 Waste Management.

The design team has been in regular contact with each other throughout the design process to minimise environmental impacts and to ensure a sustainable and integrated approach to the design of the proposed development.

There is the interaction between waste and water where management of foul water is related to prevention of contamination of water.

6.11 DIFFICULTIES ENCOUNTERED IN COMPILING

No significant difficulties were encountered in the preparation of this assessment of the impact on the water environment.

Figure 6.1 – Topography & Hydrology Map

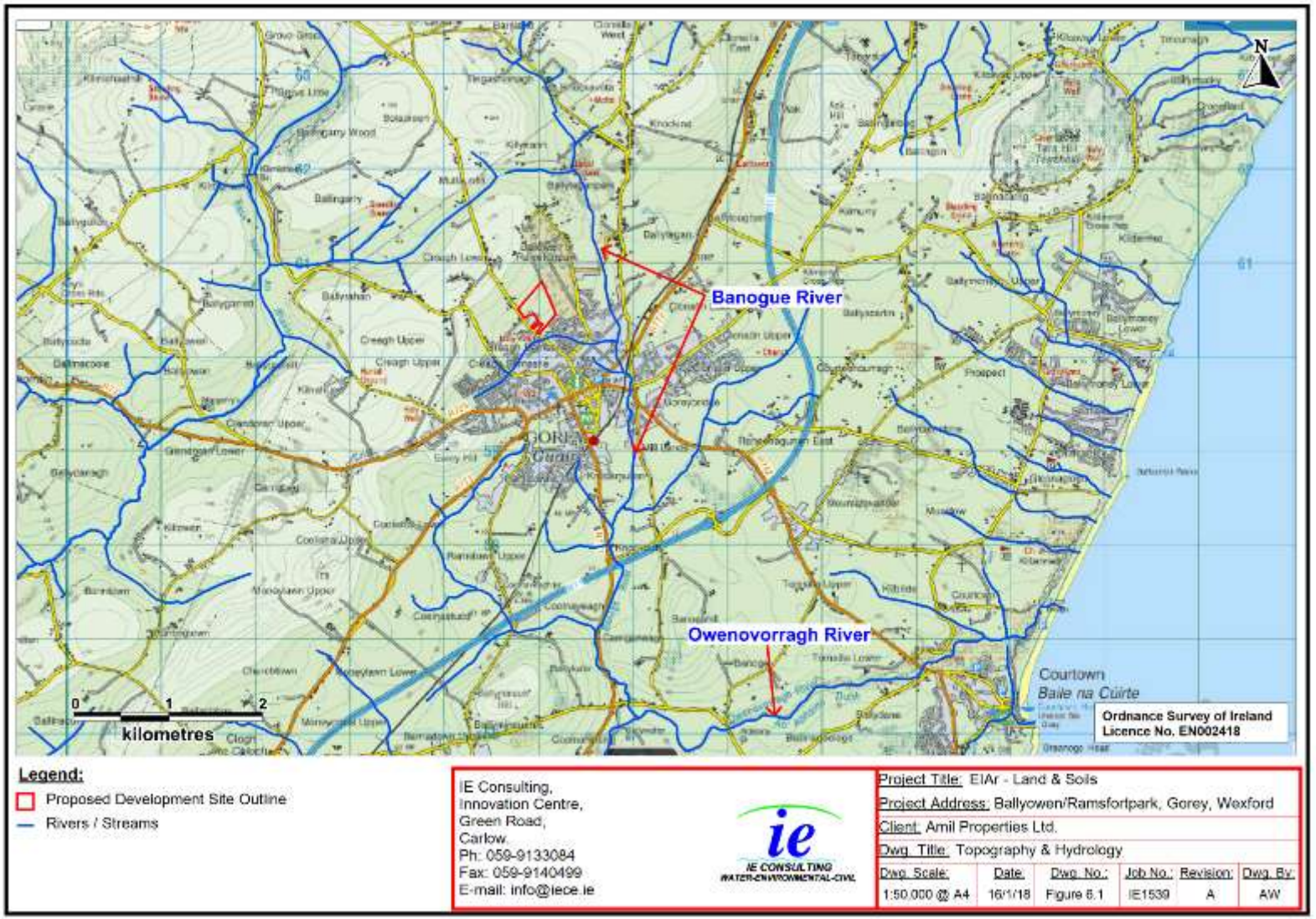


Figure 6.2 – Route of the proposed foul water pipeline.

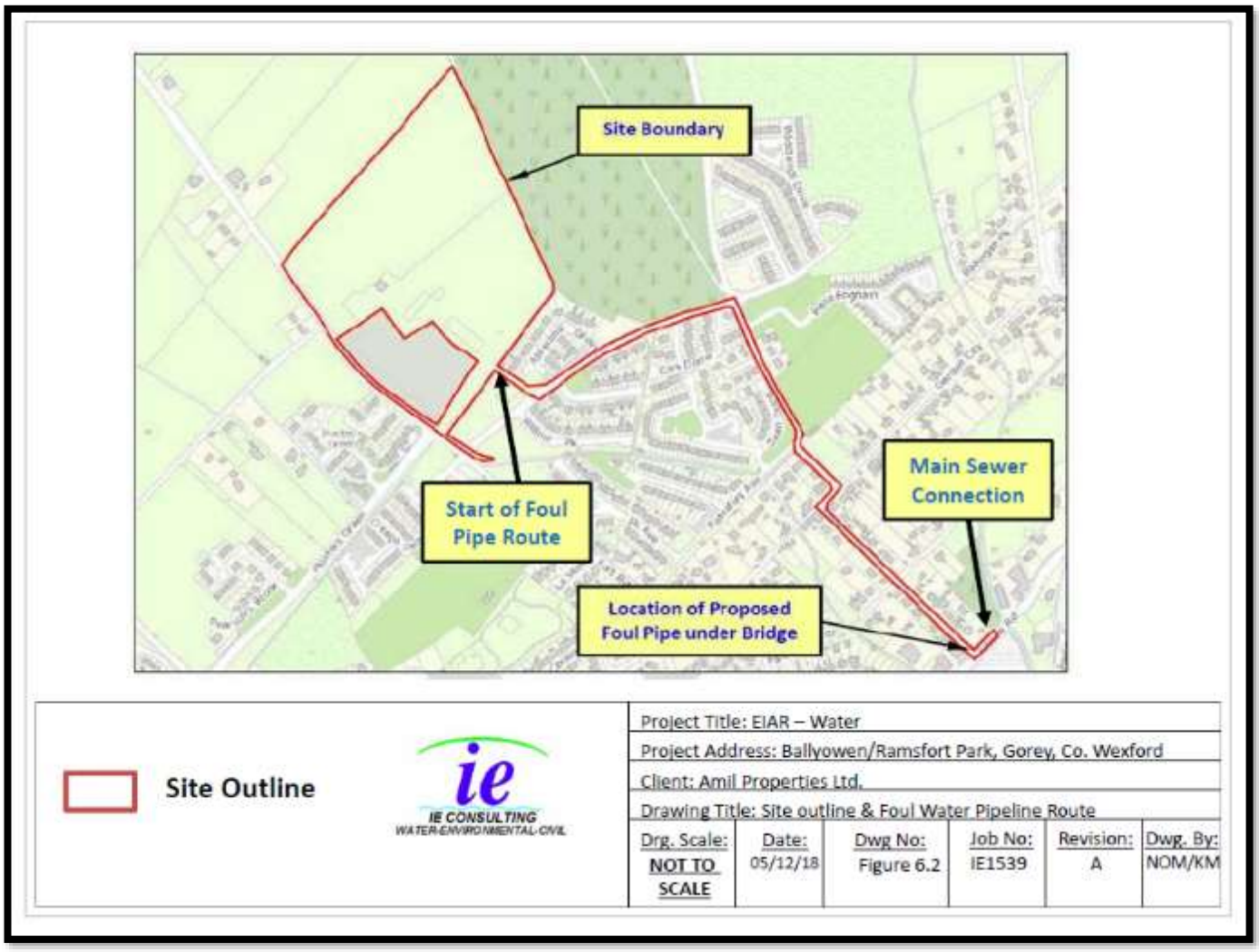


Figure 6.3 – Aquifer Map

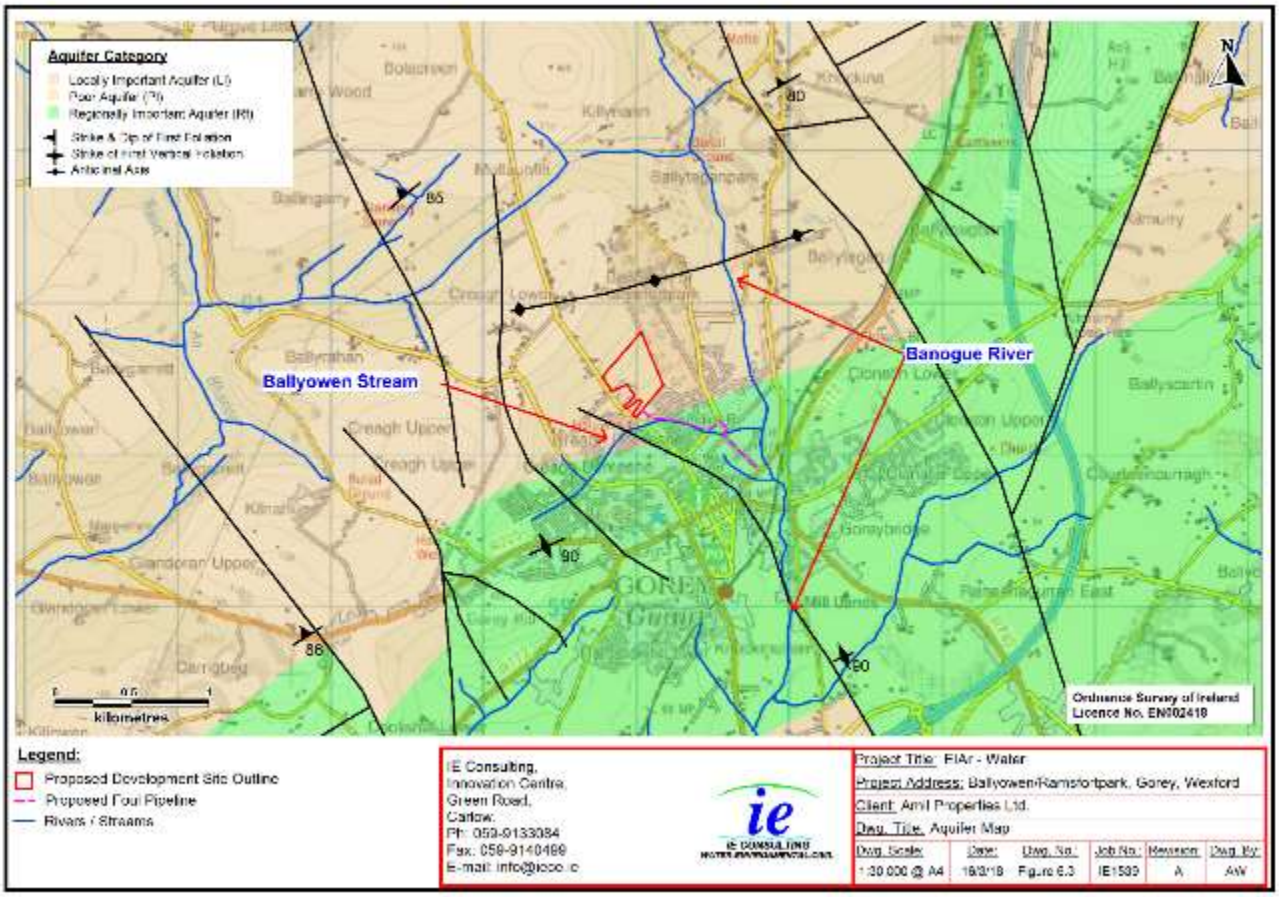
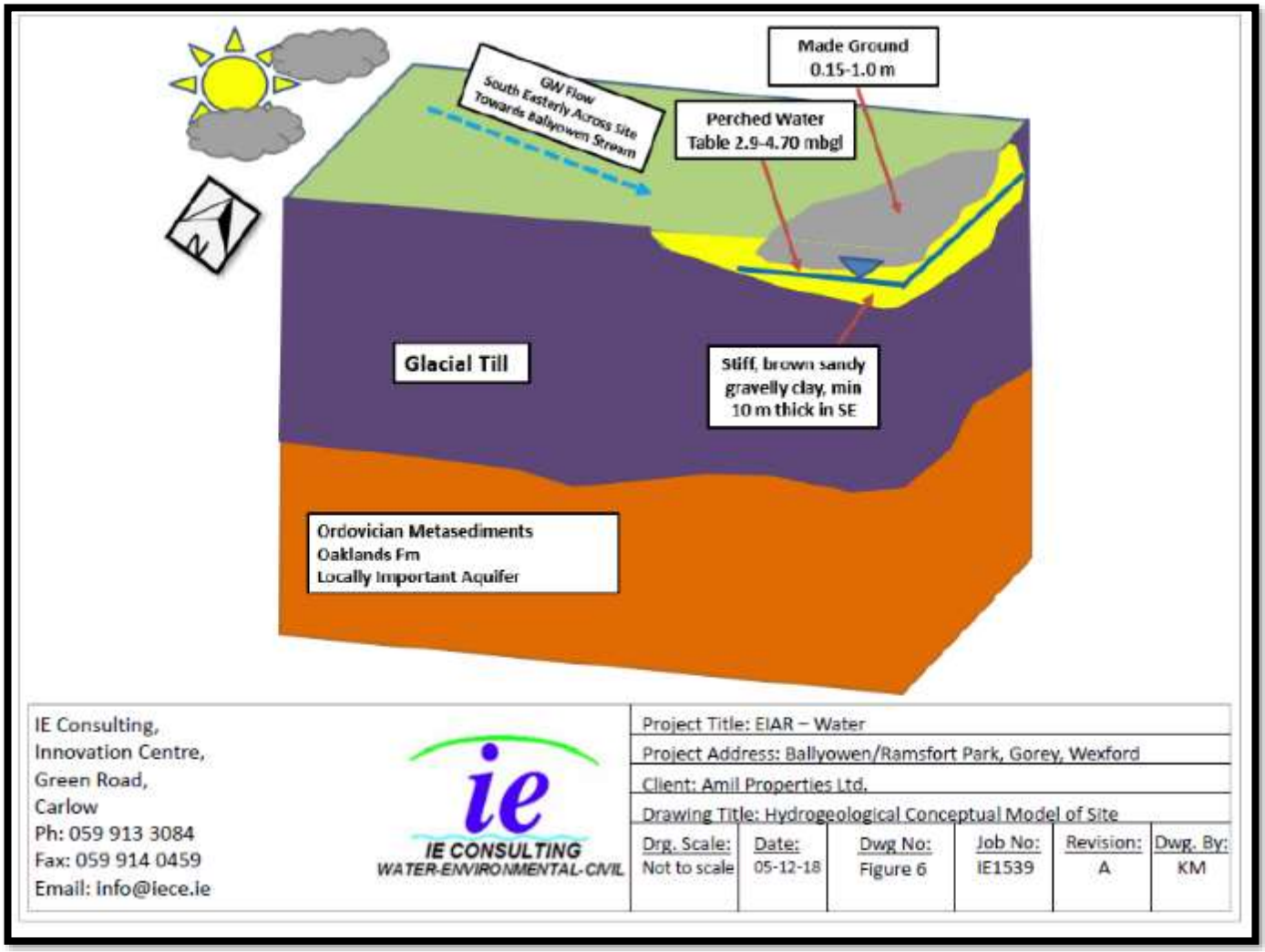


Figure 6.4 – Conceptual Model



7.0 AIR QUALITY AND CLIMATE

7.1 INTRODUCTION

The air quality and climate chapter of this EIAR describes the existing air quality setting and potential effects on ambient air quality associated with the construction phase and operational phase of the proposed development at Creagh, Gorey, Co. Wexford. The subject matter of Climate Change is also discussed. The assessment methodology, existing air quality, likely significant impacts and recommended mitigation measures are described in the following sections.

7.2 STUDY METHODOLOGY

This assessment has been prepared in accordance with and regard to the following documents:

- Environmental Protection Agency guidelines on the *Information to be Contained in Environmental Impact Statement* (EPA 2002, Revised 2015 & 2017);
- Environmental Protection Agency Advice Notes on Current Practice (*in the preparation of environmental Impact Statement*)(EPA 2003);
- Design Manual for Roads and Bridges (DMRB) Volume 11, Index, Environmental Assessment Section 3: Environmental Assessment Techniques Part I Ha 207/07 Air Quality(2007);
- Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA 2006, revised 2011);
- Guidelines on Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA 2008).

7.2.1 Scope of Assessment

Primarily a desk study was undertaken to identify activates associated with the proposed development that could generate emissions to atmosphere, and the key pollutants associated with these emissions. The construction and operational activities were examined to identify those activities that have the potential to impact negatively on the local air quality.

The desk-based assessment carried out involved:

- Initial scoping of possible emission sources and key pollutants through review of the projects construction and operational activities;
- Review of relevant assessment criteria, guidelines and best practice to assess the potential impact of the proposed development on air quality (at sensitive receptors) and climate;
- Review of the existing EPA air monitoring data to determine baseline air quality:
- Review of other relevant published documents on the study area including:
  - Wexford Development Plan.
- Review of the five year average meteorological data at the nearest synoptic weather station;
- Review of Irelands Provisional Greenhouse Gas Emissions;
- Review of Irelands National Climate Change Strategy.

The DMRB publication on Environmental Assessment Techniques for Air Quality outlines that a quantitative assessment is required if affected roads meet any of the following criteria:

- Daily traffic flow change by 1,000 (annual average daily traffic) AADT or more;
- Heavy Duty Vehicles (HDV) flow changes by 200 AADT or more;
- Daily average speed changes by 10 Km/hr or more;
- Road alignment will change by 5m or more;
- Peak hour speed will change by 20 km/hr or more.

A Traffic Impact Assessment carried out as part of this EIAR was reviewed and the change in vehicle movements considered for the construction and operational scenarios.

The projected increase in traffic due to the proposed development does not meet the threshold criteria for a quantitative assessment. Subsequently air quality sampling and air dispersion modelling was not considered necessary for this Environmental Impact Assessment Report. The assessment therefore is limited to a desk based qualitative evaluation.

7.2.2 Assessment Criteria

Potential pollutants arising from the construction phase will predominantly be as a result of vehicle exhaust emissions and fugitive dust. Potential pollutants from the operation phase will arise predominantly from vehicle exhaust emissions and minor non-traffic derived emissions (e.g. home heating systems). The statutory instruments, regulation and guidance in place to protect ambient air quality are described below. The likely predicted impacts are discussed in parallel with these criteria to determine the significance, if any, of the impacts caused by the construction phase and operational phase.

Data from the traffic assessment provides peak vehicle traffic likely to be generated by the site for both AM and PM peak hours. The AM peak occurs between 08.15 and 09.15, while the evening PM peak is between 17.00 and 18.00 hours. The traffic calculations have been carried out based on the total number of new residential units (297 dwellings) and a creche facility.

7.2.3 Air Quality Standards for PM10 and PM2.5

In order to reduce the risk to health as a result of 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 and/or environmental based levels, for which additional factors may be considered.

The *Ambient Air Quality & Cleaner Air for Europe (CAFE) Directive (2008/50/EC)* was published in May 2008. It replaced the Framework Directive and the first, second and third Daughter Directives. The fourth Daughter Directive (2004/107/EC) will be included in CAFE at a later stage.

The applicable standards in Ireland is the *Air Standard Regulation 2011* (SI: No 180 of 2011), which replaced the *Air Quality Standards Regulations 2002* (S.I. No. 271 of 2002), the *Ozone in Ambient Air Regulations 2004* (S.I. No. 53 of 2004) and S.I. No. 33 of 1999.

The ambient air quality standards applicable for PM10 and PM2.5 are outlined in this Regulation. This assessment has used these standards to determine the potential impact of PM10 and PM2.5 emissions from the proposed development on air quality.

The EPA is the competent authority for the purpose of *The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive* 2008/50/EC and *Air Standard Regulations 2011*. The EPA is required to submit an annual report to the Minister for Communications, Climate Action and Environment, and to the European Commission. These Regulations also provide for the communication of public information, including information on any exceedances of the target values, the reasons for the exceedances, the area(s) in which they occurred and appropriate information regarding effects on health and impact on the environment.

7.2.4 Climate Agreement

Ireland ratified the *United Nations Framework Convention on Climate Change* (UNFCCC) in April 1994 and the *Kyoto Protocol* in 1997 and formally in May 2002 (Framework Convention on climate Change – 1999 and Framework Convention on Climate Change – 1997). For the purpose of the European Union, burden sharing agreement under Article 4 of the *Kyoto Protocol*, in June 1998, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the *Kyoto Protocol* to 13% above the 1990 level over the period 2008 to 2012.

The UNFCCC is continuing detailed negotiations in relation to GHGs reduction and in relation to technical issues such as emissions trading and burden sharing. The most recent Conference of the Parties (COP19) Workshop was held in Warsaw, Poland in November 2013, with mandated events held every year since.

The EU has also published the *'20-20-20 Climate and Energy Package'.* The 2020 package is a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. It calls for a 20% reduction in greenhouse gas emissions, a 20% share of renewable energy and 20% energy efficiency improvements by 2020.

7.2.5 Gothenburg Protocol

Ireland signed the Gothenburg Protocol to the 1979 UN convention on Long Range Transboundary Air Pollution in 1999. The objective of the protocol is to control and reduce emission of Sulphur Dioxide (SO_2), Nitrogen Oxide (NO_x), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the targets Ireland, by 2020, had to meet national emission ceilings of 42kt for SO_2 (67% below 2001 levels), 65kt of NO_x (52% reduction), 55kt for VOC (37% reduction) and 116kt NH_3 (6% reduction).

European Commission Directive 2001/81/EC, the National Emission Ceiling Directive, prescribes the same emission limits. Emissions of SO_2 and NH_3 from the road traffic sector are insignificant accounting for less than 1.5% of total emissions in Ireland in 2001. Road traffic emissions of nitrogen oxides (NO_x) and Volatile Organic Compounds (VOCs) are important accounting for 37% and 38% respectively of total emissions of these pollutants in Ireland in 2001.

A national programme for the progressive reduction of emissions of the four transboundary pollutants is in place since April 2005. A review of the National Programme in 2011 showed that Ireland complied with the Emission ceiling for SO_2, VOCs and NH_3, but failed to comply with emissions ceiling for NO_x. Although emissions from road traffic decreased by 47% over the period 1990-2011, NO_x levels in 2011 were 2.5kt above the ceiling of 65kt.

Ireland is among six member states to have persistently exceeded their emission ceilings for NO_x between 2010 and 2015 based on the latest air pollutant emissions inventory data reported by Member States in February 2017. Ireland also had the highest exceedance for non-methane volatile organic compounds (NMVOCs) in 2015, 84% above the ceiling level. According to the report, this is due to the recent addition of NMVOC emissions from agriculture into Ireland's emission inventory.

According to an April 2017 report from the Environmental Protection Agency (EPA), the brunt of Ireland's emissions come from the agricultural and transport sectors. Combined, they are projected to account for three-quarters of Ireland's total non-ETS emissions in 2020.

The EPA recently found that Ireland would fail to meet its upcoming emissions targets if the state continues to rely on current climate policies. The EPA report projected that emissions will only be reduced by 4 - 6% below 2005 levels, well below the 20% target.

7.2.6 Directive set Targets for Air Quality

The following tables show the limit or target values specified by the five published directives that set down limits for specific air pollutants. The directives cover:

- Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM10 and PM2.5) and lead,
- Carbon monoxide and benzene,
- Ozone,
- Arsenic, Cadmium, Nickel and Benzo(a)pyrene

Table 7.1 – Limit values of CAFE Directive 2008/50/EC

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m^3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
SO2	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 Jan 2005
SO2	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
SO2	Protection of vegetation	calendar year	20	7.5	Annual mean	19 July 2001
SO2	Protection of vegetation	1 Oct to 31 Mar	20	7.5	Winter mean	19 July 2001

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m^3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
NO2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO2	Protection of human health	calendar year	40	21	Annual mean	1 Jan 2010
NO + NO2	Protection of ecosystems	calendar year	30	16	Annual mean	19 July 2001
PM10	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 Jan 2005
PM10	Protection of human health	calendar year	40	-	Annual mean	1 Jan 2005
PM2.5 - Stage 1	Protection of human health	calendar year	25	-	Annual mean	1 Jan 2015
PM2.5 - Stage 2	Protection of human health	calendar year	20	-	Annual mean	1 Jan 2020
Lead	Protection of human health	calendar year	0.5	-	Annual mean	1 Jan 2005
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded	1 Jan 2005
Benzene	Protection of human health	calendar year	5	1.5	Annual mean	1 Jan 2010

Table 7.2 – Long-term Objectives for Ozone from 2020

Objective	Parameter	Value/Threshold
Protection of human health	Maximum daily 8 hour mean	120 µg/m3
Protection of vegetation	AOT40, calculated from 1 hour values from May to July	6000 µg/m3/h
Information Threshold	1 hour average	180 µg/m3
Alert Threshold	1 hour average	240 µg/m3

Table 7.3 – Target Values of Directive 2004/107/EC

Pollutant	Limit Value Objective	Averaging Period	Target Value ng/m^3	Limit Value Attainment Date
Arsenic	Protection of human health	calendar year	6	31 Dec 2012
Cadmium	Protection of human health	calendar year	5	31 Dec 2012
Nickel	Protection of human health	calendar year	20	31 Dec 2012
Benzo(a)pyrene	Protection of human health	calendar year	1	31 Dec 2012

Table 7.4 – Previous EU Air Quality Standards

Pollutant	Regulation	Type	Averaging Period	Limit Value
NO_2	85/203/EEC	Limit Value	98th percentile of yearly mean hourly	200 µg/m^3
		Guide Value	Concentration	135 µg/m^3
		Guide Value	50th percentile of yearly mean hourly concentration	50 µg/m^3
SO_2	80/779/EEC	Limit Value	98th percentile of yearly mean hourly concentration	2 µg/m^3
		Limit Value	Winter (medium of daily values)	250-350 µg/m^3
		Limit Value	One Year (medium of daily values)	130 0r 180 µg/m^3
		Guide Value	98th percentile of yearly mean hourly concentration	80 – 120 µg/m^3
		Guide Value	50th percentile of 1 hour mean	135 µg/m^3

Lead (Pb)	82/884/EEC	Limit Value	Annual Mean	50 µg/m^3
Smoke	80/779/EEC	Limit Value	One Year (medium of daily values)	80 µg/m^3
		Limit Value	Winter (medium of daily values)	130 µg/m^3
		Limit Value	98th percentile of daily values	250 /m^3

7.2.7 National Road Authority Guidelines

Although no impact criteria, as a percentage of the limits, are enshrined in EU or Irish Legislation, the National Road Authority document *Guidelines for the treatment of Air Quality during the Planning and Construction of National Road Schemes* details a mythology for determining air quality impact significance criteria for road schemes. The degree of impact is determined based on both the absolute and relative impact of the development. The NRA significance criteria have been adopted for the proposed development and are detailed in tables 9.5 – 9.7. The significance criteria are based on PM10 and NO_2, as these pollutants are most likely to exceed their limit values. However, the criteria have also been applied to the predicted 8-hour CO, annual benzene and annual PM2.5 concentration for the purpose of this assessment.

Table 7.5 – Definition of Impact Magnitude for Changes in Ambient Air Pollution Concentration (NRA 2011)

Magnitude of Change	Annual Mean NO2/PM10	No. Days PM10 Conc. >50 µg/m^3	Annual Mean PM
Large	Increase/decrease ≥4 µg/m3	Increase/decrease > 4 days	Increase/decrease ≥ 2.5 µg/m3
Medium	Increase/decrease 2 – <4 µg/m3	Increase/decrease 3 of 4 Days	Increase/decrease 1.25 – < 2.5 µg/m3
Small	Increase/decrease 0.4 – <2 µg/m3	Increase/decrease 1 or 2 Days	Increase/decrease 0.25 – <1.25 µg/m3
Imperceptible	Increase/decrease <0.4 µg/m3	Increase/decrease < 1 Day	Increase/decrease <0.25 µg/m3

Table 7.6 – Air Quality Impact Descriptors for Change in Annual Mean NO_2, PM10 and PM2.5 Concentrations at a Receptor

Absolute Concentration in Relating to Objective/Limit Values	Changes in Concentration		
	Small	Medium	Large
Increase with Scheme			
Above Objectives/Limit Values with Scheme (≥ 40µg/m3 of NO2 or PM10) (≥ 25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just below Objectives/Limit Values with Scheme (36 – <40µg/m3 of NO2 or PM10) (22.5 – <25µg/m3 of PM2.5)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objectives/Limit Values with Scheme (30 – <36µg/m3 of NO2 or PM10)	Negligible	Slight Adverse	Slight Adverse

(18.75 – <22.5µg/m3 of PM2.5)			
Well below Objectives/Limit Values with Scheme (<30µg/m3 of NO2 or PM10) (<18.75µg/m3 of PM2.5)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objectives/Limit Values with Scheme (≥ 40µg/m3 of NO2 or PM10) (≥ 25µg/m3 of PM2.5)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just below Objectives/Limit Values with Scheme (36 – <40µg/m3 of NO2 or PM10) (22.5 – <25µg/m3 of PM2.5)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objectives/Limit Values with Scheme (30 - <36µg/m3 of NO2 or PM10) (18.75 – <22.5µg/m3 of PM2.5)	Negligible	Slight Beneficial	Slight Beneficial
Well below Objectives/Limit Values with Scheme (<30µg/m3 of NO2 or PM10) (<18.75µg/m3 of PM2.5)	Negligible	Negligible	Slight Beneficial

Table 7.7 – Air Quality Impact Descriptors for Change to Number of Days with PM10 Concentration Greater than 50 µg/m^3 at Receptors.

Absolute Concentration in Relating to Objective/Limit Values	**Changes in Concentration**		
	Small	**Medium**	**Large**
Increase with Scheme			
Above Objectives/Limit Values with Scheme (≥35 Days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just below Objectives/Limit Values with Scheme (32 – <35 Days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objectives/Limit Values with Scheme (26 – <32 Days)	Negligible	Slight Adverse	Slight Adverse
Well below Objectives/Limit Values with Scheme (<26 Days)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			

Above Objectives/Limit Values with Scheme (≥35 Days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just below Objectives/Limit Values with Scheme (32 – < 35 Days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objectives/Limit Values with Scheme (26 – < 32 Days)	Negligible	Slight Beneficial	Slight Beneficial
Well below Objectives/Limit Values with Scheme (<26 Days)	Negligible	Negligible	Slight Beneficial

This air quality assessment has been carried out, following procedures in the publication by the EPA, and using the methodology outlined in the guidance document published by the UK Department for Environment, Food & Rural Affairs (DEFRA). The assessment of air quality was carried out using the phase approach recommended by the UK DEFRA. The phased approach recommends that the complexity of an air quality assessment be consistent with the risk of failing to achieve the air quality standard. In the current assessment, an initial scoping of possible key pollutants was carries out and the likely location of air pollution *Hot-Spots* identified. An examination of recent EPA and Local Authority data in Ireland had indicated that SO_2 smoke and CO are unlikely to be exceeded at locations such as the current one and thus these pollutants do not require detailed monitoring or assessment to be carried out.

7.2.8 Dust Deposition Guidelines

Construction dust has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors (e.g. the residential properties located at the south-westerly site boundary). Construction activities such as earth excavation, moving and backfilling may generate quantities of dust, particularly in dry weather conditions.

There are no statutory limits for deposition of dust, and industry guidelines are typically employed to determine any impact. The TA Luft (German Government *'Technical Instructions on Air Quality')* states a guideline of 350 mg/m^2/day for the deposition of non-hazardous dust. This value will be used to determine the impact of residual dust as an environmental nuisance.

The National Road Authority has published guidance for assessing dust impacts from road construction, *Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes*. Table 7.11 provides a list of distances that dust could be expected to result in a nuisance, from construction sites, for impacts such as soils, PM10 and vegetation effects. These distances present the potential for dust impacts with standard mitigation in place. This has been used to determine the potential impact from the proposed construction site operations.

7.2.9 Impact Significance Rating

The assessment of impacts signification is based on the EPA Glossary of Impacts, including in the *Guidelines on Information to be contained in Environmental Impacts Statements* (EPA 2002, Revised 2015 & 2017).

7.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

7.3.1 Land Use and Receptors

Air quality in Ireland is of a high standard across the country and is among the best in Europe, due to the prevailing clean Atlantic air and a lack of large cities and heavy industry. Emissions of pollutants from vehicles, power stations, industry, domestic fuel burning and agriculture can have international, national, local or global effects. Emissions of carbon dioxide and other greenhouse gases are increasing the greenhouse effect and causing global warming. The most significant and sustained contributor to greenhouse gas emissions is the transport section and the increase in road transport use.

The proposed development site is located at Creagh, Gorey, Co. Wexford.

The development will consist of the demolition of all existing industrial buildings and made ground and will involve the construction of a residential development consisting of residential units, a crèche, roads, footpaths and all associated works.

The lands adjacent the residential development are zoned for Community and Education purposes. The future development of these lands would potentially include a nursing home, catering for approximately 60 beds and including approximately 12 sheltered units, and a mixed / medical centre.

The main transport network located adjacent to the site is the Fort Road, which is located along the south-westerly boundary.

The nearest sensitive receptors are residential properties located at Ashwood Grove, adjacent to the south-easterly boundary of the site. Other nearby sensitive receptors, including two detached house and a small number of residential properties within Hunters Green, which are separated from the sites south-westerly boundary by the Fort Road.

According to the *Wexford County Development Plan* (2013 – 2019), the Council has a supply of 1,117 ha. of existing residential zoned land throughout the county. However, some of this land is not capable of being utilised due to its location either on un-serviced land or in locations that are inappropriate for further social housing. There is an adequate supply of land zoned for residential use in the county to accommodate the projected increase in demand over the period of the Strategy.

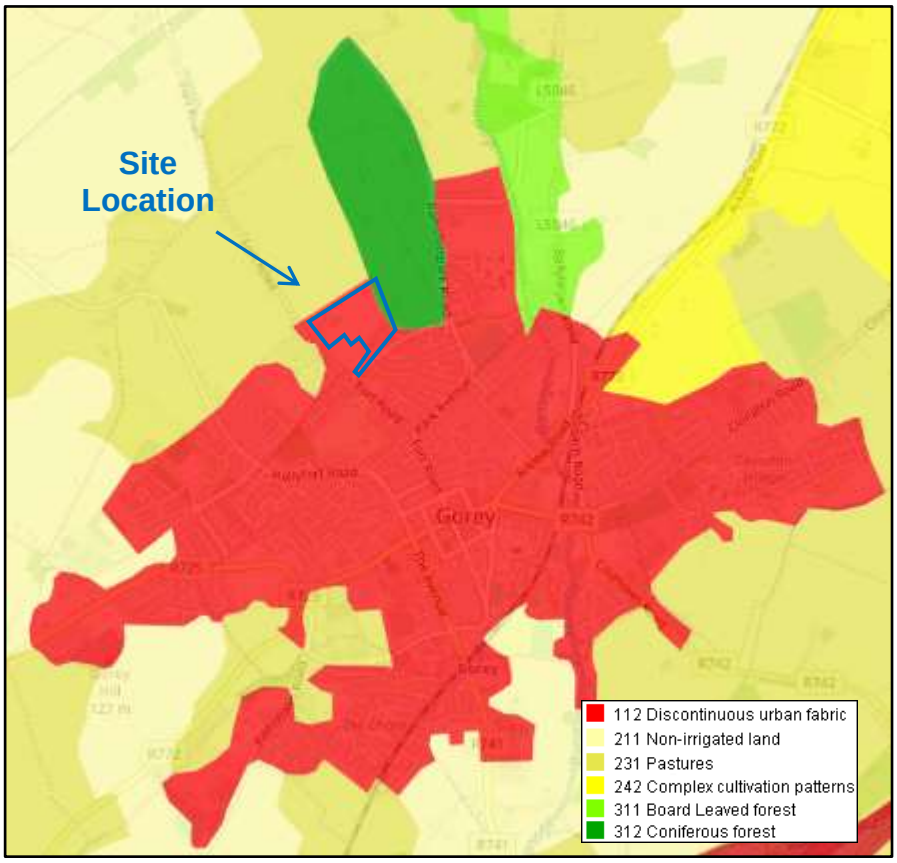
The Wexford Development Plan 2013-2019 indicates that 89.46 ha. of zoning is required to accommodate the population for Gorey, and that there is also 121 ha. of existing zonings within Gorey.

7.3.2 Local Influences on Air Quality

The site of the proposed development is semi-rural in character. The site is bounded to the south by the Ashwood Grove residential development and to the west by the Fort Road. To the north, the site is bordered by an agricultural green field, while to the east/north-east by approximately 90 acre of forestry.

The existing air quality environment is therefore principally defined by traffic from the Fort road, other local networks and agricultural activities. Fuel combustion for home heating purposes also contributes to the ambient air quality.

Figure 7.1 – Land Use in the Gorey Area



(Source: Corine 2012)

7.3.3 Meteorological Data

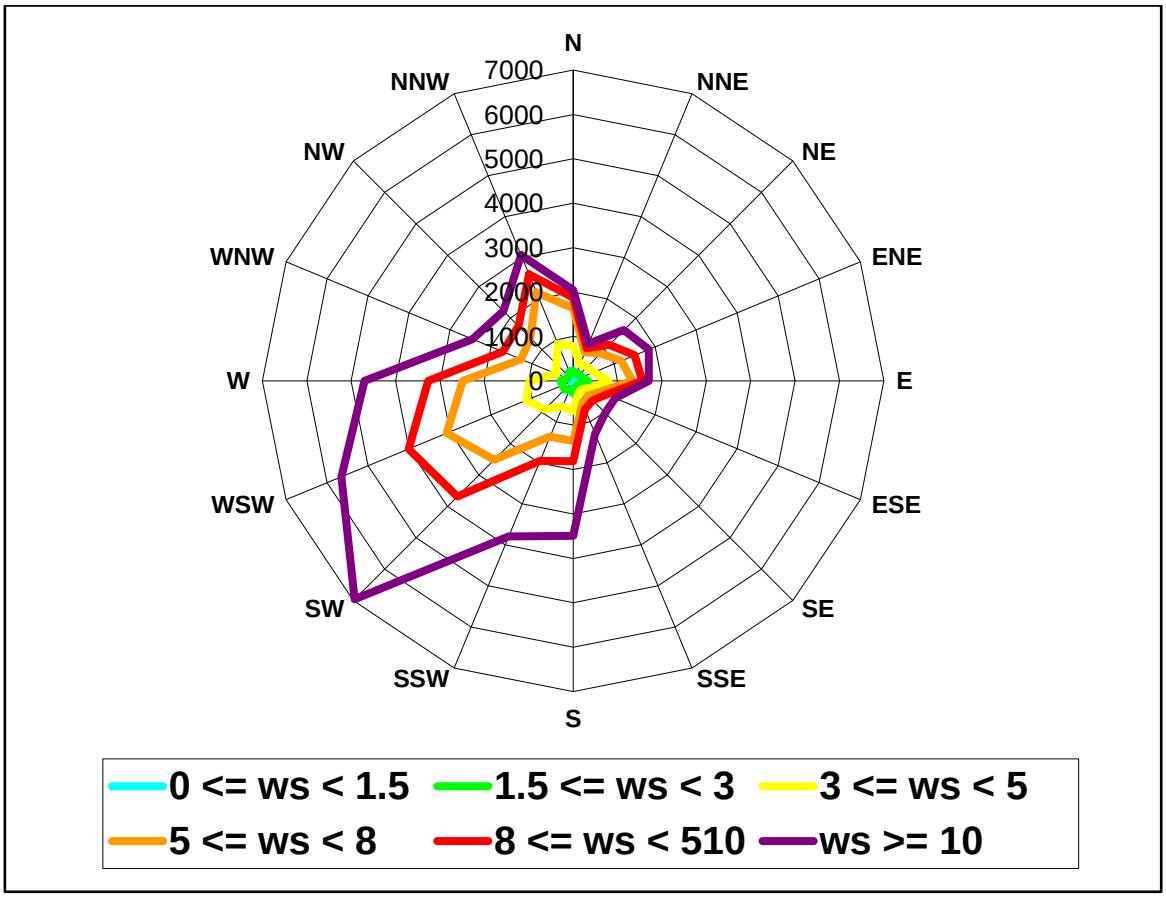
A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological condition. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength.

Wind is of key importance in the dispersing air pollution. For ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Therefore, concentrations of pollutants derived from traffic sources will generally be greatest under calm conditions and low wind speeds, when the movement of air is restricted.

In relation to PM10, the situation is more complex due to the range of sources of this pollutant. Smaller particles from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles (PM2.5 - PM10) will actually increase at higher wind speeds.

The nearest representative weather station to the proposed site, which collates detailed weather records, is at Johnstown Castle, approximately 45km south of the proposed site. Meteorological data from this station was examined to determine the prevailing wind direction over a five year period (2013-2017). The predominant wind direction was found to be from the south-west in the region of the proposed site (see the figure 9.2). This corresponds with the prevailing wind direction for the nation, which according to Met Éireann is between south and west.

Figure 7.2 – Johnstown Castle Wind-Rose Diagram (2013 – 2017)



9.3.4 Air Quality Zones

The Environmental Protection Agency manages the national ambient air quality network.

Under the *Clean Air for Europe Directive*, EU member states must designate "Zones" for the purpose of managing air quality. For Ireland, four zones were defined in the *Air Quality Standards Regulations* (2011). The zones were amended on 1st January 2013 to take account of population counts from the 2011 CSO Census, and to align with the coal restricted areas in the 2012 Regulations (S.I. No. 326 of 2012).

The main areas defined in each zone are:

- **Zone A:** Dublin,
- **Zone B:** Cork,
- **Zone C:** Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise,
- **Zone D:** Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

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

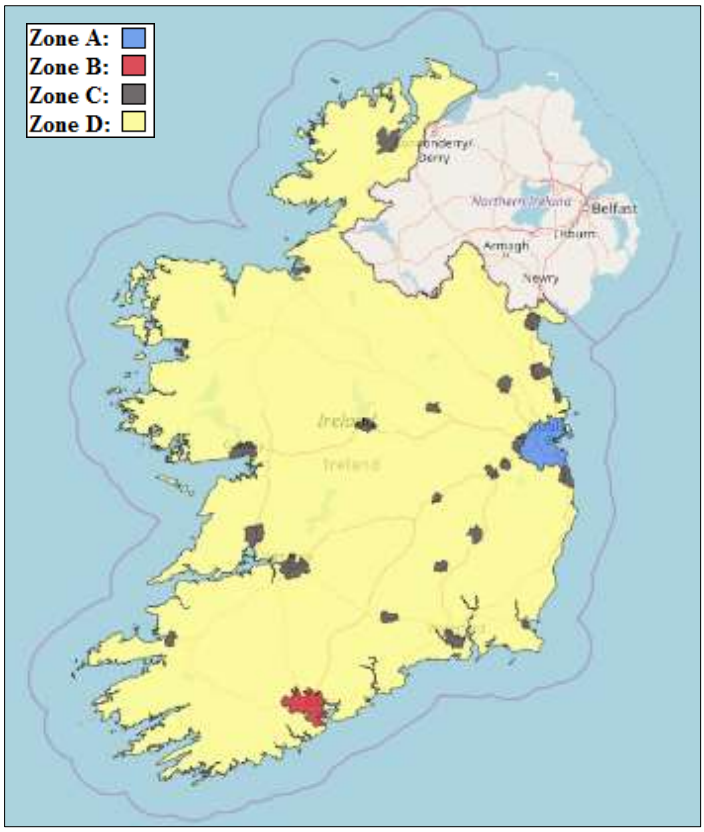


Figure 7.3 – Air Quality Zones in Ireland

9.3.5 Baseline Air Quality

The EPA and Local Authorities have undertaken air quality monitoring programs in recent years. The most recent annual report on air quality in Ireland is the *Air Quality in Ireland 2016.* 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.

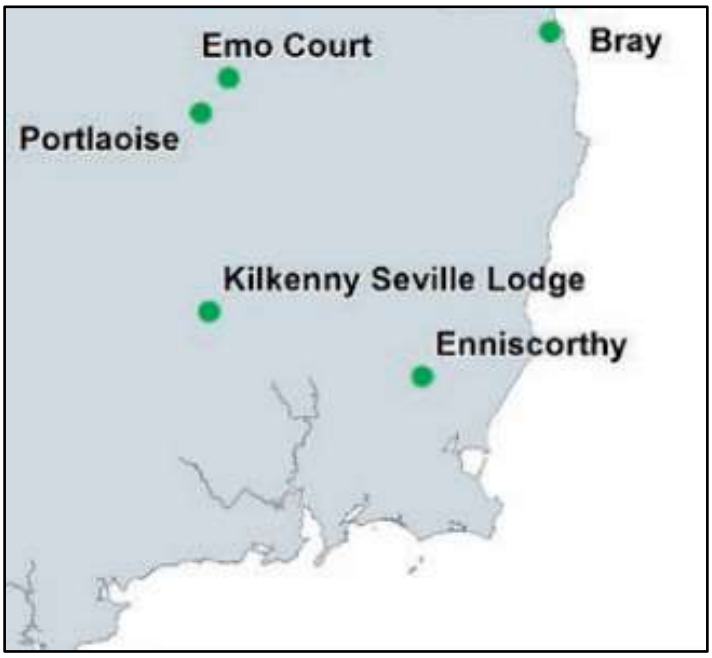


Figure 7.4 –Current Air Quality Stations in the South East Region

The EPA mobile laboratory was dispatched to Wexford Town on 10th March 2005. Monitoring was conducted from this date, until 31st March 2006. The monitoring unit was positioned within the premises of Wexford County Council building on Hill Street, Wexford, within 500m of the town centre.

An air quality assessment, as part of the above mentioned monitoring, concluded that no limit values were exceeded during the assessment. Concentrations of carbon monoxide, sulphur dioxide, nitrogen dioxide, benzene and lead were below their respective lower assessment thresholds. Levels of PM10 exceeded the upper assessment threshold of 30 µg/m^3 for this parameter, but was below the annual mean limit of 40 µg/m^3.

Wexford town is in an Air Quality Zone C, while the remainder of the county is in Zone D.

The implications of this assessment are that within Zone C (specified urban centres with populations in excess of 15,000)

- PM10 will need to be monitored continuously
- Levels of CO (Carbon Monoxide), SO_2 (Sulphur Dioxide), NO_2 (Nitrogen Dioxide), Benzene and Lead can be assessed using modelling or objective estimation techniques.

9.3.6 Trends in Air quality

Air quality is variable and subject to both significant spatial and temporal variation. In relation to spatial variations in air quality, concentrations generally fall significantly with distance from major road sources (UK DEFRA 2007). Thus, residential exposure is determined by the location of sensitive receptors relative to major road sources in the area. Temporally, air quality can vary significantly by orders of magnitude due to changes in traffic volumes, meteorological conditions and wind direction.

9.3.7 Background Data

The EPA and Local Authorities have undertaken air quality monitoring programs in recent years. The most recent annual report on air quality *Air Quality in Ireland 2016* (EPA 2017), details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Zone A is the Dublin conurbation; Zone B is the Cork conurbation with Zone C comprising 23 large towns in Ireland with a population >15,000. Zone D is the remaining area of Ireland. In terms of air monitoring, Gorey is categorised as Zone D.

In order to calculate the estimated background air quality for the proposed site, data from EPA monitoring stations within a 60 Km radius of the site was assessed, as monitoring has not been conducted within the vicinity of the proposed site. It should be noted that data from both Zone C and Zone D locations have been used, as can be seen in tables 7.8 – 7.10 below.

With regards to NO_2, monitoring data from the EPA monitoring stations at Enniscorthy (2015, 2014), Wexford Town (2006, 2005), Bray (2006) and Carlow Town (2005, 2004) shows that levels of NO_2 are below the annual mean limit. Based on this data a conservative estimate of the background NO_2 concentration in the Gorey region is 14 µg/m^3, which is well below the limit of 40 µg/m^3. This figure is considered an over estimate, as the calculation includes data from a number of Zone C locations, if Zone D data alone is used for this estimate the figure would reduce to 11 µg/m^3.

With regards to PM10, monitoring data from the EPA monitoring stations at Enniscorthy (2015, 2014), Carnsore Point (2007), Wexford Town (2006, 2005), Bray (2006) and Carlow Town (2004) shows that levels of PM10 are below the annual mean limit. Based on this data a conservative estimate of the background PM10 concentration in the Gorey region is 23 µg/m^3, which is below the limit of 40 µg/m^3. This figure is elevated due to a breach of the upper threshold (30 µg/m^3), experienced in Wexford Town in 2006, which is in Zone C, approximately 40 Km south of the proposed site.

With regards to SO_2, monitoring data from the EPA monitoring stations at Enniscorthy (2015, 2014), Wexford Town (2006, 2005), Bray (2006) and Carlow Town (2005, 2004) shows that levels of SO_2 are below the annual mean limit. Based on this data a conservative estimate of the background SO_2 concentration in the Gorey region is 6 µg/m^3, which is well below the limit of 20 µg/m^3. This figure is considered an over estimate, as the estimate contains data from a number of Zone C locations, if Zone D data alone is used for this calculation the figure would reduce to 3 µg/m^3.

With regards to Benzene, monitoring data from Bray (2006), Wexford Town (2005), and Carlow Town (2004) show that levels of Benzene are below the annual mean limit of 5 µg/m^3, with an average calculated level of 0.33 µg/m^3. This figure is considered an over estimate, as the calculation contains data from Zone C locations only.

With regards to CO, monitoring data from Wexford Town (2006, 2005), Bray(2006) and Carlow Town (2004) show that levels of CO are below the rolling 8-hour mean limit of 10 mg/m^3 , with an average calculated level of 0.33 mg/m^3. This figure is considered an over estimate, as the calculation contains data from a number of Zone C locations only.

Table 7.8 – Annual Mean Pollutant Concentrations within 60Km radius

Monitoring Station	Zone	Year	Annual Mean Pollutant Concentration µg/m^3			
			NO_x	NO_2	PM10	SO_2
CAFE Directive 2008/50/EC Limit			**30**	**40**	**40**	**20**
Enniscorthy	D	2015	9	9	18	2
Enniscorthy	D	2014	25	13	22	4
Carnsore Point	D	2007	-	-	27	-
Wexford Town	C	2006	-	16	32	15
Bray	C	2006	-	16	23	3
Wexford Town	C	2005	-	11	23	9
Carlow Town	C	2005	-	18	-	6
Carlow Town	C	2004	-	15	17	5
Average			17	14	23	6

Table 7.9 – Benzene Annual Mean (µg/m^3)

Station	Zone	Averaging Period	Year	Conc.
CAFE Directive 2008/50/EC Limit				**5**
Bray	C	Annual Mean	2006	0.3
Wexford Town	C	Annual Mean	2005	0.3
Carlow Town	C	Annual Mean	2004	0.4
			Average	0.33

Table 7.10 – Carbon Monoxide Rolling 8-Hour Mean (mg/m^3)

Station	Zone	Averaging Period	Year	Conc.
CAFE Directive 2008/50/EC Limit				**10**
Wexford Town	C	Annual Mean	2006	0.5
Bray	C	Annual Mean	2006	0.3

Wexford Town	C	Annual Mean	2005	0.3
Carlow Town	C	Annual Mean	2004	0.2
			Average	0.33

As can be seen from the monitoring data above, air quality in Wexford and the surrounding regions continues to comply with national and international air quality standards for most pollutants. There are no issues with compliance for the pollutants, benzene, carbon monoxide, nitrogen dioxide or sulphur dioxide, with an overall downward trend from 2006 to 2015. Trends in nitrogen dioxide, sulphur dioxide and particulate concentration reached a minimum in 2015.

There were no recorded exceedance of the PM10 annual mean limit, however there was a breach of the upper threshold (30 µg/m^3), experienced in Wexford Town in 2006, which is in Zone C. According to the EPA this was *'most likely due to burning of coal and other solid fuels'*.

7.3.8 Baseline Climate

The dominant influence on Ireland's climate is the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude.

Johnstown Castle Automatic Weather Station (AWS) opened in 2003 and is situated in the grounds of the Teagasc research centre, Johnstown Castle, Co. Wexford. The AWS has replaced a manual climate station, which has a continuous climatological record since 1914. Since April 2008, the station has replaced Rosslare as a World Meteorological Station (WMO) Synoptic Station.

The average annual temperature is about 9 °C. In the middle and east of the country temperatures tend to be somewhat more extreme than in other parts of the country. For example, summer mean daily maximum is about 19 °C and winter mean daily minimum is about 2.5 °C in these areas.

Mean annual wind speed varies between about 4 m/sec in the east midlands and 7 m/sec in the northwest. Strong winds tend to be more frequent in winter than in summer. Sunshine duration is highest in the southeast of the country. Average rainfall varies between about 800 and 2,800mm.

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development would comprise of the construction of a residential estate, with a variety of housing and apartment types and designs, and a childcare facility at the subject lands, Ballyownen, Fort Road, Gorey, Co. Wexford. Details of the proposed development works are as follows:

- Demolition and site clearance works of remaining infrastructure from the previous mushroom facility;
- Construction of a total of 297 residential dwellings including:

    - 4 five-bedroom houses;
    - 77 four-bedroom houses;
    - 125 three-bedroom houses;
    - 26 two-bedroom houses;
    - 36 two-bed apartments;
    - 29 three-bed apartments.

- Construction of dwellings would be either two or three storeys in height, depending on their location and number of bedrooms;
- Construction of stormwater and foul sewer drainage systems;
- Construction of a childcare facility (c. 544 sq. m), within the area zoned for Community and Education use;
- Construction of all ancillary development works including internal road surfacing, boundary construction and provision of outdoor artificial lighting;
- Construction of site access roads;
- Landscaping of public amenity areas.

Construction works, including the demolition of remaining infrastructure, are estimated to take five years over a phased basis, with hours of operation from 8am to 6pm, Monday to Saturday. A temporary site compound would be established near the entrance of the proposed site, housing the site offices, storage facilities and staff welfare facilities such as a canteen and toilets.

A new stormwater drainage system would be constructed. Storm water, comprised of rainwater run-off from roofs and paved areas, would be collected via a system of gullies and stormwater drains and would pass through a Class I Bypass Separator and Attenuation System prior to connecting with the Ballyowen Stream.

A new domestic wastewater system would also be constructed. Domestic wastewater would be directed to Gorey town's public sewer, which would undergo treatment at Courtown-Gorey Waste Water Treatment Plant prior to discharge. This would involve the construction of an underground foul sewer pipeline, approximately 1.1km in length, from the proposed site to the public sewer line.

Artificial outdoor lighting would be installed along the internal access network.

It is proposed to retain the existing drain at the south-eastern corner of the site as an open channel.

7.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

7.5.1 Construction Phase

Air Quality

The construction is to be carried out in a phased basis and would involve a number of activities including soil disturbance, excavation, foundation operations, concrete operations, handling and storage of fine materials, and use of construction traffic and plant equipment.

These activities generate particulate materials, including dust and PM10. The movement of machinery, construction vehicles and the use of plant equipment during the construction phase would also generate emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x), Particulate Matter (PM) and Carbon Monoxide (CO).

Increased road traffic arising from the proposed development may lead to increased levels of ambient air pollution at existing residential locations in the area. An assessment of whether pollution levels, with the proposed development in place, would exceed the ambient air quality standard as per *CAFE Directive* 2008/50/EC, has been carried out and is detailed below.

Construction dust, particularly in dry weather conditions, has the potential to result in significant localised impacts in terms of dust nuisance at the nearest residences, and on other sensitive receptors, unless adequate dust control measures are implemented.

The following section describes the potential impacts on local air quality and nearby sensitive receptors resulting from work associated with the construction phase of the proposed development.

Dust Emissions

There is potential for a number of short term negative impacts on air quality during the construction phase of the proposed development. Construction activities such as excavation, earth moving and backfilling may generate quantities of dust, particularly in dry weather conditions.

The short-term impact from dust also depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the source and as such any impacts form dust deposition will typically be close to the source, within several hundred metres of the construction compound.

Due to the nature of works to be carried out, the generation of airborne dust would be an air pollutant of concern during the construction phase. Dust generation is associated with materials handling (loading, unloading and storage) and excavation, site grading and similar activities resulting in the disruption of the existing land surface. Vehicles travelling on unpaved areas also have the potential to cause airborne dust.

Overall, the potential for uncontrolled dust emissions during the construction phase is largely related to local wind conditions (speed and direction), coupled with the frequency and duration of rainfall. Re-suspension of dust by the wind may occur from roads and other exposed surfaces, in particular during dry weather conditions. The wind speed will affect the dilution rate of exhaust emissions from trucks and machinery being used during the construction phase. Damp weather conditions substantially reduce the potential for dust and PM10 emission from roads and other exposed surfaces.

The proposed site has a residential housing estate located adjacent to the south-eastern boundary (Ashwood Grove), and further residential properties in close proximity to the eastern/south-eastern boundary. St. Joseph Primary School is also located 850m south-west of the proposed development. Therefore, there is a small number of receptors that have the potential to suffer dust nuisance. In order to mitigate this, a comprehensive set of dust mitigation measures are required, which are presented in Section 9.6.

There may be some short term impacts during the construction phase as the pipes are laid, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and disturbance to residents and business 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.

Table 7.11 – Assessing the Criteria for the Impact of Dust from Construction with Standard Mitigation in place. (National Road Authority)

Source		Potential Distance for Significant Effects from the Source		
Scale	**Description**	**Soiling**	**PM10**	**Vegetation**
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

In accordance with best construction practice, dust control measures would form an integral part of the *Site Development Management Programme*. The measures include the installation of a temporary wheel-wash, construction phase protective hoarding, maintenance of the site entrance and access road, restriction of on-site truck and machinery operations, and cleaning of the public road where necessary. Adverse impacts, in terms of a community nuisance at nearby houses, other building and sites are unlikely to occur, following the effective implementation of a *Dust Control Management Plan* to control and reduce dust and PM10 emissions.

The overall impact on the existing air quality at the nearest receptors during the construction phase is predicted to be of a slight - moderate negative impact. These impacts will be temporary and occur mainly during the initial site clearance work and preliminary build.

Once the construction of the outer fabric (roof, floor slabs, walls, windows, and doors) of all new buildings is completed, internal works will generate a very low quantity of emissions only.

Construction Traffic, Plant Equipment and Machinery

The movement of machinery, construction vehicles and the use of generators within the site during the construction phase will generate exhaust fumes containing predominantly SO_2, NO_x, CO_2 and particulate matter (PM10). The concentration of these pollutants is expected to increase during the construction phase, however strict adherence to *good site & engineering practice* will minimise the generation of any unnecessary air emissions. The impact of emissions from plant equipment and machinery during the construction phase would be temporary in nature.

The main access to the proposed site would be from the Fort Road running along the south-westerly boundary of the proposed site.

Dust would be expected to occur due to trucks carrying excavation and fill materials from the site and from site workers private vehicles. While site staff trips would be expected to remain constant throughout the construction phase, the majority of the trucks trips would be expected to reduce dramatically once excavation works have been completed.

Additionally, construction traffic along the Fort Road, in the form of trucks transporting building materials to the site or hauling waste material off-site, has the potential to generate dust emissions. During construction, trucks and vans would be delivering materials to the site on a daily basis. The arrivals of deliveries to the site are expected to be evenly spread throughout the workday. Overall, the impact on local air quality from the trucks and machinery exhausts during the construction phase would be temporary and slight with no significant impact.

Climate

The Environmental Protection Agency states that a development may have an influence on global climate where it represents *'a significant proportion of the national contribution to greenhouse gases'.* Due to the size and nature of the proposed development, greenhouse gas emissions resulting from the development would be insignificant in terms

of national CO_2 emissions and the national agreed limits under the Kyoto Protocol. Thus, the impact of the proposed development on climate would be imperceptable.

7.5.2 Operational Phase

Air Quality

Operational activities involved with the new development would be non-industrial. There are no proposed major stationary sources associated with the operational phase of the project that could emit significant quantities of pollutants. Following the completion of construction activities, operational air emissions associated with the residential units will be limited to minor stationary sources from on-site utilities (i.e. home heating systems) and mobile sources from traffic generated as a result of the development. The following section discusses the effect on local air quality and climate associated with the operational phase of the proposed development.

Stationary Source Emissions

The nature of the proposed residential units and their associated activities are not major air emissions sources and do not include any major emission points. Subsequently, significant air quality and climate effects are not considered likely.

While significant effects on the global climate as a result of the development are not considered likely, improving the integrity of the building envelope (reduced heat loss) and other actions to reduce building energy consumption, can have a very significant impact on indirect emissions, which contribute to greenhouse gases and influence national greenhouse gas commitments.

Mobile Source Emissions

Vehicle movements generated as a result of the development will generate emissions to the atmosphere. However, in considering the expected number of future traffic movements to and from the site during the operational phase, any expected increase in air emissions is not considered likely to breach air quality standards or contribute substantially to an existing or projected air quality pollutant.

In determining the cumulative net increase of any criteria pollutant, the traffic volumes to be generated by the proposed development were considered in combination with traffic volumes on the local road network. The number of vehicles utilising the local road network, will not increase significantly as a result of the proposed development.

The Traffic Impact Assessment states that traffic generation for the proposed development suggest that the proposed site is within a medium growth forecast range. This mean local traffic is expected to increase by 6.15% in 2021 (completion year) as a result of the development.

7.5.3 Potential Cumulative Impacts

Cumulative impacts are those new impacts, or enhancements of existing impacts, that occur only as a result of the interaction of the construction and operation of the proposed development with existing developments.

Impacts may occur from the compounding of an issue (e.g. pollution from different sources affecting the same receptor) or from changes to the baseline (e.g. future development may change the air flow character and thus the impact of the development on the future baseline).

In order to assess cumulative impacts as a result of the proposed development in the vicinity of the proposed site, information regarding proposed developments is required. Based on experience in similar schemes, only developments within 1km of the proposed development have been considered, as beyond this arbitrary study area cumulative impacts are unlikely to occur.

Sites currently under construction are assumed to be finalised by the time the construction phase for the proposed development begins. Hence, these may only have a cumulative impact during their operational phase. Sites currently under construction include residential and employment developments. Proposed developments that have been approved or are likely to be approved can potentially have cumulative impacts with the proposed development during construction and operation phase. These include employment, residential and retail developments. Sites such as these (e.g., residential lands to the north) would be subject to mitigation measures as part of the construction phase so as to reduce impacts on local residents.

It is accepted that the proposed developments, identified as part of this assessment are likely to alter traffic flows. The Traffic Impact Assessment used throughout and presented in this EIAR, has considered changes in traffic flows as a result of these proposed developments.

Construction Phase

Cumulative impacts will only occur during the construction phase if the construction of other nearby projects coincides with that of the proposed development. If this is the case, even greater attention should be paid to the mitigation measures outlined in section 9.6 to ensure the cumulative impact will remain of minor adverse significance.

Operation Phase

It is anticipated that the proposed development will have a minor adverse impact on the closest properties to the site only.

The lands adjacent the residential development are zoned for Community and Education purposes. The future development of these lands would potentially include a nursing home, catering for approximately 60 beds and including approximately 12 sheltered units, and a mixed / medical centre.

The impacts of the proposed development on regional air quality and greenhouse gases are predicted to be negligible.

7.5.4 'Do Nothing' Scenario

The proposed development and associated traffic would not substantially contribute to or offset an existing or projected air quality pollutant. Therefore, no significant change in air quality or future air pollutant levels with the 'No Development' scenario is likely.

7.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

It is considered that the proposed housing development will not result in any significant adverse impacts to air quality. Outlined below is a series of mitigation measures and good working practices to ensure that any potential impacts during the construction are minimised, and to ensure there will be no adverse impacts on the receiving environment. The mitigation measures have been sourced from international best practice guidance documents for the implementation of dust management plans, such as:

- *Control of Dust from Construction and Demolition Activities*, UK British Research Establishment (BRE).
- *Environmental Good Practice on Site*, Construction Industry Research and Information Association (CIRA),
- *Environmental Management Plans*, Institution of Environmental Management and Assessment (IEMA),
- *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*, National Roads Authority (NRA).

7.6.1 Construction Phase

Construction Phase Generation of Dust

In order to mitigate dust emissions during the construction phase, a *Dust Control Management Programme* will be prepared as part of the Environmental Management Plan and submitted to the Planning Authority. The dust minimisation plan will be cognisant of the industry guidelines such as the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities' and the Construction Industry Research and Information Association (CIRIA) 'Environmental Good Practice on Site'. A *Dust Control Management Programme* will be agreed with Wexford County Council (as part of Construction Management Plan).

The *Dust Control Management Plan* should be prepared, to include measures outlined in the following section, for the control and reduction of dust and fine particulate emissions (PM10).

- Protective hoarding screens should be erected around construction activities, to reduce dust-blow from the site, in particular where the sensitive receptors are in close proximity (i.e. along the south-eastern and western boundaries).
- A temporary wheel-wash facility should be installed close to the location of the site entrance, to prevent the hauling of silt and mud onto the local road surface by vehicles departing from the site.
- Exposed surfaces and entrances to the site should be dampened during dry windy conditions in the interest of controlling fugitive dust.
- Any spillage of material from vehicles departing the site should be promptly removed to prevent re-suspension of silt from the road surface by passing vehicles.
- Dust control measures will be active on equipment used for drilling, pavement cutting, grinding of block surfaces and similar types of stone finishing, as significant fine particulate emissions can be generated which may cause a local nuisance.
- Bulk fine-sized aggregates and other similar building materials that may easily become airborne by the wind should not be stored in uncovered stockpiles.
- Truck speeds will be controlled within the development area to prevent high levels of dust being re-suspended from the construction area.
- Vehicles and plant machinery operating on-site will be properly maintained to prevent excessive emissions of particulates and other pollutants from the exhaust pipes.

Construction Traffic Emissions

Mitigation measures to minimise related traffic emissions include:

- Ensure regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they perform most efficiently.
- Implementation of a *Traffic Management Plan* to minimise congestion.
- All site vehicles and machinery will be switched off when not in use (i.e. no idling).

Climate

CO_2 and NO_x emissions during construction will have a negligible impact on climate; therefore, no mitigation measures are required.

7.6.2 Operational Phase

Mitigation to ensure significant quantities of air pollutants are not generated during the operational phase has been incorporated into the design proposal.

The proposed energy and sustainability measures incorporated into the design of the building will improve energy efficiency at the development. High efficiency heating will reduce the energy input and CO_2 produced. Other electrical considerations including energy efficient lighting, shall allow for a further reduction in energy consumption.

Air Quality

It is considered that the operational phase of the development will not have a significant negative impact on the local air quality. Nevertheless, mitigation measures in relation to traffic-derived pollutants have focused generally on improvements in both engine technology and fuel quality. EU legislation, based on the EU sponsored Auto-Oil programmes, have imposed stringent emission standards for key pollutants for passenger cars to be complied with from 2009 (Euro V standard) and from 2014 (Euro VI standard).

With regards to heavy duty vehicles, EU directive 2005/78/EC defines the emission standard currently in focus, as well as the next stage which entered into force in October 2009. In addition, it defines a non-binding standard called *Enhanced Environmentally Friendly Vehicles* (EEV). In relation to fuel quality, S.I. No. 407 of 1999 and S.I. No. 72 of 2000 have introduced significant reduction in both sulphur and benzene content of fuels.

In relation to design and operational aspects emissions of pollutants from road traffic can be controlled most effectively by either diverting traffic away from the heavily congested area or ensuring free flowing traffic through good traffic management plans and the use of automatic traffic control systems.

Improvements in air quality are likely over the next few years as a result of the on-going comprehensive fuelled vehicles and the introduction of cleaner fuels.

Climate

The impact of the proposed development on climate will be negligible, therefore no site specific mitigation measure are required. Through EU legislation, on improvements in vehicle motor technology, and by an increased use of bio fuels, CO_2 emissions for the average new car fleet were reduced to 120g/kg over the period 1995-2013. 15% of the necessary effort towards the overall climate change target of the EU was met by this measure alone.

The average emissions level of a new car sold in 2016 was 118.1 grams of CO_2 per kilometre (g CO_2/km), significantly below the 2015 target of 130g. Since monitoring started under current legislation in 2010, emissions have decreased by 22 g CO_2/km (16%).

Additions made to the *National Climate Change Strategy* include:

- VRT and Motor Tax rebalancing to favour the purchase more fuel-efficient vehicles with lower CO_2 emissions.
- Continuing the Minerals Oils Tax Relief (MOTR) II scheme and introduction of a bio fuel obligation scheme.
- Implementation of a national efficient driving awareness campaign, to promote smooth and safe driving at lower engine revs.
- Enhancing the existing mandatory vehicle labelling system to provide more information on CO_2 emission levels and on fuel economy.

7.6.3 Strategic Environmental Assessment – Wexford County Development Plan

The proposed development will also adhere to the appropriate mitigation measures, as per the Wexford County Development Plan Strategic Environmental Assessment, to minimise the impact of development on air and climate.

These measures were developed based on a number of international and national environmental policies such as the Kyoto Protocol, the National Emissions Ceilings, and the development management standards.

At a local level, Wexford County Council has a statutory function to place conditions on air emissions licences to ensure emissions from development or facilities do not affect the ambient air quality. The mitigation measures provided by public transport will help mitigate greenhouse gas emissions.

Table 7.12 – Strategic Environmental Objectives – Air & Climate

SEO	Objective
AC1	Facilitate measures, which seek to reduce all forms of air pollution and reduce dependence on travel by private car.
AC2	Promote use of renewable energy sources and support energy conservation initiatives.

In the absence of detailed information on the type and scale of developments, which may be proposed during the lifetime of the Development Plan, it is necessary to mitigate any uncertainty by including the following Objectives:

Table 7.13 – Mitigation Measures – Air, Noise & Climate

Mitigation	Policy
MM12	Objective CC04 - To minimise emissions greenhouse gases in order to contribute to a reduction and avoidance of human induced climate change in accordance with the Kyoto agreement. The Council supports and is committed to the National Climate Change Strategy and in general to facilitating measures, which seek to reduce emissions of greenhouse gases.
MM13	Objective AQ05 - To encourage a modal change from private car use towards other types of travel and to promote the use of public transport as a means of reducing vehicle emissions and improving air quality.
MM14	Objective EN07 - To encourage and favourably consider proposals for renewable energy developments and ancillary facilities in order to meet national, regional and county renewable energy targets and to facilitate a reduction in CO2 emissions and the promotion of a low carbon economy, subject to development management standards and compliance with Article 6 of the Habitats Directive.
MM15	Objective EN22 - To promote innovative building design and layout that demonstrates a high level of energy conservation, energy efficiency and use of renewable energy sources.

7.6.4 'Worst Case' Scenario

During the construction phase the 'worst case' impact would occur in the event that the *Dust Control Management Programme* to be agreed with Wexford County Council (as part of Construction Management Plan) was not successful and dust nuisance occurred for sensitive receptors in the area. Should dust mitigation measures not be implemented during the construction phase, significant dust nuisance is likely in areas close to the construction site. Given the distance to sensitive receptors and prevailing wind direction, dust nuisance is not considered a significant issue.

The generation of dust during the construction phase and minor air pollutants during the operational phase, cannot be totally eliminated. However, proposed energy technologies, good site management and strict adherence to the recommendations set out, will ensure fugitive dust emissions are kept to a minimum and air pollution emissions are controlled to within acceptable levels. Therefore, with the recommended mitigation in place, significant negative residual impacts are not predicted in relation to air quality.

7.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

7.7.1 Construction Phase

Once the detailed dust mitigation measures presented above are implemented (as part of an Environmental Management Plan) and adhered to rigidly, the potential for dust generation and nuisance is low. Consequently the impact to air quality are considered slight negative to neutral in the short term.

7.7.2 Operational Phase

It is considered that the operational phase of the development will not have a significant negative impact on the local air quality. Nevertheless, mitigation measures in relation to traffic-derived pollutants have focused generally on improvements in both engine technology and fuel quality. Improvements in air quality are likely over the next few years as a result of the on-going comprehensive fuelled vehicles and the introduction of cleaner fuels.

The impact of the proposed development on climate will be negligible, therefore no site specific mitigation measure are required.

7.8 MONITORING

7.8.1 Construction Phase

It is recommended that monthly dust deposition survey be carried out along the boundary of the proposed site in order to monitor the effectiveness of dust management for the duration of the construction phase. The TA Luft (German Government *Technical Instruction on Air Quality)* states a guideline of 350mg/m^2/day for the deposition of non-hazardous dusts. This value should not be exceeded beyond the site boundary and any breaches will require a review of operations and dust mitigation measures.

7.8.2 Operational Phase

Not Applicable

7.9 REINSTATEMENT

7.9.1 Construction Phase

In the event of the discontinuation of the proposed development during the construction phase, the following measures should be taken to reduce the potential impact on air quality and climate:

- Exposed surfaces should be covered or planted using appropriate vegetation in the interest of controlling fugitive dust in windy conditions.
- Stockpiled fine-sized aggregates and other similar building materials that may easily become airborne by the wind should not be stored on the site.
- Stored flammable materials should be removed from the site in order to reduce the potential risk of pollutants due to fire.

7.10 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no difficulties encountered in compiling any specific information regarding air quality and climate.

8.0 NOISE AND VIBRATION

8.1 INTRODUCTION

The noise and vibration chapter of this EIAR describes the existing noise setting and potential effects on ambient noise associated with the construction phase and operational phase of the proposed development at Creagh, Gorey, Co. Wexford. The subject matter of vibration is also discussed. The assessment methodology, existing noise, likely significant impacts and recommended mitigation measures, in the context of current relevant standards and guidance, are described in the following sections.

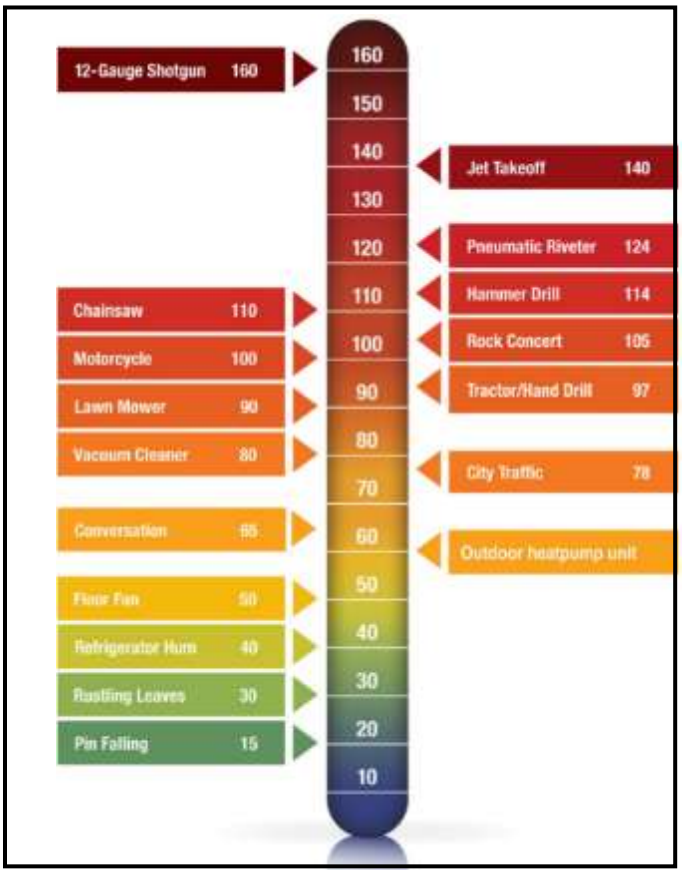
This section should be read in conjunction with Appendix D, which illustrate the noise monitoring locations and noise prediction locations included in the assessment.

8.2 NOISE FUNDAMENTALS

Simply put, sound may be described as a variation in atmospheric pressure that is detected by the human ear and results in the sensation of hearing. The human ear is a very sensitive anatomical organ and can detect a wide range of fluctuations in pressure levels, from the quietest whisper to a jet engine take off. In order to represent this range of detectable pressure changes in a more efficient manner, sound is typically measured in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

Sound level (Lp dB) and sound power (LW dB) are physical quantities which measure derivatives of the energy associated with a sound that can be measured by recording instruments.

Figure 8.1 – Decibel Scale dB(A)



An indication of the level of some common sounds on the LpA (dB) scale is presented in Figure 9.1.

In terms of sound pressure levels, audible sound ranges from 0dB (i.e. the threshold of hearing) to the threshold of pain at 120dB. A doubling/halving of pressure equates to a 3dB increase/decrease in decibel level. Typically, under normal circumstances, a 3dB change in environmental noise level is the smallest noticeable to the human ear. A 10dB increase/decrease in sound level normally equates to a subjective doubling/halving of noise.

Loudness is a psycho-physical subjective measure of the perceived response by the human auditory system to a sound. The loudness level of a sound is determined by adjusting a sound pressure level of a comparison pure tone of specified frequency until it is judged by normal hearing observers to be equal in loudness. Loudness level is expressed in phons.

In the mid-frequency range at sound pressures greater than approximately 2x10-3 Pa (40 dB re 20 µPa SPL), the following table summarises the average subjective perception of noise level changes. Table 8.1: WHO International: Fundamentals of Acoustics

Table 8.1 – WHO International: Fundamentals of Acoustics

Change in Sound Level (dB)	Change in Power		Change in Apparent Loudness
	Decrease	Increase	
3	1/2	2	Just Perceptible
5	1/3	3	Clearly Noticeable
10	1/10	10	Half or Twice as Loud
20	1/100	100	Much Quieter or Louder

As can be seen in the above table, an increase of 3 dB is double the sound power level; however, the change in loudness is just perceptible.

9.2.1.1 A-Weighted Decibels dB(A)

'A' Weighting is standard weighting of the audible frequencies designed to reflect the response of the human ear to noise. At low and high frequencies, the human ear is not very sensitive, but between 500 Hz and 6 kHz the ear is much more sensitive. In the A-weighted system, the decibel values of sounds at low frequencies are reduced compared with un-weighted decibels, in which no correction is made for audio frequency.

The term Leq is used to express the average noise level. It is measured in dB (A) and measured over a defined period of time. Specifically it is the constant level equivalent to the same acoustic energy as a given event. The Leq is written as LAeq when it is measured with the A frequency weighting.

8.3 RELEVANT GUIDANCE AND LEGISLATION DOCUMENTS

9.3.1 Noise Guidance and Legislation

Planning and Development Act (2000), **as amended**

Local authorities are responsible for the planning and environmental regulation of any proposed developments. The current planning and environmental regulatory framework requires these developments to comply with the Planning and Development Act (2000) and related regulations.

The local authorities and An Bord Pleanála attach conditions relating to environmental management of these developments to planning permissions granted. Local authorities consider the land use and planning issues associated with the proposed developments in their County Development Plans.

9.3.1.2 EPA "Guidance Note on Noise (NG4)" (2016)

The document relates primarily to noise surveys and assessments for EPA licensed facilities but in the absence of any other directly applicable guidance documents, it also is pertinent for the purposes of noise surveys and assessments accompanying planning applications.

It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the settling of noise ELV's and compliance monitoring. In line with World Health Organisation (WHO) guidance, it recommends that the following noise levels not be exceeded at the facades of the nearest noise-sensitive receptors:

Table 8.2 – EPA NG4 Recommended Noise Limit Levels

Divisions	Times	dB(A)
Day	(07:00 to 19:00hrs)	55dB LAr,T
Evening	(19:00 to 23:00hrs)	50dB LAr,T
Night	(23:00 to 07:00hrs)	45dB LAeq,T

Other EPA general EIA guidelines such as Guidelines on the Information to be Contained in Environmental Impact Statements [2002], Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) [2003] and (DRAFT) Guidelines on the Information to be Contained in Environmental Impact Statements [2017] have been considered in the preparation of this Noise and Vibration Chapter.

The National Roads Authority (NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004)

The NRA's guidance document Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) is the recognised Irish guidance document for the assessment of road traffic noise. This document sets out the key items that should be included in a noise and vibration assessment for any significant road scheme. As a minimum, it stipulates that the following items should be included:

- A series of noise surveys to quantify the prevailing noise climate at sensitive receptors along the existing and proposed routes
- Preparation and calibration of a suitable noise prediction model;
- Prediction of Do Minimum and Do Something noise levels for opening and design years;
- Comparison of predicted Do Something noise levels with the design goal and three conditions that must be satisfied before mitigation measures are deemed necessary;
- Specification and assessment of road traffic mitigation measures, where required;
- Assessment and review of construction impacts and mitigation measures;
- Assessment and review of vibration.

This document has been referred to in the consideration of road traffic noise associated with the proposed development. The document also presents maximum permissible noise levels at dwelling facades during construction activities (see Table 8.3 below). This provide a useful reference for assessing construction noise of the proposed development.

Table 8.3 – The National Roads Authority (NRA) Guideline Construction Noise Limits

Days / Times	$L_{Aeq\ (1hr)}$ dB	$L_{pA\ (max)slow}$ dB
Monday to Friday (07:00 to 19:00hrs)	70	80
Monday to Friday (07:00 to 22:00hrs)	60	65
Saturday (08:00 to 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30hrs)	60	65

9.3.2 Vibration Guidance and Legislation

There is a very low likelihood of operational vibration impacts from the proposed development on account of its residential nature. The most likely potential vibration effects associated with the proposed development would be associated with the construction phase, during site clearing, excavation and levelling. Vibration threshold values discussed below are presented in the context of potential vibration effects from the construction phase.

Limits of transient vibration, above which cosmetic damage could occur, are given numerically in Table 8.4 (Ref: BS5228-2:2009). Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 8.4, and major damage to a building structure can occur at values greater than four times the tabulated values (definitions of the damage categories are presented in BS7385-1:1990).

Table 8.4 – Transient Vibration Guide Values for Cosmetic Damage (Ref BS5228-2:2009)

Type of Building	Peak Particle Velocity (PPV) (mm/s) in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/S at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

British Standard BS 7385 (1993) Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration indicates that cosmetic damage should not occur to property if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz. These guidelines refer to relatively modern buildings and therefore, these values should be reduced to 50% or less for more sensitive buildings.

The human body is an excellent detector of vibration, which can become perceptible at levels which are substantially lower than those required to cause building damage. The human body is most sensitive to vibration in the vertical direction (foot to head). The effect of vibration on humans is guided by British Standard 6472:1992. This standard does not give guidance on the limit of perceptibility, but it is generally accepted that vibration becomes perceptible at levels of approximately 0.15 to 0.3 mm/s. buildings.

BS 6472 defines base curves, in terms of root mean square (rms) acceleration, which are used to assess continuous vibration. Table 5 of the Standard states that in residential buildings, the base curve should be multiplied by 1.4 at night and by 2 to 4 during the daytime to provide magnitudes at which the probability of adverse comment is low.

In order to assess human exposure to vibration, ideally, measurements need to be undertaken at the point at which the vibration enters the body, i.e. measurements would need to be taken inside properties. However, various conversion factors have been established to convert vibration levels measured at a foundation to levels inside buildings, depending on the structure of the building.

Vibration Dose Values (VDVs) is recommended in BS 6472 for the assessment of subjective response to vibration. The VDVs at which it is considered there will be a low probability of adverse comment are drawn from BS 6472 and presented in Table 8.5.

Table 8.5 – Threshold Values for the Evaluation of Disturbance due to Vibration

Place	Daytime 16 Hr VDV ($ms^{-1.75}$)	Night-time 16 Hr VDV ($ms^{-1.75}$)
Critical Working Area	0.11	0.09
Residential	0.22-0.43	0.13
Office	0.43	0.36
Workshops	0.87	0.73

The NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) also includes a discussion of vibration levels in relation to construction activities. While the document relates to national road

schemes, the advice on construction vibration is relevant to all construction activities. Table 8.6 includes allowable vibration levels during construction activities which would minimise the risk of building damage. This is the reference to be applied to the assessment of vibration in the Republic of Ireland.

Table 8.6 – Allowable Vibration During Construction in Order to Minimise the Risk of Building Damage

Allowable Vibration Velocity (Peak Particle Velocity) at the Closest Part of Any Sensitive Property to the Source of Vibration, at a Frequency of		
Less than 10 Hz	10 to 50 Hz	50 to >=100 Hz
8 mm/s	12.5 mm/s	20 mm/s

8.4 STUDY METHODOLOGY

This section has been prepared using the following methodology:

- A baseline Noise Survey was conducted in the vicinity of the proposed site to establish noise climate and the main sources of noise contributing to the existing environment,
- A review of the most relevant standards and guidelines has been undertaken for the project in order to identify appropriate noise criteria for the site,
- The SoundPLAN, v8.0 software package was used to model the expected noise levels to be emitted to the surrounding environment from the proposed development. SoundPLAN is a proprietary noise calculation package for computing noise levels in the vicinity of sources of noise.
- Noise calculations for the operational phase, in conjunction with the Traffic Impact Assessment, have been assessed in general accordance with ISO 9613 Attenuation of Sound during Propagation Outdoors and the UK Calculation of Road Traffic Noise (CRTN), 1988,
- A number of recommended noise and vibration mitigation measures have been proposed, where necessary, to ensure the proposed development does not result in any significant impact on its surrounding environment.

In order to assess the current ambient noise level at the proposed site an environmental noise assessment was carried out on the 21st January 2018 by Martin O'Looney BSc.

30 minute samples were monitored at two measurement locations in the vicinity of the proposed development, referenced NM1 and NM2. See Appendix D for a map of the monitoring points.

All measurements were taken at:

- 1.2 – 1.5m height above local ground level
- 1 – 5m away from reflective surfaces

NM1 – located on the proposed development western boundary, adjacent to the Fort Road.

NM2 – located to the east of the proposed development, beside the Ashwood Grove residential estate.

The equipment used for the noise monitoring was a Cirrus CR:171B Sound Level Meter. The noise meter and calibrator were calibrated externally on 25th August 2017. The meter was calibrated at the start and end of each measurement session using a class 1 calibrator, which conforms to BS 7189: 1989 and IEC942: 1988.

The following parameters were recorded during each monitoring period:

LAeq The continuous equivalent A-weighted sound pressure level. This is an "average" of the sound pressure level.

LAmax This is the maximum A-weighed sound level measured during the sample period.

LA10 This is the A-weighted sound level that is exceeded for noise for 10% of the sample period.

LA90 This is the A-weighted sound level that is exceeded for 90% of the sample period.

8.5 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The proposed development site is located at Creagh, Gorey, Co. Wexford.

The main transport network located adjacent to the site is the Fort Road, which is located along the south-westerly boundary. To the north, the site is bordered by an agricultural green field, while to the east/north-east by approximately 90 acre of forestry.

The nearest sensitive receptors are residential properties located at Ashwood Grove, adjacent to the south-easterly boundary of the site. Other nearby sensitive receptors, including two detached house and a small number of residential properties within Hunters Green, which are separated from the sites south-westerly boundary by the Fort Road.

The existing noise environment is therefore principally defined by traffic from the Fort road, other local networks and seasonal agricultural activities.

Figure 8.2 – Proposed Site Location

Noise monitoring was carried out at the proposed development site on 21st January 2018. The noise monitoring locations are illustrated in Appendix D. The noise measurements attained during each monitoring period are displayed in Table 8.7 below.

Table 8.7 – Summary of Background Noise Monitoring Survey

Location	Monitoring Period	Measured L_{Aeq} dB(A)	Measured L_{Amax} dB(A)	Measured L_{10} dB(A)	Measured L_{90} dB(A)
NM1	14:13 – 14:43	65.2	85.7	69.7	41.6
NM1	17:35 – 18:05	63.2	88.6	66.7	40.9

Location	Monitoring Period	Measured L_{Aeq} dB(A)	Measured L_{Amax} dB(A)	Measured L_{10} dB(A)	Measured L_{90} dB(A)
NM1	23:07 – 23:37	58.0	82.8	60.1	34.7
NM2	14:46 – 15:16	57.8	85.9	61.6	48.2
NM2	16:59 – 17:29	58.6	77.7	63.0	45.9
NM2	23:45 – 00:15	48.1	73.1	46.7	34.3

Observations during the assessment period noted that traffic was the dominant noise source at both locations. Other sources of noise included human activity noise, animal noises and birdsong. It should be noted that, while traffic on the Fort Road (NM1) was generally less frequent than at NM2, the speed of traffic was higher past this point. This is due to traffic calming measures on the road passing Ashwood Grove (NM2).

8.6 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development would comprise of the construction of a residential estate, with a variety of housing and apartment types and designs, and a childcare facility at Creagh, Gorey, Co. Wexford. Details of the proposed development works are as follows:

- Demolition and site clearance works of remaining infrastructure from the previous mushroom facility;
- Construction of a total of 297 residential dwellings including:
    - 4 five-bedroom houses;
    - 77 four-bedroom houses;
    - 125 three-bedroom houses;
    - 26 two-bedroom houses;
    - 36 two-bed apartments;
    - 29 three-bed apartments.
- Construction of dwellings would be either two or three storeys in height, depending on their location and number of bedrooms;
- Construction of surface water and foul sewer drainage systems;
- Construction of a childcare facility, within the area zoned for Community and Education use;
- Construction of all ancillary development works including internal road surfacing, boundary construction and provision of outdoor artificial lighting;
- Construction of site access roads;
- Landscaping of public amenity areas.

The expected construction timeframe would be approximately five years over a phased basis, with hours of operation from 8am to 6pm, Monday to Saturday. No works would be carried out on Sundays and Bank Holidays. A temporary site compound would be established near the entrance of the proposed site, housing the site offices, storage facilities and staff welfare facilities such as a canteen and toilets.

During the construction phase, site clearance works would be undertaken, which would involve the removal of existing rubble and other infrastructure from the site, earth-moving activities and the removal of a section of treeline vegetation. Following site clearance works, construction of the residential dwellings and childcare facility would commence.

New surface water and domestic wastewater drainage systems would be constructed. Surface water, comprised of rainwater run-off from roofs and paved areas, would be collected via a system of gullies and stormwater drains and

would discharge to the Ballyowen Stream. A new sewer line of approximately 1.15 km would be required to be constructed, as outlined in figure 9.2 above, to connect domestic wastewater services to the Gorey town's public sewer system.

Artificial outdoor lighting would be installed along the internal access network.

A landscaping plan has been prepared for the proposed development, which includes planting of both native and non-native species. Areas of wildflower meadow have been incorporated into this plan, which would be of benefit to biodiversity in the area. The north-western and western site boundaries, comprising of mature hedgerow and treeline, would be retained, with root protection zones established around the mature trees of the north-western boundary and the entirety of the western boundary treeline.

8.7 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

8.7.1 Construction Phase

Construction Phase Noise

The construction phase of the development would comprise two main aspects, demolition and site clearance works of remaining infrastructure; and construction of the new residential developments and landscaping. . Short-term noise impacts are likely to occur during the construction phase of the development due to the requirement to use heavy plant and machinery.

In order to complete a worst-case noise impact assessment of the programme above, it is necessary to determine what the noisiest stages of the construction phase will be. The simplest and most robust means of ensuring a worst-case scenario is assessed is to assume all items of plant/equipment are active at the same time. To ensure the most conservative approach, the assessment will also assume that all items of plant/equipment are active at the nearest boundary of the proposed development site to the relevant noise sensitive receptor.

Table 8.8 contains typical noise levels from various construction plant that will be used during the construction phase. Table 8.9 contains typical noise levels for construction plant that would be used on the pipeline route construction. These standard noise emission data will be used for the purposes of the worst-case noise assessment of the proposed works.

Table 8.8 – Noise Levels from Construction Plant (Ref: BS5228:2009)

Activity / Plant (Reference from Annex C & D, BS5228:2009)	Power Rating (kW)	Equipment Size, Weight (Mass), Capacity	Activity Equivalent Continuous Sound Pressure Level LAeq at 10m (dB)
Ground Excavation: Dozer (C2 - Ref 12)	142	20t	81
Ground Excavation: Tracked excavator (C2 - Ref 14)	226	40t	79
Ground Excavation: Wheeled loader (C2 - Ref 27)	193	-	80
Distribution of Material: Dump Truck (tipping fill) (C2 - Ref 30)	306	29t	79
Distribution of Material: Dump Truck (empty) (C2 - Ref 31)	306	29t	87
Resultant Worst Case Noise Level			**90**

Table 8.9 – Noise Levels from Construction Plant (Ref: BS5228:2009) – Pipeline Route

Activity / Plant (Reference from Annex C & D, BS5228:2009)	Power Rating (kW)	Equipment Size, Weight (Mass), Capacity	Activity Equivalent Continuous Sound Pressure Level LAeq at 10m (dB)
Breaking Road Surface: Backhoe mounted hydraulic breaker (C5 – Ref 1)	67	-t	88
Trenching: Wheeled excavator (C5 – Ref 34)	51	7t	70
Pumping Water: Electric water pump (C5 – Ref 40)	15	-	68
Sawing Timber (Tree felling): Petrol driven Chainsaw (D.2 – Ref 14)	114	-	86
Resultant Worst Case Noise Level			**90**

Based on the overall combined worst-case noise level from the proposed development site (i.e. 90dB[A] at 10m as per Table 9.8 and Table 9.9), noise predictions have been undertaken to determine the worst-case predicted noise levels from the proposed development at a range of the nearest noise sensitive receptors.

Table 8.10 and includes all worst-case predicted noise levels based on the distance from the nearest portion of the proposed site boundary of the main construction area to the relevant noise sensitive receptor. In order to ensure a worst-case scenario is assessed, distance attenuation has been predicted in Table 9.10 on the basis of hard ground attenuation between the source and receiver (i.e. it assumes ground surface reflects noise and no absorption takes place).

Table 8.10 – Worst-Case Predicted Noise Levels from Construction Plant within the main construction area at Nearest Noise Sensitive Properties

Nearest Sensitive Receptors (See Appendix D)		Worst - Case LAeq @ 10m (dBA)	Distance from Construction Boundary (m)	Distance Attenuation (dBA)	Predicted Worst-Case Construction Noise (dBA)
CNSL1	Fort Road	90	91	19.2	70.8
CNSL2	Fort Road	90	74	17.4	72.6
CNSL3	Fort Road	90	35	11.0	79.0
CNSL4	Fort Road	90	31	9.9	80.1
CNSL5	35 Hunters Green	90	20	6.2	83.8
CNSL6	36 Hunters Green	90	20	6.2	83.8
CNSL7	58 Hunters Green	90	20	6.2	83.8
CNSL8	6 Creagh Demesne	90	76	17.7	72.3
CNSL9	1 Willow Park	90	82	18.3	71.7
CNSL10	9 Ashwood Grove	90	15	3.7	86.3

CNSL11	22 Ashwood Grove	90	15	3.7	86.3

Table 9.10 above illustrates that there is potential for worst-case construction noise levels of >86 dB(A) at numerous properties in the vicinity of the proposed main construction area if measures are not put in place to control construction noise levels.

The proposed pipeline route works would involve breaking of the road surface and trenching. These works would occur within 10 to 20 metres of residences, which would receive noise levels of 90 to 84 dBA while the highest noise activities are occurring. However, these maximum noise levels would be limited to a few hours per day, and would only occur during the initial ground preparation on each phase of the pipeline. Each phase of the pipeline would also only occur for a few days in the immediate vicinity of individual noise sensitive receptors before moving to the next section of the route. Public familiarity with noise from temporary road works would also reduce the risk of perceived nuisance from these works.

It must be borne in mind that the above predicted noise levels are very much a worst-case scenario and assume all activities are taking place simultaneously at the nearest point of the construction phase boundary to the relevant residential receptor.

The predicted worst case scenario construction noise has been predicted to be in excess of the NRA Guidance Weekday limit of 70 dBA and Saturday limit of 65 dBA. Therefore, it is anticipated that there would be a moderate impact, for limited periods of time, on the closest local residences within the vicinity of the development during construction. Mitigation measures would be required to reduce noise levels from construction activities to within guidance recommended levels. Mitigation measures aimed at reducing construction noise levels are outlined in Section 9.8 below.

Vibration

There is potential for vibration impacts during the construction phase on account of the proximity of general construction activities to some of the nearest sensitive receptors and on account of the fact that made ground demolition (ground breaking) will be required as part of the construction works.

Minor short-term vibration impacts may occur during the construction phase as a result of the use of heavy plant and machinery; however these impacts will be unlikely to propagate beyond the construction site boundary. No significant vibration impacts would be expected to occur during ground breaking for the proposed sewer line.

Section 9.3 outlines permissible vibration levels below which there is no likelihood of structural damage from vibration levels associated with the construction of the proposed development. During construction, it will be necessary to consider the potential vibration impact associated with the construction phase activities at the nearest sensitive receptors. Control of the use of specific vibration generating plant in the vicinity of the site boundary closest to the nearest sensitive receptors would be required in order to ensure no significant impacts occur.

9.7.2 Operational Phase

Operational Phase Noise

The main potential noise source that would be evident during the operational phase of the development would be that of increased road traffic noise associated with the site. Specifically, sources would be likely to include but not be limited to the following:-

- Vehicular traffic into and out of the estate by residents;
- Vehicular traffic into and out of the estate from service and delivery vehicles (waste/recycling, oil/gas/electricity, tradesmen etc);
- General residential activities (DIY, lawnmowers, house alarms etc);
- Vehicular traffic into and out of the CE zoned land where a crèche will be located.

In order to determine the design of the proposed development with regard to traffic noise impacts on the proposed residences, an assessment was also completed on local and proposed internal roads. Road traffic flows (24-hour annual average daily traffic [AADT] flows) and road design speeds were retrieved from the traffic consultants in order to undertake the road traffic noise assessment. Internal road design speeds were assumed to be 30 km/h.

Tables 8.11 and 8.12 present the predicted day-time and night-time road traffic noise impacts on selected proposed onsite residences The tables illustrate the predicted Day-time and Night-time L_{Aeq} dB(A) along internal roads, the relevant recommended EPA NG4 guidance noise limit and the relevant monitored existing background noise level.

Table 8.11 – Day-time Traffic Noise Impact within Proposed Development

Ref	Receiver	Floor	Dir	EPA Daytime Limit	Predicted Day-time Noise Level	Predicted Day-time Exceedance of EPA Guidance Level	Existing Background Noise Level
				LAeq dB(A)	LAeq dB(A)	LAeq dB(A)	Daytime
NSL1	16 New Housing	GF	SW	55	62.2	7.2	64.2
NSL1	16 New Housing	F 1	SW	55	64.5	9.5	64.2
NSL1	16 New Housing	F 2	SW	55	65.5	10.5	64.2
NSL2	20 New Housing	GF	SE	55	56.8	1.8	---
NSL2	20 New Housing	F 1	SE	55	56.8	1.8	---
NSL2	20 New Housing	F 2	SE	55	56.9	1.9	---
NSL3	52 New Housing	GF	SE	55	48.3	---	---
NSL3	52 New Housing	F 1	SE	55	50.1	---	---
NSL3	52 New Housing	F 2	SE	55	51.5	---	---
NSL4	62 New Housing	GF	SE	55	50.1	---	---
NSL4	62 New Housing	F 1	SE	55	50.6	---	---
NSL4	62 New Housing	F 2	SE	55	51.3	---	---
NSL5	120 New Housing	GF	SE	55	45.4	---	---
NSL5	120 New Housing	F 1	SE	55	46.7	---	---
NSL5	120 New Housing	F 2	SE	55	47.7	---	---
NSL6	130 New Housing	GF	SE	55	45.0	---	---
NSL6	130 New Housing	F 1	SE	55	45.8	---	---
NSL6	130 New Housing	F 2	SE	55	47.0	---	---
NSL7	138 New Housing	GF	SE	55	44.0	---	---
NSL7	138 New Housing	F 1	SE	55	44.9	---	---
NSL7	138 New Housing	F 2	SE	55	46.1	---	---
NSL8	139 New Housing	GF	N	55	42.2	---	---

Ref	Receiver	Floor	Dir	EPA Daytime Limit	Predicted Day-time Noise Level	Predicted Day-time Exceedance of EPA Guidance Level	Existing Background Noise Level
				LAeq dB(A)	LAeq dB(A)	LAeq dB(A)	Daytime
NSL8	139 New Housing	F 1	N	55	43.3	---	---
NSL8	139 New Housing	F 2	N	55	45.0	---	---
NSL9	156 New Housing	GF	SW	55	47.1	---	---
NSL9	156 New Housing	F 1	SW	55	48.6	---	---
NSL9	156 New Housing	F 2	SW	55	49.6	---	---
NSL10	159 New Housing	GF	SE	55	46.9	---	---
NSL10	159 New Housing	F 1	SE	55	48.2	---	---
NSL10	159 New Housing	F 2	SE	55	49.1	---	---
NSL11	239 New Housing	GF	NW	55	45.3	---	---
NSL11	239 New Housing	F 1	NW	55	46.9	---	---
NSL11	239 New Housing	F 2	NW	55	48.4	---	---
NSL12	246 New Housing	GF	NW	55	43.6	---	---
NSL12	246 New Housing	F 1	NW	55	45.2	---	---
NSL12	246 New Housing	F 2	NW	55	47	---	---
NSL13	Apartment Block 01	GF	SE	55	60.2	5.2	64.2
NSL13	Apartment Block 01	F 1	SE	55	62.2	7.2	64.2
NSL13	Apartment Block 01	F 2	SE	55	63.1	8.1	64.2
NSL14	Apartment Block 03	GF	NE	55	51.0	---	---
NSL14	Apartment Block 03	F 1	NE	55	52.5	---	---
NSL14	Apartment Block 03	F 2	NE	55	52.8	---	---
NSL15	Apartment Block 05	GF	SE	55	59.6	4.6	64.2
NSL15	Apartment Block 05	F 1	SE	55	61.5	6.5	64.2
NSL15	Apartment Block 05	F 2	SE	55	62.5	7.5	64.2
NSL16	Apartment Block 07	GF	SW	55	49.6	---	---
NSL16	Apartment Block 07	F 1	SW	55	51.2	---	---
NSL16	Apartment Block 07	F 2	SW	55	51.8	---	---
NSL17	Apartment Block 08	GF	SW	55	45.6	---	---

Ref	Receiver	Floor	Dir	EPA Daytime Limit	Predicted Day-time Noise Level	Predicted Day-time Exceedance of EPA Guidance Level	Existing Background Noise Level
				LAeq dB(A)	LAeq dB(A)	LAeq dB(A)	Daytime
NSL17	Apartment Block 08	F 1	SW	55	47.4	---	---
NSL17	Apartment Block 08	F 2	SW	55	48.5	---	---
NSL18	Apartment Block 11	GF	NW	55	47.3	---	---
NSL18	Apartment Block 11	F 1	NW	55	49.4	---	---
NSL18	Apartment Block 11	F 2	NW	55	50.5	---	---
NSL19	Apartment Block 12	GF	SE	55	49.1	---	---
NSL19	Apartment Block 12	F 1	SE	55	50.4	---	---
NSL19	Apartment Block 12	F 2	SE	55	51.5	---	---
NSL20	Apartment Block 13	GF	SE	55	43.0	---	---
NSL20	Apartment Block 13	F 1	SE	55	45.2	---	---
NSL20	Apartment Block 13	F 2	SE	55	47.4	---	---
NSL21	Apartment Block 15	GF	NW	55	47.5	---	---
NSL21	Apartment Block 15	F 1	NW	55	49.1	---	---
NSL21	Apartment Block 15	F 2	NW	55	50.4	---	---
NSL22	Apartment Block 23	GF	NW	55	41.2	---	---
NSL22	Apartment Block 23	F 1	NW	55	42.2	---	---
NSL22	Apartment Block 23	F 2	NW	55	44.6	---	---
NSL23	Apartment Block 24	GF	W	55	45.0	---	---
NSL23	Apartment Block 24	F 1	W	55	47.0	---	---
NSL23	Apartment Block 24	F 2	W	55	48.3	---	---
NSL24	Apartment Block 25	GF	NW	55	54.0	---	---
NSL24	Apartment Block 25	F 1	NW	55	55.2	0.2	---
NSL24	Apartment Block 25	F 2	NW	55	55.7	0.7	---
NSL25	Crèche	GF	NW	55	45.9	---	---
NSL25	Crèche	GF	NE	55	45.6	---	---

Table 8.12 – Night-time Traffic Noise Impact within Proposed Development

Ref	Receiver	Floor	Dir	EPA Night-time Limit	Predicted Night-time Noise Level	Predicted Night-time Exceedance of EPA Guidance Level	Existing Background Noise Level
				LAeq dB(A)	LAeq dB(A)	LAeq dB(A)	Night
NSL1	16 New Housing	GF	SW	45	59.0	14	58
NSL1	16 New Housing	F 1	SW	45	60.5	15.5	58
NSL1	16 New Housing	F 2	SW	45	61.2	16.2	58
NSL2	20 New Housing	GF	SE	45	52.2	7.2	---
NSL2	20 New Housing	F 1	SE	45	52.6	7.6	---
NSL2	20 New Housing	F 2	SE	45	52.9	7.9	---
NSL3	52 New Housing	GF	SE	45	46.8	1.8	---
NSL3	52 New Housing	F 1	SE	45	47.9	2.9	---
NSL3	52 New Housing	F 2	SE	45	48.7	3.7	---
NSL4	62 New Housing	GF	SE	45	49.5	4.5	---
NSL4	62 New Housing	F 1	SE	45	49.7	4.7	---
NSL4	62 New Housing	F 2	SE	45	49.9	4.9	---
NSL5	120 New Housing	GF	SE	45	46.6	1.6	---
NSL5	120 New Housing	F 1	SE	45	47.3	2.3	---
NSL5	120 New Housing	F 2	SE	45	47.7	2.7	---
NSL6	130 New Housing	GF	SE	45	47.2	2.2	---
NSL6	130 New Housing	F 1	SE	45	47.6	2.6	---
NSL6	130 New Housing	F 2	SE	45	47.9	2.9	---
NSL7	138 New Housing	GF	SE	45	44.1	---	---
NSL7	138 New Housing	F 1	SE	45	44.5	---	---
NSL7	138 New Housing	F 2	SE	45	45.0	---	---
NSL8	139 New Housing	GF	N	45	42.2	---	---
NSL8	139 New Housing	F 1	N	45	42.6	---	---
NSL8	139 New Housing	F 2	N	45	43.1	---	---
NSL9	156 New Housing	GF	SW	45	48.4	3.4	---
NSL9	156 New Housing	F 1	SW	45	49.3	4.3	---

Ref	Receiver	Floor	Dir	EPA Night-time Limit	Predicted Night-time Noise Level	Predicted Night-time Exceedance of EPA Guidance Level	Existing Background Noise Level
				LAeq dB(A)	LAeq dB(A)	LAeq dB(A)	Night
NSL9	156 New Housing	F 2	SW	45	49.7	4.7	---
NSL10	159 New Housing	GF	SE	45	46.2	1.2	---
NSL10	159 New Housing	F 1	SE	45	46.9	1.9	---
NSL10	159 New Housing	F 2	SE	45	47.3	2.3	---
NSL11	239 New Housing	GF	NW	45	44.9	---	---
NSL11	239 New Housing	F 1	NW	45	46.0	1	---
NSL11	239 New Housing	F 2	NW	45	46.7	1.7	---
NSL12	246 New Housing	GF	NW	45	43.2	---	---
NSL12	246 New Housing	F 1	NW	45	44.5	---	---
NSL12	246 New Housing	F 2	NW	45	45.4	0.4	---
NSL13	Apartment Block 01	GF	SE	45	58.5	13.5	58
NSL13	Apartment Block 01	F 1	SE	45	59.9	14.9	58
NSL13	Apartment Block 01	F 2	SE	45	60.5	15.5	58
NSL14	Apartment Block 03	GF	NE	45	50.3	5.3	---
NSL14	Apartment Block 03	F 1	NE	45	51.3	6.3	---
NSL14	Apartment Block 03	F 2	NE	45	51.4	6.4	---
NSL15	Apartment Block 05	GF	SE	45	57.4	12.4	58
NSL15	Apartment Block 05	F 1	SE	45	58.1	13.1	58
NSL15	Apartment Block 05	F 2	SE	45	58.7	13.7	58
NSL16	Apartment Block 07	GF	SW	45	49.0	4	---
NSL16	Apartment Block 07	F 1	SW	45	50.1	5.1	---
NSL16	Apartment Block 07	F 2	SW	45	50.3	5.3	---
NSL17	Apartment Block 08	GF	SW	45	46.1	1.1	---
NSL17	Apartment Block 08	F 1	SW	45	47.3	2.3	---
NSL17	Apartment Block 08	F 2	SW	45	47.7	2.7	---
NSL18	Apartment Block 11	GF	NW	45	46.3	1.3	---
NSL18	Apartment Block 11	F 1	NW	45	47.8	2.8	---

Ref	Receiver	Floor	Dir	EPA Night-time Limit	Predicted Night-time Noise Level	Predicted Night-time Exceedance of EPA Guidance Level	Existing Background Noise Level
				LAeq dB(A)	LAeq dB(A)	LAeq dB(A)	Night
NSL18	Apartment Block 11	F 2	NW	45	48.4	3.4	---
NSL19	Apartment Block 12	GF	SE	45	45.3	0.3	---
NSL19	Apartment Block 12	F 1	SE	45	46.5	1.5	---
NSL19	Apartment Block 12	F 2	SE	45	47.5	2.5	---
NSL20	Apartment Block 13	GF	SE	45	43.0	---	---
NSL20	Apartment Block 13	F 1	SE	45	44.4	---	---
NSL20	Apartment Block 13	F 2	SE	45	45.4	0.4	---
NSL21	Apartment Block 15	GF	NW	45	45.8	0.8	---
NSL21	Apartment Block 15	F 1	NW	45	46.8	1.8	---
NSL21	Apartment Block 15	F 2	NW	45	47.5	2.5	---
NSL22	Apartment Block 23	GF	NW	45	42.9	---	---
NSL22	Apartment Block 23	F 1	NW	45	43.5	---	---
NSL22	Apartment Block 23	F 2	NW	45	44.2	---	---
NSL23	Apartment Block 24	GF	W	45	46.3	1.3	---
NSL23	Apartment Block 24	F 1	W	45	47.6	2.6	---
NSL23	Apartment Block 24	F 2	W	45	48.1	3.1	---
NSL24	Apartment Block 25	GF	NW	45	53.0	8	---
NSL24	Apartment Block 25	F 1	NW	45	53.8	8.8	---
NSL24	Apartment Block 25	F 2	NW	45	51.7	6.7	---
NSL25	Crèche	GF	NW	45	40.7	---	---
NSL25	Crèche	GF	NE	45	43.9	---	---

As can be seen in Table 8.11 and 8.12 predicted noise levels at proposed residences closest to the existing Fort Road would experience noise levels similar to existing noise levels, as determined by background monitored results. Further within the development, predicted daytime noise traffic levels would be in compliance with the EPA NG4 Day-time noise limit, however, predicted night-time noise levels would be in excess of the EPA NG4 Night-time noise limit.

Predicted noise levels would be similar to existing levels at the site, and that are experienced at other housing estates in the area. However, the amenity of the proposed development for future residents may be improved through the inclusion of mitigation in the design of the site. Mitigation measures aimed at reducing traffic impact noise levels are outlined in Section 9.8 below.

Operational Phase Vibration

There will be no significant vibration sources as a result of the operational phase of the development.

9.7.3 Cumulative Impacts

In order to determine the potential for road traffic noise impacts associated with the operation of the proposed development, an assessment of traffic flows on local roads was carried out. Road traffic flows (24-hour annual average daily traffic [AADT] flows) and road design speeds were retrieved from the traffic consultants in order to undertake the road traffic noise assessment.

In terms of interpreting the associated between road traffic flows and road traffic noise, it takes an increase in road traffic flows of 25% to result in a 1dB(A) increase in road traffic noise (Ref: UK Design Manual for Roads and Bridges [DMRB], Volume 11, Section 3, Part 7). It is also generally accepted that it takes an approximate 3dB(A) increase in noise levels for the average person to perceive a change in noise levels (Ref: UK Planning Policy Guidance Note 24 [PPG24] - Planning & Noise).

Table 8.13 presents the road traffic noise increases on all relevant roads in the study area in the vicinity of the proposed development, as per the traffic impact assessment. The traffic impact assessment includes predicted traffic number increases expected due to the development of the onsite CE zoned lands in combination with the proposed residential development and development to the north. The table illustrates the percentage increase in road traffic levels along these routes and the equivalent noise level increase associated with such an increase in traffic levels.

Table 8.13 – Traffic Noise Level Increases as a Result of the Proposed Development

Zone	2021 Development Completion	Increase in Noise Levels as a Result of Proposed Development dB(A)	2025 5 years after dev. comp.	Increase in Noise Levels as a Result of Proposed Development dB(A)	2035 15 years after dev. comp.	Increase in Noise Levels as a Result of Proposed Development dB(A)
669	6.15%	<1dB	14.39%	<1dB	22.95%	<1dB

Increases in noise levels in the area are all predicted to be less that 1dBA, and therefore would be imperceptible. Therefore, there would be no additional noise impact at offsite third party locations as a result of traffic from the proposed development.

While further residential development would be likely to occur in the area, it is not considered that the proposed development would contribute significantly to the cumulative traffic noise impact.

9.7.4 'Do Nothing' Scenario

If the proposed development were not to be established, there would be no impact on existing noise and vibration in the vicinity of the proposed site.

8.8 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

In order to sufficiently reduce the likely noise and vibration impact, a schedule of noise control measures has been formulated for both the construction phase and operational phase.

8.8.1 Construction Phase

With regards to construction activities, reference is made to BS5228: Noise Controls on Construction and Open Sites, which contains detailed guidance on the control of noise and vibration from demolition and construction activities. The following is a list of mitigation measures, which should be adhered to during the construction phase:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; Normal working hours will be 0800-1900 hours Monday to Friday and 0800-1600 hours on Saturdays. Sunday working will be avoided but may be necessary on some occasions. When working outside of normal hours is required the contractor will discuss such requirements with Wexford County Council.,

- Channels of communication between the developer, contractor, local authority and community should be established,
- A site representative responsible for matters relating to noise should be appointed,
- Noise level at sensitive location should be carried out monthly or during critical periods,
- All on-site construction roads should be maintained to prevent banging and vibration noise from traffic,
- Plant with low inherent potential to generate noise and vibration will be used on-site,
- Activities with the potential to create noise should be scheduled so as not to be carried out simultaneously,
- Noise/acoustic barriers should be erected between noise sensitive location and noise sources.

Vibration

The vibration from construction activities will be limited to the values set out in section 8.3. It should be noted that these limits are not absolute, but provide guidance as to magnitude of vibration that are very unlikely to cause cosmetic damage. 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. Where there is existing damage, these limits may need to be reduced by up to 50%.

Activities with the potential to create vibration should be scheduled so as not to be carried out simultaneously.

8.8.2 Operational Phase

With regard to the operational phase of the development, the majority of noise impacting upon the residences within the development would be due to traffic on the Fort Road. It is recommended that the county council be approached to reduce the speed limit from 80 kilometres per hour to 50 kilometres per hour on the Fort Road adjacent to the boundary of the proposed development. Reducing internal traffic speed limits to 25 km/hour may also be considered to reduce internal traffic noise.

8.8.3 'Worst Case' Scenario

The worst case scenario is that the development is not constructed as per the drawings and details provided in the planning application. While one would expect that the development is required to be constructed in accordance with the planning documents, which includes various mitigation measure outlined above, the worst-case scenario would be that the attributes and mitigation measure were not carries out and subsequently not appropriately enforced by the local authority.

The main potential for adverse impacts on local quality will occur during the construction phase. The worst-case scenario, therefore, corresponds to the situation where the mitigation measures for construction activities fail or are not implemented. Should noise mitigation measures not be implemented during the construction phase, significant noise nuisance is likely in areas close to the construction site.

8.8.1 Predicted Impacts of the Proposed Development with mitigation

Outward Noise Impact

Construction phase

During the construction phase there is the potential for some minor impact on nearby noise sensitive properties due to noise generated by construction site activities. The implementation of the construction phase noise and vibration mitigation and monitoring programme as detailed in Section 8.6.1 below, will minimise the potential noise and vibration impact on the receiving environment including existing residential receptors.

Operational Phase

The predicted noise impact generated by additional traffic movements associated with the development is predicted to be of insignificant impact at existing residential receptors in the vicinity of the existing and proposed road network., however the road speed should be limited to 25kph.

Inward Noise Impact

It may be concluded that during daytime and night-time periods, acceptable internal noise levels can be achieved across the site as defined in BS 8233 with windows closed using the recommended glazing, wall and roof constructions.

With regard to the recommended mitigation by design measures as specified above, it may be concluded that residential properties located within the proposed development can be appropriately designed and constructed to achieve acceptable internal noise levels.

Outward Vibration Impact

Construction Phase

During the construction phase there is no predicted adverse vibrational impact on any existing properties or on human beings, however a vibration monitoring programme will be implemented as part of the comprehensive construction monitoring programme for the development.

Operational Phase

There is no operation phase outward vibrational impact predicted as part of the development.

Inward Vibrational Impact

There is no inward vibrational impact predicted as part of the proposed development.

8.9 MONITORING

8.9.1 Construction Phase

It is recommended that monthly noise monitoring be carried out along the boundary of the proposed site in order to monitor the effectiveness of noise management for the duration of the construction phase. Noise levels at noise sensitive locations should not exceed 70 dB(A) during weekdays and 65 dB(A) during Saturdays as per NRA guidance. These levels should not be exceeded and any breach would require a review of operations. Noise mitigation measures should be put in place to ameliorate any exceedance which may be due to on-site construction work.

Should complaints arise, it is recommended that noise monitoring be carried out at sensitive receptors during the construction phase of the proposed development, including along the pipeline route, to ensure guideline limits are not exceeded and to determine whether further mitigation measures are required.

It is recommended that vibration measurements are carried out at requisite monitoring points. This will ensure that any vibration generated by the construction activities would not give rise to nuisance in the vicinity of the proposed development.

8.10 REINSTATEMENT

Not Applicable.

8.11 DIFFICULTIES ENCOUNTERED IN COMPILING

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, predictive modelling can only give a quantitative estimate of future noise levels.

9.0 LANDSCAPE AND VISUAL

9.1 INTRODUCTION

Murray and Associates were engaged to complete a Landscape and Visual Impact Assessment for the proposed residential development on lands at Creagh, Gorey, County Wexford. The report was completed by Jim Bloxam, a Senior Landscape Architect. He holds a Master's Degree in Landscape Architecture from University College Dublin and is a full corporate member of The Irish Landscape Institute.

The proposed site is located at Creagh, Gorey, County Wexford, 750 metres to the north of the Main Street of Gorey (R772). The closest road access to the lands is at Fort Road, adjacent to the east of the site. The lands are adjacent to the west of the Coillte lands of Ramsfort Park Forest.

The proposed development is comprised of 297 no. dwellings and a creche. The development also includes 1.4 hectares of pubic open space; associated internal roads; car parking; public lighting; surface water attenuation; landscaping; and associated site development works. The site measures approximately 11.41Ha (9.57Ha developable area when not including the community and educational zoned area to the south-west of the site and route for foul pipe) and is bounded by Fort Road the west where the development is proposed to be accessed from.

Further works are required outside the site, within council owned lands and roadways, to facilitate stormwater and foul pipes. This entails excavation and associated traffic management systems.

The landscape and visual assessment of the proposed development is a means of appraising the effect the proposed development would have on the receiving environment in terms of quality of landscape – both physically and visually. The assessment aims to indicate the layout and design of the proposed development which would present the least overall landscape and visual impact. Also considered are construction and demolition works, the operational phase, light emissions and the cumulation of effects with other existing and/or approved projects.

9.2 METHODOLOGY

9.2.1 Terminology

Table 9.1 – The extent of Landscape Effect

Imperceptible Effects	An effect capable of measurement but without noticeable consequences. There are no noticeable changes to landscape context, character or features.
Not Significant	An effect which causes noticeable changes in the character of the landscape but without noticeable consequences. There are no appreciable changes to landscape context, character or features
Slight Effects	An effect which causes noticeable changes in the character of the landscape without affecting its sensitivities. There are minor changes over a small proportion of the area or moderate changes in a localised area or changes that are reparable over time.
Moderate Effects	An effect that alters the character of the landscape in a manner that is consistent with existing and emerging trends. There are minor changes over some of the area (up to 30%) or moderate changes in a localised area.
Significant Effect	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the landscape. There are notable changes in landscape characteristics over a substantial area (30-50%) or an intensive change over a more limited area
Very Significant Effects	An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment. There are notable changes in landscape characteristics over a substantial area (50-70%) or a very intensive change over a more limited area.

Profound Effects	An effect which obliterates sensitive characteristics. There are notable changes in landscape characteristics over an extensive area (70-100%) or a very intensive change over a more limited area.

Landscape impacts are defined as changes in the fabric, character and quality of the landscape as a result of the development. This includes direct effects to landscape receptors and greater effects that can alter the wider distinctiveness of the landscape. Landscape receptors are the physical or natural resource, special interest or viewer group that will experience an impact. The sensitivity (of a landscape receptor) is the vulnerability to change. The extents of the landscape impacts have been assessed by professional evaluation using the terminology defined as per Tables 9.1, 9.3, 9.4, 9.5 and 9.6. The terminology is based on the criteria set down in the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, published by the EPA (Draft, August 2017) and with additional guidance from Guidelines for Landscape and Visual Impact Assessment (3rd Edition, by The Landscape Institute / Institute of Environmental Assessment published by Routledge, 2013).

Visual impacts relate solely to changes in available views of the landscape and the effects of those changes on people viewing the landscape. They include the direct impact of the development on views, the potential reaction of viewers, their location and number and the impact on visual amenity. The intensity of the visual impacts is assessed by professional evaluation using the terminology defined as per Tables 9.2, 9.3, 9.4, 9.5 and 9.6 below:

Table 9.2 - The 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 9.3 - The Quality of the Landscape & Visual Effect

Neutral Effect	Neither detracts from nor enhances the landscape of the receiving environment or view
Positive Effect	Improves or enhances the landscape of the receiving environment or a particular view
Negative Effect	Detracts from the quality of the landscape or view

Table 9.4 - The Duration of the Landscape & Visual 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
Permanent	Effects lasting over sixty years

Please note: “Momentary” and “Brief” Effects as defined in the Draft EPA Guidelines (August 2017) are not considered relevant to landscape & visual assessment as effects of such short duration are extremely unlikely to generate appreciable effects.

Table 9.5 - The Extent and Context of Effects

Extent	Describes the size of the area, the number of sites and the proportion of a population affected by an effect
Context	Describes whether the extent, duration or frequency conforms or contrasts with established conditions

Table 9.6 - The Probability of Effects

Likely Effects	Effects that can be reasonably expected to occur if all mitigation measures are properly implemented.
Unlikely Effects	Effects that can be reasonably expected not to occur if all mitigation measures are properly implemented.

The landscape and visual assessment methodology will be utilised in conjunction with a professional evaluation of the proposed development to determine the degree of impact.

The term ‘study area’ as used in this report refers to the site itself and its wider landscape context in the study of the physical landscape and landscape character. This may extend for approximately 1km in all directions from the site in order to achieve an understanding of the overall landscape. In terms of the visual assessment, the study of visual

amenity may extend outside the study area, from areas where views of the site are available, but the majority of visual impacts for a development of this nature would be most significant within 500m.

9.2.2 Methodology

The methodology employed in the landscape and visual impact assessment is as follows:

1. Desktop survey of detailed maps, aerial photography and other information relevant to the study area, including the Wexford County Development Plan 2013 – 2019, and the Gorey Town and Environs Local Area Plan 2017 – 2023.

2. Site survey and photographic survey to determine landscape character of the general study area and specific landscape of the site.

3. Assessment of the potential significant impacts of the proposed scheme utilising the plan and elevation drawings of the scheme to determine the main impacting features and the degree to which these elements would be visible in relation to observations made during the field survey. In determining visibility, the views to the proposed development site are considered based on the heights, finishes, design and other visual characteristics of the proposed structures and setting.

4. The proposal of a scheme of mitigation measures. These will be defined as measures which will be generally implemented and specific landscape measures which would be site-specific and address particular landscape or visual issues identified.

5. An evaluation of the impacts of the scheme with and without amelioration. For the purposes of assessment, the predicted visual effects of the scheme are assumed at

10 years following the completion of the proposed development. This is to allow a professional judgement on visual effects that is based on early mature tree planting sizes.

The study will follow from prescribed methodologies as set down in the following publications:

1. Guidelines for Landscape and Visual Impact Assessment 3rd Edition, by The Landscape Institute / Institute of Environmental Assessment published by E&FN Spon (2013),

2. Draft Guidelines on the information to be contained in environmental impact statements, published by the EPA (Draft, August 2017).

The assessment has operated in a stepwise refinement method with the identification of impacts forming the basis for design of the proposed scheme. Therefore, the methodology has informed and assisted in the design of the proposed development as opposed to be an assessment of a predetermined development. For the purposes of impact assessment, however, the landscape planting will be described under the mitigation measures section and impacts with and without this mitigation will be considered as part of the study.

9.3 PLANNING CONTEXT

9.3.1 Regional Planning Guidelines for the South-East Region 2010-2022:

The SERPGs designate the towns of New Ross, Enniscorthy and Gorey as ‘Larger Towns’. These towns are considered to be good locations for economic development. The SERPGs suggest that these larger towns should be:

1. Targeted for growth, or

2. Where the towns have already experienced high levels of population growth, the objective should be more measured growth in a manner that allows community, social and retail development to catch up with recent rapid phases of mainly residential development.

The development approach for Gorey Town is to accommodate more measured growth in the town, consolidating the existing pattern of development. The focus will be on encouraging and facilitating the further development of physical and social infrastructure for the town.

9.3.2 Wexford County Development Plan, 2013 - 2019:

The settlement hierarchy within the County Development Plan (Chapter 3, Pg. 48) centres on developing the role of Wexford Town as the Hub, supported by the county's other three larger towns New Ross Town, Enniscorthy Town and Gorey Town. The lands are zoned mainly residential, with pockets of Open Space and Amenity within the County Development Plan (Map No. 11, 2017).

The Wexford County Development Plan distinguishes between several Landscape Category Areas within County Wexford. The site of the proposed development is located in an area under Strong Urban Influence (Map No. 6, Rural Area Types, Pg. 99) and as being in the Lowlands area (Map no. 13, Pg. 367) as categorised in the Landscape Character Assessment (Volume 3, CDP).

The Landscape Assessment further states:

"The Lowland area generally comprises gently undulating lands and relates to extensive areas of the county. This landscape has characteristics which provide it with a higher capacity to absorb development without causing significant visual intrusion. The landscape is characterised by higher population levels and more intensive agriculture. It is punctuated by many of the county's hills and ridges, the more sensitive of which have been defined as Landscapes of Greater Sensitivity."

The site is not in proximity to any Landscapes of Greater Sensitivity, the nearest being Ask Hill and Tara Hill to the north-east (4 – 5 km) and Ballyminaun (4km) to the south-east. There are views towards the high point of the site from Tara Hill and Ballyminaun Hill.

There is an Objective (Objective L03) within the CDP that aims:

"To ensure that developments are not unduly visually obtrusive in the landscape, in particular in the Upland, River Valley and Coastal landscape units and on or in the vicinity of Landscapes of Greater Sensitivity."

Relevant Landscape policies and objectives within the County Development Plan include: Objective L01. To have regard to the Landscape Character Assessment and associated map contained in Volume 3, the Landscape and Landscape Assessment-Guidelines for Planning Authorities (2000) Draft and any updated versions of these guidelines published during the lifetime of the Plan, when assessing planning applications for development. Objective L03. To ensure that developments are not unduly visually obtrusive in the landscape, in the Upland, River Valley and Coastal landscape units and on or in the vicinity of Landscapes of Greater Sensitivity.

Objective L04. To require all developments to be appropriate in scale and sited, designed and landscaped having regard to their setting in the landscape so as to ensure that any potential adverse visual impacts are minimised.

Objective L09. To require developments to be sited, designed and landscaped in manner which has regard to the site-specific characteristics of the natural and built landscape, for example, developments should be sited, designed and landscaped to minimise loss of natural features such as mature trees and hedging and built features.

9.3.3 Gorey Town and Environs Local Area Plan 2017 - 2023

The zoning in the lands have been defined as Residential (R) in the CDP, with a portion of the subject lands are also zoned as Open Space and Amenity (OS)

Figure 9.1 - Zoning Map (Map No. 11) Gorey LAP

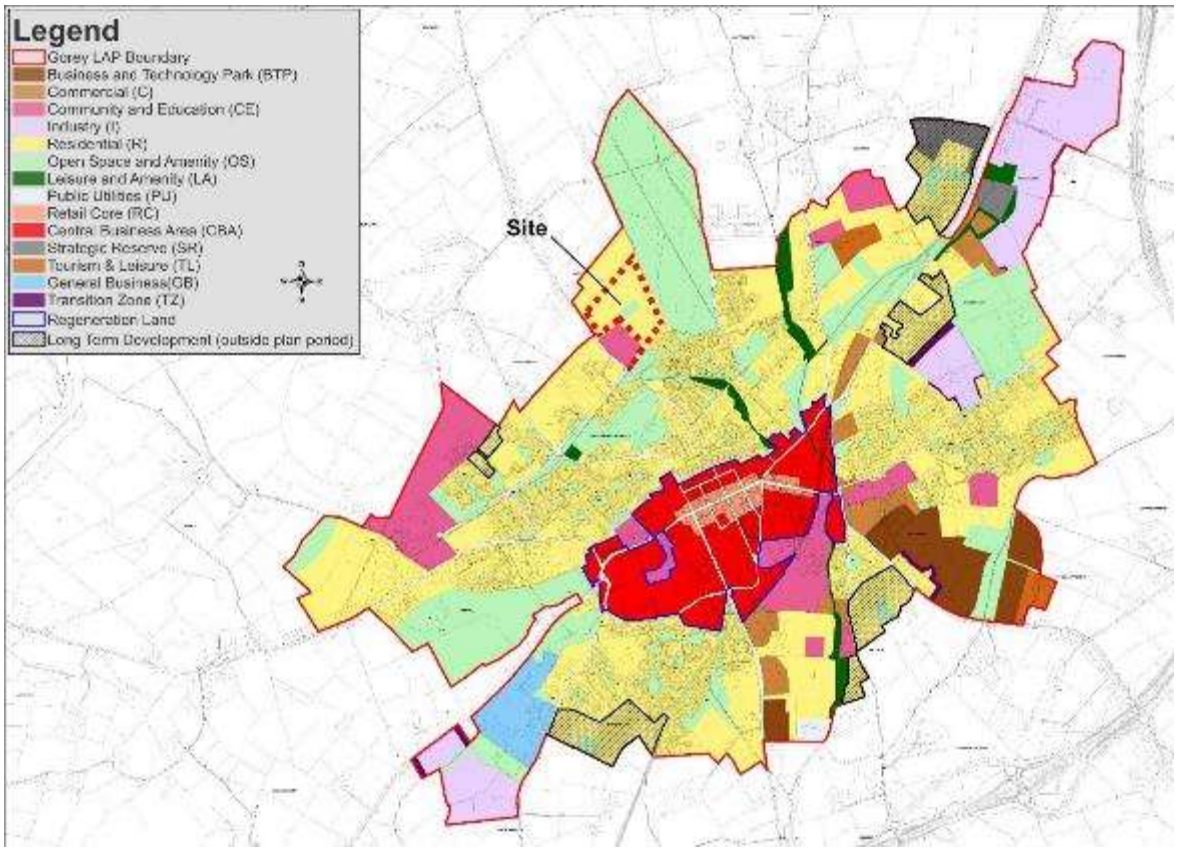
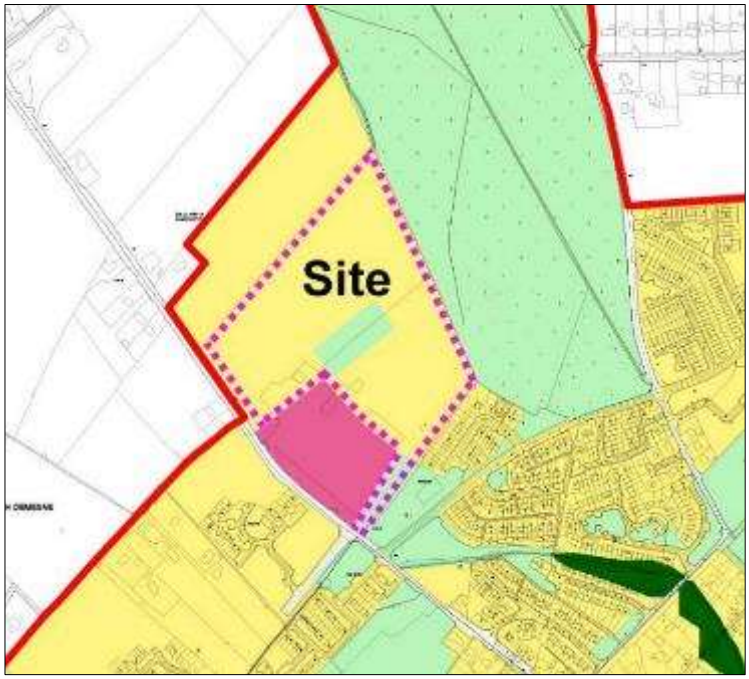
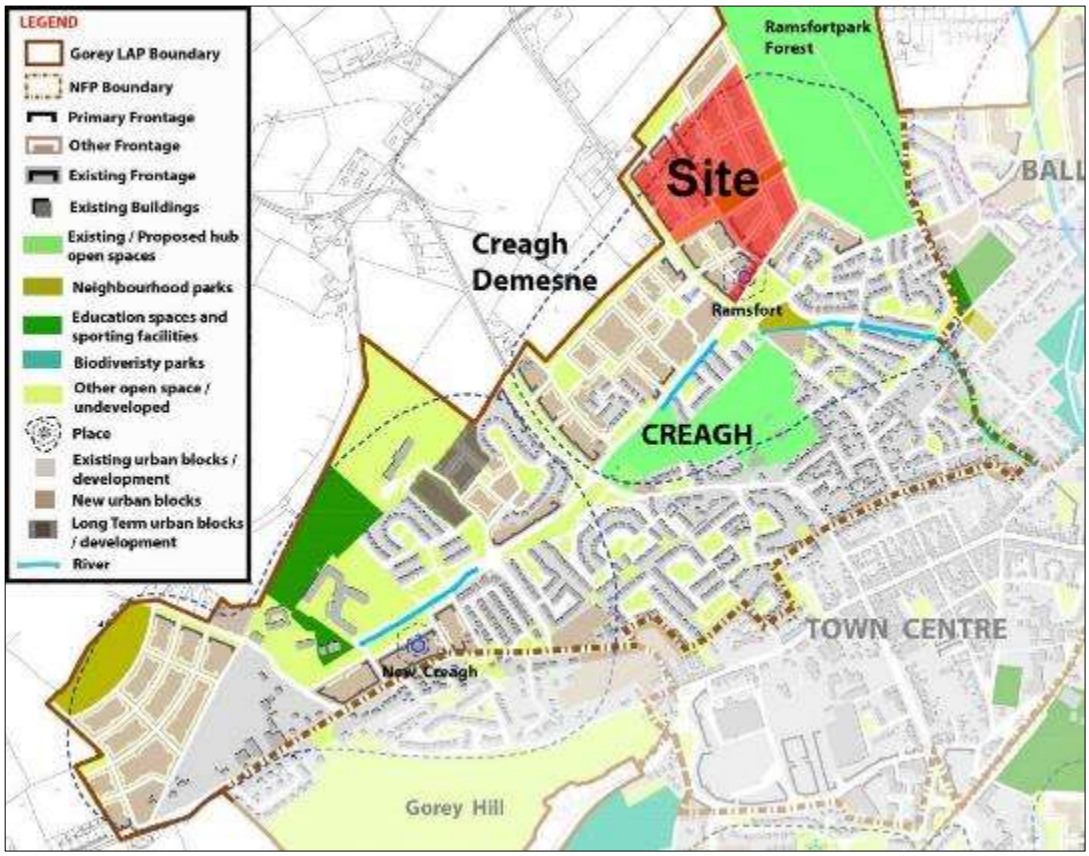


Figure 9.2 - Zoning Map insert (Map No. 11) Gorey LAP



The site is also located within the planning boundaries of the Gorey Town and Environs Local Area Plan 2017 - 2023. Under the land-use zoning objectives the subject lands are have been identified in the Creagh Neighbourhood Framework Plan (Appendix 1, Pg. 11 of the LAP) as being designated for significant development. The lands have been designated as a key development area (Parcel Cr1) within the plan (Fig 13: Creagh – Development Sites).

Figure 9.3 - Creagh – Place Concept (Fig 10, Pg.11, Creagh Neighbourhood Framework Plan)



Further relevant objectives within the Creagh Neighbourhood Framework plan include:

3. To provide new connections between existing and new developments in selected locations in the area to address issues of poor local level access and permeability

4. To enhance the current role of the country roads as green routes, by retaining established landscape features and adding new pedestrian and cyclist facilities.

6. To provide a new, connected green infrastructure of local corridors and hubs, to provide for improved quality and connectivity of biodiversity, amenity (including a neighbourhood park and play areas) and local water management.

7. To support the development of Gorey Town Park and Ramsfortpark Forest for high level recreational and amenity uses.

8. To respect locally-distinctive landscape features such as tree lines and field boundaries in the new urban structure and to enhance these as part of an improved and integrated green infrastructure network.

(Table 6, Pg. 13, Appendix 1, Gorey LAP)

9.3.4 Planning Summary

In summary, the lands that the site is in have been zoned for significant residential development.

Based on both Wexford County Development Plan 2013 -2019 and Gorey Town and Environs Local Area Plan 2017-2023, the existing site does not possess any significant features of note or trees that require protection. There are no scenic routes or viewpoints within the site, neither are there any Tree Preservation Orders. Furthermore, there are also no protected structures or National Monuments within the site.

There are no Natura 2000 sites (statutory protection areas under the Habitats and Birds Directives) on or near the proposed site.

The site is located within an area under '*Strong Urban Influence'*, as designated in The Wexford County Development Plan, and within the Lowlands Landscape Character Area. Lowlands have the capacity to absorb development without causing significant visual intrusion. The higher portions of the site are within the views of Tara Hill (5.8 kilometres distance), and Ballyminaun Hill (4.1km) which is designated as a Landscape of Greater Sensitivity.

9.4 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

9.4.1 Landscape Character and Site Setting

The proposed site is located at Creagh, Gorey, County Wexford, 750 metres to the north of the Main Street of Gorey (R772). The closest road access to the lands is at Fort Road, adjacent to the east of the site. The lands are adjacent to the west of the Coillte lands of Ramsfort Park Forest.

The surrounding land is predominantly rural in nature, with agricultural fields currently being used for arable agriculture located to the west and north, with associated hedges and linear tree groups located between the fields and around the perimeter of the site. To the west lies Ramsfort Park Forest, under Coillte ownership, with the urban fringe of Gorey immediately adjacent to the south.

Gorey Town lies 700 - 800 metres to the south, with an urban population of approximately 10,000 people. There are also further residential land uses in the wider contextual area. Scattered one-off housing is evident to the north and east of the site, with some dwellings immediately adjacent to the site boundary.

Tara Hill is approximately 5.8 kilometres to the north-east, with Ballyminaun Hill to the south, of which views are available from the higher northern portion of the site.

9.4.2 Description of Site

The site sits on a south facing slope, with views from the upper slopes over to the existing Gorey hinterland residential developments.

The full development site covers approximately 11.78Ha (9.57Ha developable area when not including the community and educational zoned area to the south-west of the site). The receiving landscape of the site is gently sloped from north to south. The high point (+71.85

AOD) is to the northern corner of the proposed site. This high point gently falls to the southern boundary corner (+53.73 AOD), resulting in a maximum level change of +18.12 metres.

The site is divided into two portions. The northern half of the site is an agricultural field of arable grassland, while the southern half is taken up by a brownfield area which was the former Walsh's mushroom production facility. The former industrial buildings have largely been demolished, but there are significant areas of hardstanding and concrete, with the steel shell of one former building still standing.

The site is bounded by mature hedgerows in various states of management. This ranges from the well managed Griselinia hedges to the south-west that have been recently maintained to some portions of hedgerow to the western and northern boundary of the site that have been neglected for some time, with resultant overgrown areas and some large gaps in the fabric of the hedge.

The western boundary consists of a large earth embankment with a line of late mature specimen trees growing from the top of the bank. Any hedgerow on this bank or to the existing field boundary has been unmanaged over a long period of time, with the resultant loss of much of the fabric of the hedge. This has resulted in the growth of much Bramble and Ivy, which currently dominates the earth bank.

The northern boundary is also unmanaged, with large gaps in the hedgerow and any existing hedgerow species being overgrown. Large areas of Bramble and Ivy have also dominated the hedge.

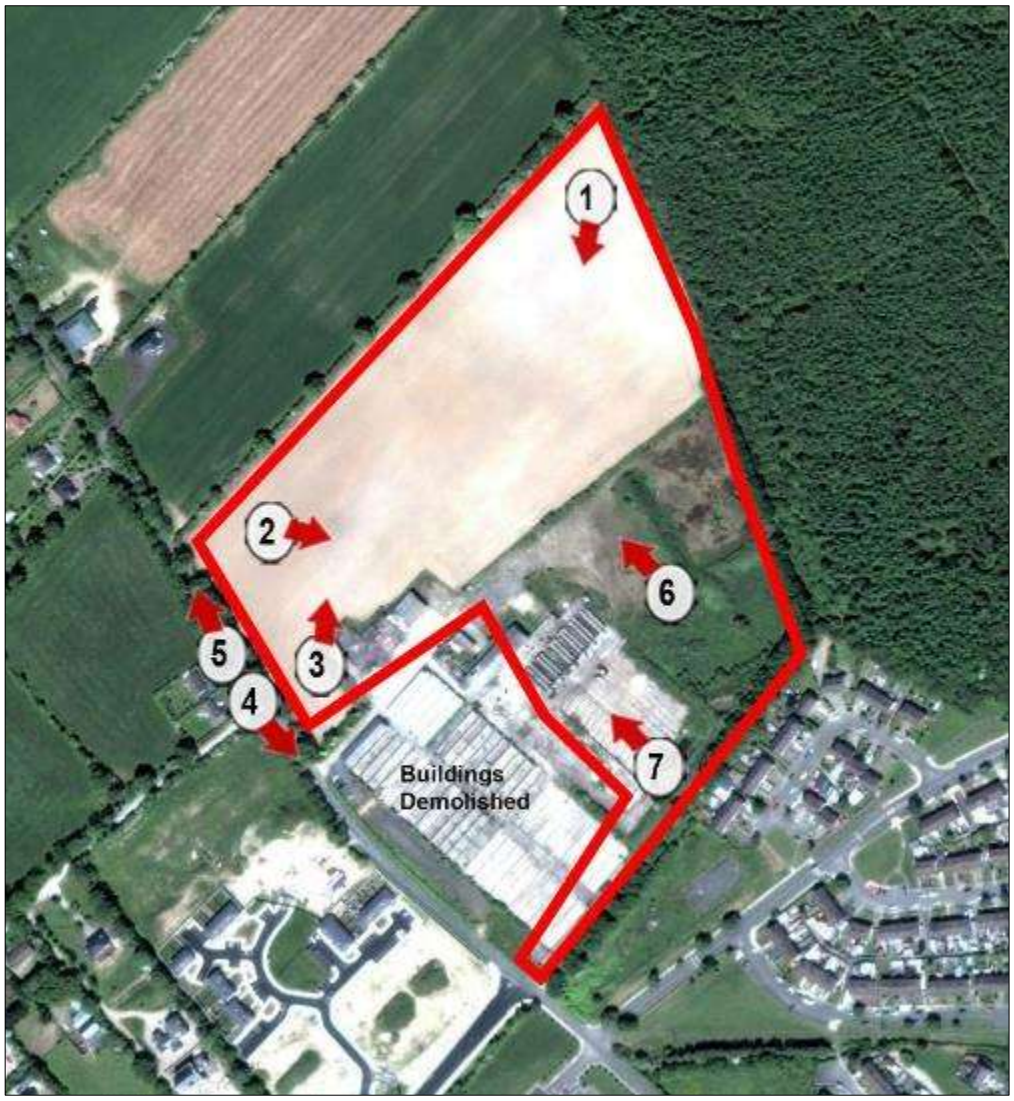
Where portions of the hedgerow exist, these are generally of Hawthorn (*Crataegus monogyna*) with lesser amounts of Elder (*Sambucus nigra*), Bramble (*Rubus spp*.), Ivy (Hedera helix).

Included in the existing boundaries are several juvenile Ash (*Fraxinus excelsior*) and mature specimen trees that include Oak (Quercus robur), Beech (*Fagus sylvatica*) and Ash (*Fraxinus excelcior*)

The boundary to Ramsfort Park forest is post and wire fence with a shelterbelt of juvenile Oak trees within the Coillte lands. To the south, poorly maintained boundaries consist of overgrown hedgerows and belts of large Leyland Cypress (Cupressus x leylandii). Refer to the Tree and Hedgerow Survey (Drawing 1706_TS_P_01 and associated report) for further detailed information.

The site works also extend further south with the inclusion of the proposed foul and storm pipe through council-owned lands and roadways. (See Chapter 2 for route of proposed pipe.)

Figure 9.4 - Site Pictures Key Map



1: View from High Point to South - Sloping nature of site with Gorey Hinterland and Ballyminaun Hill

2: View East to Tara Hill and Gorey Hinterland

3: View north to field hedgerow boundary

4: View south of Fort Road – Site on left

5: View north on Fort Road – site on right

6: View north from Southern Brownfield Half of Site

7: Existing Structure in southern portion of site

9.4.3 Existing Visual Context and Views

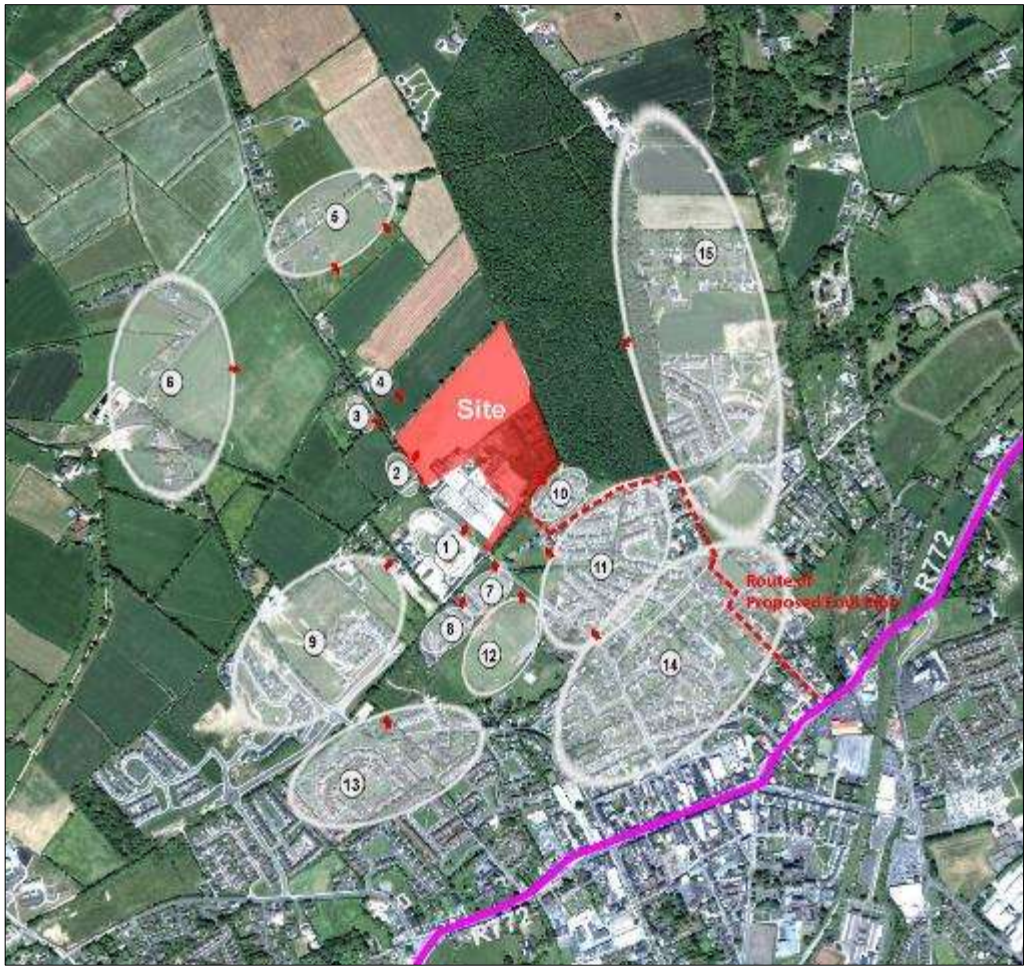
Although this is a relatively open site, views in from the north and west are somewhat restricted by the enclosed nature of the agricultural field patterns and the existing sloping topography. The enclosed nature of the potential receptors within their property boundaries to the north and west further restrict views to and from the site. Ramsfort Park Forest restricts views from receptors to the east. To the south, the existing Leylandii trees restrict views to the site from adjacent properties. Views are available to the site from the wider residential areas of Gorey to the south, though these would be at a distance, partial and glimpsed.

Open views into the site are potentially from bordering one-off properties and new residential developments to the south- east and south on the urban edge of Gorey, albeit generally oblique views from upper floor windows would be the predominant receptors. Further glimpsed and/or oblique views are likely to occur mainly from the first floor of residential properties and potential rear/front gardens as the town extends southwards. As the distance increases from the site, the sensitivity of the potential visual receptors and effects of the proposed development lessen. This is due to the site being mainly visible from residential dwellings to the south, and as distance increases the proportion of development within the visual envelope decreases. The proposed development also increasingly becomes part of the urban fabric of Gorey at further distances, thus diminishing its impact.

Views are also available from the Fort Road (Viewpoint 19), although the sensitivity of these views is considered low, as it is primarily passing views from vehicles that are under consideration.

Account is taken of the potential views from Tara Hill and Ballyminaun Hill due to the designation within the County Development Plan as Landscapes of Greater Sensitivity. The quality of views that may occur from similar or more distant vantage points will not be affected by the proposed development due to the existing context and character of the site and are therefore considered to be irrelevant to this study.

Figure 6.5 – Map showing location of Potential Visual Receptors



1: Hunters Green Development

2: 2no. One-off Bungalow Dwellings

3: 4no. One-off Dwellings

4: Single One-off Dwelling

5: Scattered One-off Dwellings

6: Scattered One-off Dwellings

7: Creagh Demesne Residential Development

8: Creagh Demesne Residential Development

9: Residential Development off Pearson's Brook and Scattered One-off Dwellings

10: Ashwood Grove (dwellings adjacent to site)

11: Selected Residential Developments bounded by Fort Rd, Park Ave, Ramsfort Ave

12: Gorey Town Park

13: Selected Residential Developments between Hollyfort Rd and Gorey Hill

14: Selected Residential Developments to south of Park Ave

15: Selected Residential Developments off Ramsfort Park

NOTE: The viewpoints have been aggregated into separate visual receptors or distinct groups with similar sensitivity and geographic location. The distances stated are approximate and are to the nearest point of the proposed site.

Also note the location of the proposed foul pipe passes through residential areas. The location of the pipe is under the existing roadways.

9.4.4 Sensitivity of the Identified Receptors

Landscape sensitivity refers to the inherent sensitivity to change of the landscape resource, as well as the visual sensitivity in terms of views, visibility, number and nature of viewers and scope to mitigate visual impact.

In landscape terms, this site is categorised as being within a 'Strong Urban Influence Area' in the Wexford County Development Plan (Map No. 6, Rural Area Types, Pg. 99) and as being in the Lowlands area (Map no. 13, Pg. 367) as categorised in the Landscape Character Assessment (Volume 3, CDP).

Lands within these areas are considered to be of low vulnerability to development. As stated within the Landscape Character Assessment,

'The Lowlands…has characteristics which have a higher capacity to absorb development without it causing significant visual intrusion…'

The Lowlands designation also notes that expansion of urban settlements will be factors of change in this landscape. Note, however, is taken of the site-specific nature of the development. It is considered that the proposed development is a continuation of the existing form and fabric of Gorey and its environs, being directly adjacent to existing developments of a similar nature. The former industrial nature of the southern half of the site lowers the landscape sensitivity.

Furthermore, as set out in the Gorey Town and Environs Local Area Plan 2017-2023, the lands in question have been zoned for substantial residential development. This zoning further lowers the sensitivity of the landscape receptors. These factors, therefore, lead to a low sensitivity designation of the lands in question.

Visual receptors have greater potential sensitivity to change in the landscape, however this is reduced by the following existing adverse factors:

There are visual barriers for many of the receptors, including fencing, existing hedgerows and vegetation, tree planting, etc.

Although the site is visible from a wide area to the south and south-west, the distance to the site from these potential receptors, and the oblique views over the site generally from first floor windows,

The existing residential zoning designation within the Gorey Town and Environs Local Area Plan 2017-2023.

Therefore, sensitivity of all residential visual receptors is considered to be low. The visual receptors associated with Tara Hill and Ballyminaun Hill are of a low sensitivity due to the recreational nature of the potential users of these areas, and the distance from the site. The proposed development is very small within the visual field and being directly adjacent to the urban fringe of Gorey, will be seen as an almost imperceptible continuation of the existing developments.

9.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The planned development (approximately 9.57 Hectares) includes the construction of a substantial residential housing estate and new road link from Fort Road to the west. The housing development will include 297 new housing units, a creche and associated infrastructure (internal roads, car parking, public lighting and associated site development works). There are three areas of open space identified for passive recreation within the development, totalling 1.41 hectares. The main open space is designated as a Neighbourhood Park within the Local Area Plan. The boundaries to the open spaces are lined with substantial buffer planting of native woodland trees and shrubs.

In visual terms the most visible element of the development will be the general massing of residential units within the site. General heights are two storeys, with the scattered apartment buildings within the development rising to three storey units.

Lighting measures consist of 8 metre columns to the proposed new link road and 6 metre columns elsewhere. Light spill is minimised through the use of directional LED fittings. There is no public lighting proposed to the active or passive open space areas.

The proposal will also include the construction of a foul and stormwater sewer pipe network connection from the south of the subject site, through council-owned lands, onto the R722. This new foul pipe will connect to an existing 525mm Pipe at the location shown on the Site Layout Plan.

The proposal also will include removal of some trees along the northern and western hedgerows, with the existing hedgerows remaining intact. Overall, there will be an increase of approximately 316 metres of native hedgerow on the boundary with Ramsfort Park Forest, with a further 521 linear metres being rehabilitated and enhanced (both the western boundary with Fort Road and the northern boundary adjacent to the neighbouring development site). Therefore, there is a total of 837 linear metres of native hedgerow associated with the development.

Across the site there will also be approximately 340 no. new native and non-native trees planted.

9.6 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT WITHOUT MITIGATION

9.6.1 Introduction

The potential impacts are the effects that the development could have without consideration of landscape mitigation or amelioration – i.e. without landscape works. For the sake of clarity these shall be considered under the following headings: Landscape Impacts and Visual Impacts.

These impacts are considered under the following headings:

- temporary effects (construction phase up to one year);
- short-term impacts (construction phase up to two years);
- short-term impacts (operation phase up to seven years);
- medium-term impacts (operation phase, seven to fifteen years) and
- long-term impacts (operation phase up to fifteen years and beyond).

These effects have been compiled to identify any areas where the proposed development may be injurious to the scenic and 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 and that the open spaces are simply grass areas. This enables recognition of potential, rather than actual, effects which facilitates the identification of suitable landscape mitigation measures.

The proposed development is likely to visually impact on the existing environment and its surroundings. This will be due to the need for vegetation removal in places, the potential impacts from construction works and the operational use of the proposed development as well as the proposed landscape works. These effects are examined in detail under the below headings.

9.6.2 Construction Phase – Potential Landscape and Visual Impact

Temporary & Short-Term effects

During this process the site will undergo a change from that of an area of previously disused development and open fallow land to a large construction site. Any impacts generated at this stage will be short term in duration, save for some landscape effects which will be permanent.

There will be moderately negative effects associated with the construction works of this development. This will be due to the site clearance and the building processes required to build the proposed development and associated distributor roadworks. These are temporary and short term. As stated in the Wexford County Development Plan 2013-2019 (Volume – Landscape Assessment), the landscape is capable of absorbing development without causing signification visual intrusion. This site, however, will undergo a change from that of an area of agricultural fields (and hard standing areas associated with the southern portion of the site's former use) to a large construction site.

Landscape impacts will occur over the majority of the site due to the excavation required into the existing slope, extending the length and width of the site, giving a moderately negative effect on the existing landscape.

Visual impacts will be more acute than in the operational phase, but short term in duration. This is due to the construction traffic, site hoarding, cranes, etc. Cranes will be taller than the proposed buildings and therefore more visible in the landscape. There will also be vehicular and crane movement and changes to the configuration of the site, typical of building sites, resulting in visual impacts to local viewpoints.

The most substantive effects during construction will be experienced by the adjacent residential receptors on Hunters Green (Viewpoint 1) and the scattered one-off dwellings adjacent to Fort Rd (Viewpoint 2). Some residents of Ashwood Grove (Viewpoint 10) which are nearest to the development and have direct views, will experience short term visual impact during construction due to the high level of change in the environment and their proximity. Moderate effects will occur for the dwelling at Viewpoint 4.

Other residents in these areas with oblique but no direct views from their properties will experience visual effects from the public realm as they come and go from their dwellings and potentially from their upper floor windows or gardens.

The effect on views from Tara Hill and Ballyminaun Hill (Landscapes of Greater Sensitivity) will be Imperceptible to Not Significant, due to the distance (5.8km) from the site - any view of the proposed development will be seen as a very small continuation within the visual field of view of the existing urban fabric of Gorey Town.

Temporary and Short Term visual effects during construction will affect the following visual receptors:

Viewpoints 1, 2, 4 and 10: Moderately negative effects. Viewpoints 3, 5 and 7: Slightly negative visual effects.

Viewpoints 6, 8, 9, 11, 12, 13, 14 Not significant negative visual effects.

Viewpoint 15, Imperceptible visual effect.

Temporary effects will occur in relation to the construction of the proposed foul pipe from the south of the site through to the R772. Construction will take place over a period of two to three months. This will include localised roadwork excavation and associated traffic management measures. The effects on the landscape of this construction are considered to be imperceptible in nature, due to the existing nature of the site (the pipe being installed beneath existing public roadway). The visual effects will be not significant in nature due to the temporary/short-term nature and size of the works.

9.6.3 Operational Phase - Potential Landscape Impact

9.6.3.1 Short-term landscape impacts after the construction works (up to seven years)

Following construction, the main landscape effects of the proposed development are associated with the change in land use from agricultural lands of low sensitivity to a more intensified, residential use, as specified in the Gorey Town and Environs Local Area Plan zoning designation. This will result in a moderately negative effect on the landscape to the northern arable half of the site. The loss of mature trees to the northern boundary and some trees to the boundary with Fort Road will contribute towards the moderately negative effect. The proposed development will have a slightly negative effect on brownfield southern half of the site due to the current nature of the site. It is noted the hedgerows will remain intact.

9.6.3.2 Medium-term landscape impacts (seven to fifteen years)

As the existing planting matures on site there will be a slight positive impact upon the subject site. However, the cumulative effect of future development of the adjacent lands zone Community and Education to the south-west by others, in line with the permitted zoned development would result in further residential development, albeit on existing brownfield land. This could result in a slightly negative impact, due to the potential loss of trees and associated hedgerows and their associated landscape value.

9.6.3.3 Long-term landscape impacts (over fifteen years)

Maturing trees and hedgerows will further integrate the proposed development into the existing landscape, resulting in a long term slightly negative impact on the landscape.

9.6.4 Potential Visual Impact

Potential visual impacts of the proposed development are assessed by examining potential views to the site of the proposed development that have the likely potential to significantly affected. The lands have been zoned for significant residential development within the Gorey Town and Environs Local Area Plan 2107-2023. This designation has been taken into consideration within the assessment of sensitivity of the all residential viewpoints.

The greatest magnitude of change experienced by any of the receptors will be in views south from the one-off dwelling at Viewpoint 4 due to the removal of trees on the field boundary, and views north from the rear of adjacent properties on Ashwood Grove (Viewpoint 10). However, the views from many of these receptors are either oblique, from upper floor windows or from a portion of the external garden spaces of the affected dwellings. In some viewpoints there is a mix of all these conditions. The effect on views from these areas are considered range from slight to moderate, based on the localised position of individual viewpoints and dwellings. Viewpoint 1 (Hunters Grove) is also immediately adjacent. However, due to the fact that the site in this location was previously industrial/agricultural structures (and now brownfield/demolition site) the magnitude of change is considered to be low.

Viewpoint 2 (2no One-off bungalow dwellings) is also immediately adjacent, across the site on Fort Road. These properties are single storey, with one dormer window on the southern property. The interceding garden vegetation combined with the earth bank and its associated trees and vegetation mitigates the visual effect of the development on these properties. These same conditions exist at Viewpoint 3 (Scattered one-off dwellings).

In views into the site from more distant viewpoints, the site will be visible from mainly upper windows and are partial, glimpsed and oblique viewpoints. The effect on views is considered to be not significant in extent from these viewpoints.

- Viewpoints 4 and 10: moderately negative visual effect.
- Viewpoints 1, 2, 3, 5, 7 and 12: slightly negative visual effect.
- Viewpoints 6, 8, 9, 11, 13, 14, not significantly negative visual effect.
- Viewpoint 15: imperceptible visual effect.

9.6.4.1 Potential Night-time Effects

Lighting to the proposed development consists of columns to the residential areas. The luminaires are LED fittings which allow for low energy, directionally-focused lighting that minimise light spill to the surrounding areas.

Due to the distance of the site from the identified receptors, the lighting to the roads and residential areas will have a slightly negative effect during the hours of darkness. This impact is also mitigated by the use of the LED fittings.

9.6.5 '*Do Nothing'* Scenario

The 'do-nothing' impact refers to the non-implementation of the proposed development. The primary effect of this would be that the impacts and effects identified would not directly occur. In this regard the following issues are relevant.

The current land use of the subject site is not a land use which is likely to persist in the longer term due to the current zoning as Residential in the Gorey Town and Environs Local Area Plan. This envisages a considerable development for the land to the south-west of proposed development area. This is zoned for Community and Education, and could contain schools, creches and medical centres.

In the event that the development does not proceed it is likely that the subject site would be developed in the future for some residential and open space use in line with its zoning. If the site is left in its current state, as agricultural land use, the management of the fields and hedgerows will be likely to continue in its current manner and hence a neutral impact will persist on the existing landscape.

9.7 MITIGATION MEASURES

The following recommendations are put forward to mitigate against the negative impacts mentioned above and to reinforce the positive impacts of the proposed development. Mitigation measures are proposed and considered only on the lands of the subject site.

9.7.1 Construction Phase

The remedial measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

A number of existing trees are to be retained and these are shown in the Arboricultural Reports and Drawings accompanying the planning application. Existing trees to be retained are particularly sensitive to negative impacts during the construction phase if proper protection measures are not adhered to. With regard to the protection of the retained trees on site during proposed construction works, reference should be made to BS5837: Trees in relation Design, Demolition and Construction – Recommendations (BSI, 2012), and also Murray and Associates Arboricultural Impact Assessment Plan (1706_TS_P_02).

Overall, there will be an increase of approximately 316 metres of native hedgerow on the boundary with Ramsfort Park Forest, with a further 521 linear metres being rehabilitated and enhanced (both the western boundary with Fort Road and the northern boundary adjacent to the neighbouring development site). Therefore, there is a total of 837 linear metres of native hedgerow associated with the development.

Across the site there will also be approximately 340 no. new native and non-native trees planted.

9.7.2 Operational Phase

The primary proposed mitigation measures can be seen on Murray and Associates Drawing no. 1706_PL_P_01, and are as follows:

1. Within the southern portion of the site there is an area of Open Space acting as an entrance area into the development. Semi-mature native tree planting and shrub planting is proposed. This will create a buffer space that will reduce the views into the site from adjacent properties. The development will continue to be softened and screened over time as the trees and planting mature.

2. Existing boundary hedgerows and trees within the site boundaries are retained where possible, maintaining the mature visual buffer between the proposed development and the surrounding area. Areas for tree removal to facilitate development include 15no. trees along the existing earth bank to Fort Road and 7 no. along the northern boundary. The associated vegetation will be retained and enhanced with new planting. This provides screening from Fort Road and adjacent properties.

The 7no. existing trees along the northern boundary, bordering the adjacent site, are to be removed to facilitate the development. However, the existing hedge-line is to be retained and enhanced, with additional 26no. semi-mature native trees planted along the boundary.

3. There are substantial numbers of trees (340 no.) proposed within the development's open spaces and along the roadways.

At time of planting, the proposed trees will be at least 4.0m in height. The trees will reach a mature height of at least 7 to 15 metres, dependant on species within the medium term (seven to fifteen years).

If necessary, and subsequent to appropriate soil analysis, topsoil may be imported where necessary to ensure that mitigation measures establish and grow appropriately.

A summary of the mitigation measures that have been adopted in the proposed scheme are as follows: -

- The architectural layout aims to address visual impacts by proposing variety in scale and massing of buildings and by design of high quality buildings.

- The extensive planting of trees and shrubs throughout the site where possible will reduce the visual mass of the buildings, soften and partially screen the development over time from various viewpoints, as identified in the assessment, thereby minimising the visual impacts.

- Native and appropriate planting for biodiversity has been incorporated into the scheme in accordance with the advice of the Project Ecologist.

- Public open spaces have been designed as part of an overall design strategy that focuses on creating a 'sense of place' and individual character for the development area.

- Facilitate the creation of meaningful public open space.

- Design Public open space that forms part of a network of spaces that includes areas for passive and active recreation, social / community interaction and play facilities catering for all ages.

During construction there will be a change to the landscape and there will be negative visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

The scheme design incorporates significant consideration and mitigation in respect of potential impacts. The quality of the public realm scheme is of a high standard and the quality of materials proposed is similarly high and robust.

Landscape works are proposed to reduce and offset any 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, both native and ornamental varieties, 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.

9.8 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT WITH MITIGATION

The predicted impacts are the impacts that the development is most likely to have on the receiving environment having regard to the remedial and reductive measures outlined in the previous section.

9.8.1 Construction Phase

Predicted landscape impacts at construction stage are likely to be as per the potential impacts – see section 9.6.1.1. However, the proposed hoarding will slightly improve the negative effect on visual impact from adjacent properties as the majority of construction traffic and activity will be screened. However, as the proposed development will be higher than the hoarding, the predicted visual effects will remain largely unchanged.

The construction phase will have a moderately negative impact for the receptors at viewpoints 1, 2 4 and 10 due to the proximity of the development.

9.8.2 Operational Phase

9.8.3 Predicted Landscape Impact

The landscape effects of the proposed development would overall be moderately negative, particularly considering the low sensitivity of the site being under 'Strong Urban influence', and the existing residential zoning designation within the Gorey Town and Environs Local Area Plan 2017-2023.

These predicted effects are further mitigated by the potential quality of the public realm, the cohesive land use and pattern that would result; and the new spaces, landscape features and distinctiveness introduced by the proposed development with its associated landscape spaces and planting interventions.

Screen planting is proposed to the southern boundary of the site to protect the privacy and visual amenity of the existing residents to the south. Boundary and native screen planting species mix, that includes trees and shrubs, and will be selected from the native local palette to encourage wildlife in the area and enhance biodiversity.

The existing vegetated earth bank and associated trees to Fort Road are to be retained, as are the existing mature trees to the field boundary to the north-west.

Within the site there here will also be approximately 340 new trees planted within the residential development. It is noted 120 metres of existing vegetation is proposed to be removed due to construction. This is on the western boundary with the existing Ashwood Grove development, and consists of large, overgrown Leylandii. The proposed removal of this low-value Leylandii and the inclusion of increased native tree cover throughout the site would substantially increase the tree resource and quality in the area overall and contribute towards a moderately positive effect on the landscape.

Overall, there will be an increase of approximately 316 metres of native hedgerow on the boundary with Ramsfort Park Forest, with a further 521 linear metres being rehabilitated and enhanced (both the western boundary with Fort Road and the northern boundary adjacent to the neighbouring development site). Therefore, there is a total of 837 linear metres of native hedgerow associated with the development.

These mitigation measures contribute towards ameliorating the negative impact of the development upon the landscape.

9.9 PREDICTED VISUAL IMPACT

The predicted visual impacts are those that will persist following implementation and establishment of the proposed landscape measures (medium term). The residential zoning designation of these lands within the Gorey Town LAP have been taken into consideration when assessing the impacts on the following receptors.

Viewpoints 4 and 10: moderately negative effect

Viewpoints 2, 5 and 12: slightly negative effect.

Viewpoints 1, 3, 6, 7, 8, 9, 11, 13, and 14, not significantly negative visual effect

Viewpoint 15: imperceptible visual effect.

9.9.1 Summary

During construction there will be a change to the landscape and there will be negative visual effects for residents and visitors to the areas adjacent to the site associated with construction activity.

In the medium to long term, the landscape effects due to the completed development would overall be slightly negative, particularly considering the low sensitivity of the landscape and the existing residential zoning designation within the Gorey Town and Environs Local Area Plan 2017-2023.

In the longer term, the assessment concludes that there will be slight to moderate negative visual effects to houses immediately adjacent to the site, with not significant, or imperceptible visual effects to the remaining residential receptors.

Landscape works are proposed to reduce and offset any effects generated due to the proposed development, where possible. The planting of substantial numbers of new native trees (340 in number) and other planting will enhance the overall appearance of the new development.

9.9.2 'Worst-Case' Effects

The worst-case effects arise when the mitigation measures as proposed substantially fail. This would result in the effects as laid out in section 7, where the landscape and visual impacts of the project are assessed without the proposed mitigation measures.

9.10 MONITORING

9.10.1 Construction phase

Landscape tender drawings and specifications will be produced to ensure that the landscape work is implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect.

The planting works will be undertaken in the planting season after completion of the main civil engineering and building work.

9.10.2 Operational phase

Monitoring of the mitigation measures forms part of the landscape management plan. Replacement trees, replacement planting and pruning measures are captured in landscape management plans and are intrinsically linked to the proposed mitigation measures.

All landscape works will be in an establishment phase for the initial three years from planting. A landscape management plan accompanies the planning application. Prior to completion of the landscape works, a competent landscape contractor will be engaged and a detailed maintenance plan, scope of operation and methodology will be put in place.

9.11 POTENTIAL CUMULATIVE IMPACTS

The Gorey Town and Environs Local Area Plan 2017-2023 has designated the lands to be zoned as Residential (R), Open Space (OS). Adjacent lands to the north are also zoned as Residential. Other lands immediate adjacent to the south-west are Community and Education.

The proposed development is part of the wider expansion and consolidation of Gorey town in this area. For some views this will mean further development occurring adjacent to the proposed development expanding the urban area. Cumulatively this is a moderate change, but the new scheme design and masterplan is also in accordance with local and national policy on the proper planning and sustainable development in urban areas. The proposed new development provides green infrastructure networks, landscape structure – trees and woods – and an appropriate material.

Cumulatively the magnitude of change is moderate but overtime the quality of change from rural/brownfield to urban retaining key landscape structural elements can be Neutral. Any further development within the vicinity of the proposed lands could have the possibility of impacting on the same sensitive receptors as identified above. This could lead to potential impacts of a slightly higher level of significance on the identified receptors when assessed cumulatively. These future developments will have further impact on the named receptors above that cannot, at this stage, be fully quantified. The most likely of these potential impacts will be loss of hedgerow and a moderate impact on views from Viewpoints 4 and 1. Further slight visual impact may occur to further receptors.

10.0 MATERIAL ASSETS – TRAFFIC

10.1 INTRODUCTION

Roadplan Consulting was commissioned to prepare a Transportation and Traffic Assessment on behalf of Amil Properties Ltd. for a proposed residential development at Ballowen, Fort Road, Gorey, Co Wexford.

In preparing this report, Roadplan Consulting has made reference to:

- The Wexford County Development Plan 2013-2019.
- The Institute of Highways and Transportation *Guidelines on the Preparation of Traffic Impact Assessments*.
- The *TII Transport Assessment Guidelines.*
- The *TII National Traffic Model*.
- 'Traffic and Transport Assessment Guidelines' (May 2014) National Road Authority,
- 'Traffic Management Guidelines' Dublin Transportation Office & Department of the Environment and Local Government (May 2003);

The objective of this report is to examine the traffic implications of the proposed development in terms of how it can integrate with existing traffic in the area. The report will determine and quantify the extent of additional trips generated by the development, and the impact of such trips on the operational performance of the local road network and junctions, in particular the existing Fort Road / Willow Park / Creagh Demesne Crossroads junction, the Fort Road / Pearse Street / John's Street Crossroads Junction and the proposed Fort Road / Residential Access priority junction.

10.2 STUDY METHODOLOGY

The methodology adopted for this report is summarised as follows:

- A scoping document was provided to the Roads Department of Wexford County Council. This document is contained in Appendix A of the Roadplan Traffic and Transportation Report.
- Traffic Count was undertaken by Irish Traffic Surveys Ltd. on Monday 18th of December 2017 during a 12-hour period (07:00 to 19:00). Count information was obtained at the existing Fort Road / Willow Park / Creagh Demesne crossroads junction. A secondary traffic count was undertaken at the existing Fort Road / Pearse Street / John's Street crossroads junction by Irish Traffic Surveys Ltd. on Tuesday 9th of January 2018 during a 12-hour period (07:00 to 19:00).
- Existing Traffic Assessment – A spreadsheet model was created which contains the base year DO-NOTHING traffic count data described above. The traffic count data was used to develop an PICADY model of the existing Fort Road / Willow Park / Creagh Demesne Crossroads junction and the existing Fort Road / Pearse Street / John's Street Crossroads Junction and a PICADY model of the proposed Fort Road / Residential Access priority junction.
- Future Year Assessment – The estimated future year traffic volumes on the study area road network, as a result of the increase in background traffic and the additional development related traffic was used to assess the future operational performance of the junctions both at the year of opening of the development, 5 and 15 years after opening.
- Parking Requirements – Car parking provision for the proposed development was assessed against the parking standards as set out in the Wexford County Development Plan 2013 – 2019.

10.3 RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The proposed residential development is located at Fort Rd, Gorey, Co. Wexford. The development is bounded by a Ramsfortpark forest to the east, the Fort Rd to the west, undeveloped lands to the north and residential developments to the south as shown below.

Figure 10.1 – Site Location Map

10.3.1 Existing Land Use

The existing site is currently a mixture of undeveloped lands and disused buildings.

10.3.2 Public Transport

There are several bus stops servicing surrounding areas locally and inter county. They are located within close proximity to the proposed development and they can be easily accessed by pedestrians walking to and from the development. The closest bus stops are located on Main Street and are within a 15-minute walking distance from the proposed development. Details on bus routes can be found below:

Bus route	Service
2	Dublin Airport – Dublin – Arklow – Gorey – Enniscorthy – Wexford
133	Dublin Airport – City Centre – Ashford – Wicklow
133X	Gorey – Arklow – Dublin

Gorey town has a train station that is located in the southern section of the of Gorey town. It is approximately a 20-minute walk from the proposed development. Irish Rail provides a daily service from Dublin Connolly to Rosslare Europort.

The proposed development will cater for a future bus route. The future bus route is shown on Strutec Architects Site Layout Plan.

10.3.3 Existing Traffic Flows

Traffic Count was undertaken on the 18th of December 2017 during a 12-hour period (07:00 to 19:00) and on the 9th of January 2018 during a 12-hour period (07:00 to 19:00). The count data is provided in Appendix F – Traffic Counts of the Roadplan Traffic and Transportation Report, submitted with the SHD application. Count information was obtained at the following junctions:

Fort Road / Willow Park / Creagh Demesne Crossroads junction

Fort Road / Pearse Street / John's Street Crossroads Junction

The traffic flows during the AM and PM peak hours were abstracted from the surveyed data and are shown in the following tables:

Fort Rd/ Willow Park/ Creagh Demesne Crossroads Junction

Table 10.1 – 2017 AM Peak Existing (08:15 – 09:15)

From / To	Fort Rd (north)	Willow Park	Fort Rd (south)	Creagh Demesne	Totals
Fort Rd (north)	0	74	203	7	284
Willow Park	76	0	33	2	111
Fort Rd (south)	154	17	0	6	177
Creagh Demesne	12	2	12	0	26
Totals	242	93	248	15	598

Table 10.2 – 2017 PM Peak Existing (17:00 – 18:00)

From / To	Fort Rd (north)	Willow Park	Fort Rd (south)	Creagh Demesne	Totals
Fort Rd (north)	0	49	77	3	129
Willow Park	30	0	24	1	55
Fort Rd (south)	141	38	0	16	195
Creagh Demesne	7	1	5	0	13
Totals	178	88	106	20	392

10.3.3.1 Fort Road/ Pearse Street/ John's Street Crossroads Junction

Table 10.3 – 2017 AM Peak Existing (08:15 – 09:15)

From / To	Fort Rd	Pearse St ((east)	Johns Street	Pearse St (west)	Totals
Fort Rd	0	102	0	78	180
Pearse St ((east)	7	0	0	18	25
Johns Street	96	24	0	37	157
Pearse St (west)	44	108	0	0	152
Totals	147	234	0	133	514

Table 10.4 – 2017 PM Peak Existing (17:00 – 18:00)

From / To	Fort Rd	Pearse St ((east)	Johns Street	Pearse St (west)	Totals
Fort Rd	0	58	0	47	105
Pearse St ((east)	14	0	0	32	46
Johns Street	83	37	0	74	194
Pearse St (west)	81	73	0	0	154
Totals	178	168	0	153	499

A summary of the count data for the peak hour flows is contained in Appendix C – Traffic Flow Sheets of the Roadplan Traffic and Transportation Report.

10.3.4 Existing Road Network

The proposed development is accessed from a proposed priority junction onto the existing Fort Rd.

The Fort Rd has the following characteristics at the location of the proposed development:

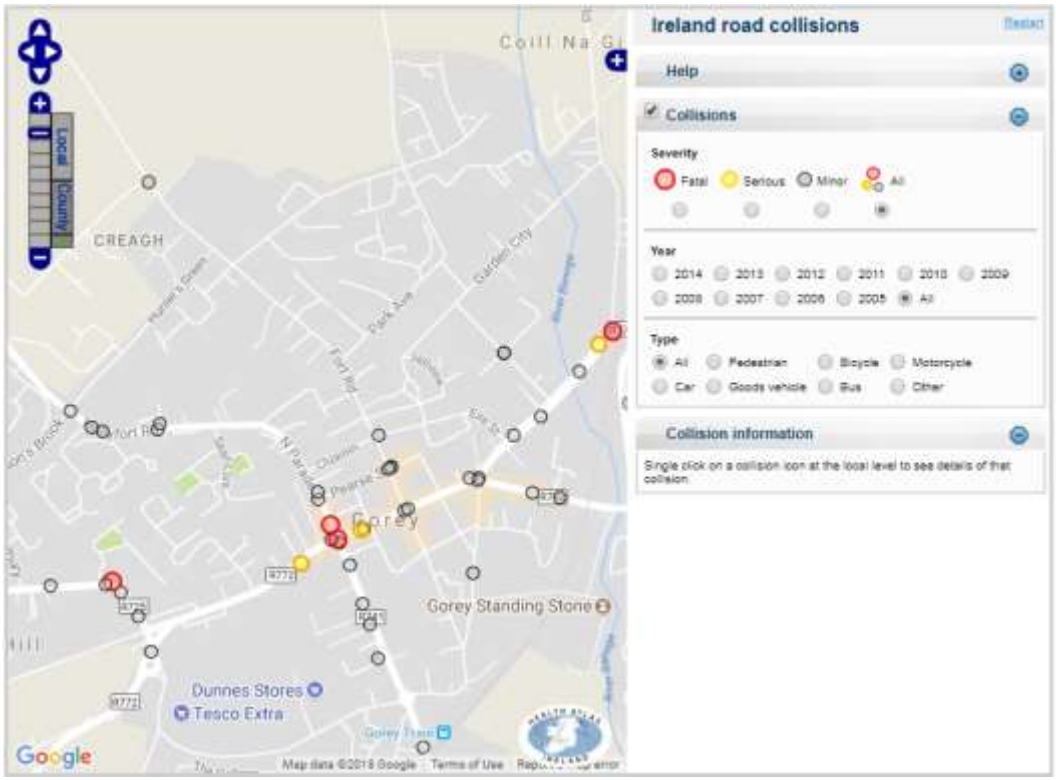
- It is a single carriageway road that is approximately 6m wide.

- It travels in a north to south and provides local access to Gorey town.
- All roads are governed by a 50kph speed limit.

10.3.5 Road Collisions

Information on road collisions was taken from the Road Safety Authority website and is provided below.

Figure 10.2 – Road collisions



There are a number of minor collisions along the Fort Rd in the period of nine years (from 2005 to 2013), but none at the proposed access to the development.

10.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development consists of new 246 residential units and 61 apartments as shown in table 2.1 Development Schedule.

Table 10.5 – Proposed Development

Item	Unit	Quantity
Residential Dwellings	2, 3 & 4 bed	232
Apartments	2 & 3 Bed	65
Crèche	sqm	554

Access to the proposed residential development will be via a proposed access onto the existing Fort Rd. A layout of the proposed development, is shown on the Architect's drawing which is contained in Appendix B – Drawings of the Roadplan Traffic and Transportation Report, submitted with the SHD application.

10.4.1 Car Parking Provision

A total of 590 parking spaces are to be provided within the proposed residential development as shown on the architect's drawings. A further 18 no spaces are provided for the creche (including 9 for creche drop off).

10.4.2 Car Parking Requirements From Development Plan

The 'Wexford County Development Plan 2013-2019' lists standard provision for car parking and the table below sets out those requirements in relation to the proposed development.

Table 10.6 – Car parking requirements from the County Development Plan

Parking Standards for Residential Developments			
Location	**Requirements**	**Quantity**	**Parking**
Residential Dwelling	2 spaces per unit	232 dwellings	464
Apartments	1.5 spaces per unit	61 Apartments	98
Creche	1 space per 4 children plus 1 space per employee	90 Children 18 Staff	22 18
Total			602

The Wexford Development Plan indicates that the number of parking spaces required is 602 spaces.

The proposed residential development will provide a total of 464 spaces for the residential dwellings, 122 spaces for the apartments and 18 spaces for the creche, along with 4 no. visitor spaces.

The Wexford development plan indicates that the number of parking spaces required for the creche is 40 spaces. It is considered that the parking demand for the creche is excessive and lower parking provision should be considered.

The Wicklow Development Plan indicates a parking provision of 1 space per 10 children and 0.5 space per employee. This parking provision is considered adequate for the following reasons:

- The creche will have staggered drop-off / pick-up times for children throughout the day.
- As the creche is located within the residential development and it is assumed that a number of parents will walk to and from the creche which will reduce the dependency of car trips to the creche. Therefore the 18 spaces provided for the creche car park is considered adequate.

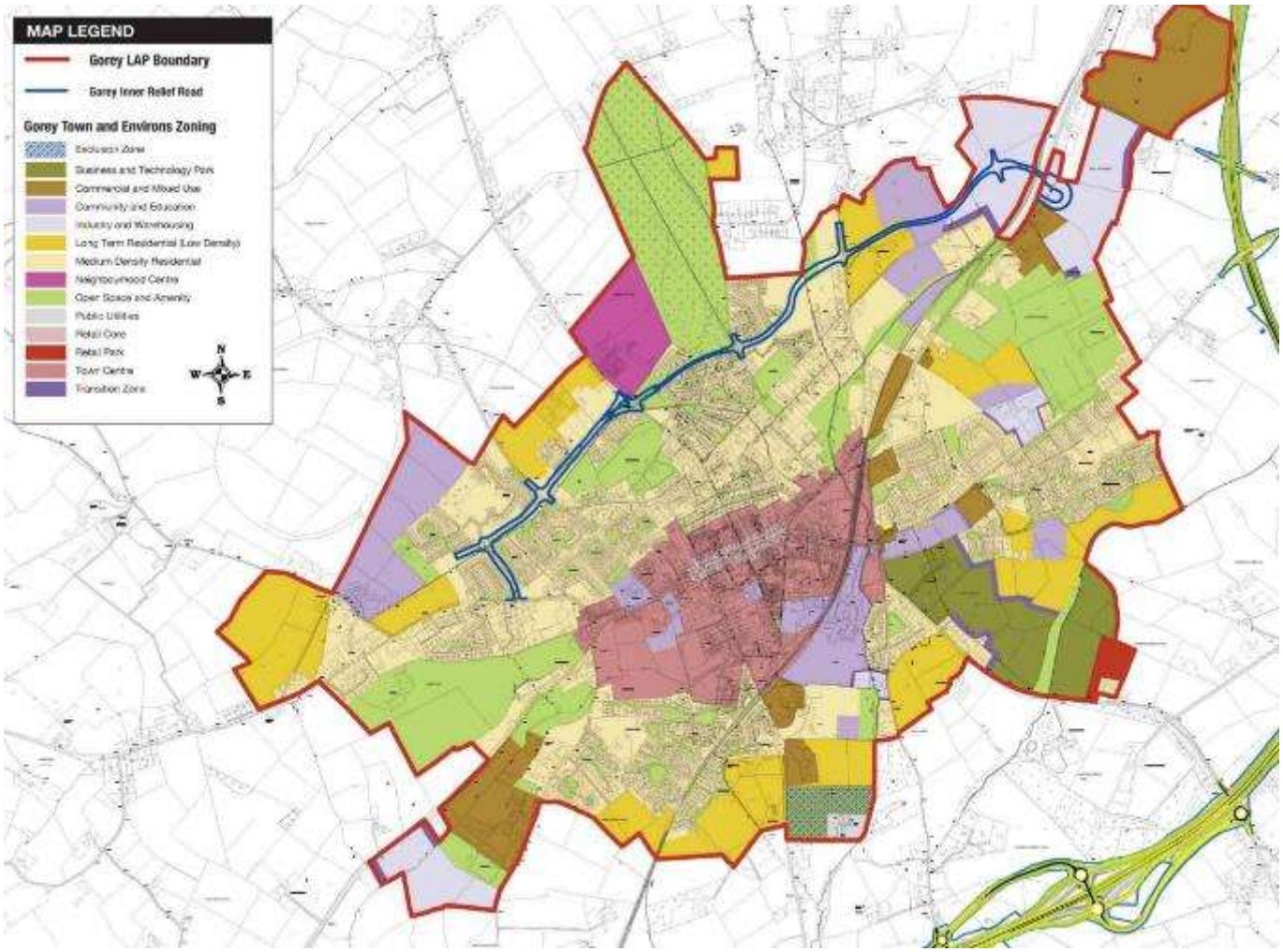
10.4.3 Foul Pipeline Route

The proposal includes the construction of an underground foul sewer pipeline, approximately 1.1km in length, from the proposed site to the public sewer line on the Arklow Road. The proposed pipeline route would follow the existing public road network.

10.4.4 Proposed Road Network Improvements

The western section of the Gorey Inner Relief Road has been constructed. The scheme commences at the R725 / Woodbury priority junction and terminates at Ford Road. The eastern section of the Gorey Inner Relief Road has not yet been constructed. The eastern section of the inner relief road runs from Fort Road and will terminate at the R772. There is no definite date for the commencement of construction of the eastern section of the inner relief road. A layout of the proposed road network improvements are shown below.

Figure 10.3 – Proposed Road Network Improvements



10.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

10.5.1 Construction Phase

All construction activities will be governed by a Construction Traffic Management Plan (CTMP) which will form a key component of the development proposals overall Construction Management Plan (an outline CMP accompanies the application). Furthermore, the applications accompanying Construction and Waste Management Plan also considers the impacts potentially generated during the construction stage. The details, scope and management initiatives detailed within the final CTMP will be agreed with the local authority's Roads Department 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 requirements thereby ensuring that both the public and construction workers' safety is maintained at all times, disruptions are minimised and undertaken within a controlled hazard free environment. It is noted that the impact of the construction works will be temporary in nature.

The period (time of day and day of week) during which construction activities will be permitted on-site, and during which construction traffic will be travelling across the local road network are set out in the detailed construction management plan.

During the general excavation of the foundations there will be additional HGV movements to and from the site. All suitable material will be reused for construction and fill activities where possible and appropriate. All spoil material will be removed to a registered landfill site which will be agreed in full with the local authority. In addition to the traffic generated by the disposal of surplus subsoil from the site, there will be traffic generated from deliveries of construction materials and equipment. It should be noted that construction traffic generated during the development works tends to be outside of peak hours. Such trips would generally be spread out over the full working day and will not be higher than the peak hour predicted volumes for the operational stage.

Construction Traffic Routing: A dedicated construction 'haul' routes will be identified and agreed with the local authority with the objective of directing all construction traffic along the most appropriate road connections between the subject lands and the M11 strategic road network. Furthermore, the identified 'haul' routes, will respect local accessibility characteristics.

The proposal includes the construction of an underground pipeline from the subject site to the Arklow Road. The route of the sewerage connection, would be subject to a road open licence under Section 254 of the Planning and Development Acts 2000-(as amended) from Wexford County Council.

There will be some short term impacts during the construction phase as the pipes are laid, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and disturbance to residents and business in the vicinity of the works.

Construction Traffic Vehicle Types: Construction traffic will consist of the following two principal categories. (i) Private vehicles owned and driven by site construction staff and by full time supervisory staff. On-site employees will generally arrive before 08:00, thus avoiding the morning peak hour traffic. These employees will generally depart after 18:00. It should be noted that a large proportion of construction workers would arrive in shared transport or use public transport. (ii) Excavation plant and dumper trucks 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.

Construction Traffic Impact: In the absence of a final construction programme it is difficult to assess the exact impact during the construction period. However, the impact will be greatly reduced for residential and commercial areas through utilisation of the agreed haul road (dedicated connections and junctions with the strategic road network) and above management measures.

10.5.2 Operational Phase

Traffic Generation and Trip Distribution

The TRICS database has been used to predict the trip generation to and from the proposed development for the AM and PM peak periods. Full details of the TRICS information used for the assessments are provided in Appendix D - TRICS information of the Roadplan Traffic and Transportation Report.

Residential Dwellings

The category of "Residential – Houses Privately Owned" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.7 – Trip rates per number of Units

	Trip rate to development	Trip rate from development
AM Peak	0.164	0.416
PM Peak	0.354	0.228

For the proposed 232 residential dwellings, this would give the following trips to and from the proposed development:

Table 10.8 – Trip Generation – 232 Residential Dwellings

	Trip rate to development	Trip rate from development
AM Peak	38	97
PM Peak	82	53

Apartments

The category of "Residential – Flats Privately Owned" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.9 – Trip rates per number of Units

	Trip rate to development	Trip rate from development
AM Peak	0.05	0.15
PM Peak	0.12	0.07

For the proposed 65 apartments, this would give the following trips to and from the proposed development:

Table 10.10 – Trip Generation – 65 Apartments

	Trip rate to development	Trip rate from development
AM Peak	4	10
PM Peak	8	5

Crèche

The category of "Educational – Nursery" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.11 – Trip rates per 100 sqm

	Trip rate to development	Trip rate from development
AM Peak	6.629	5.181
PM Peak	5.211	5.861

For the proposed 554sqm Crèche, this would give the following trips to and from the proposed development:

Table 10.12 – Trip Generation – 554 sqm

	Trip rate to development	Trip rate from development
AM Peak	37	29
PM Peak	29	33

Total Development Trip Generation Summary

To summarise, the combined trips that are predicted to be generated by the proposed residential development are shown in the table below:

Table 10.13 – Trip Generation – Total Development

	Trip rate to development	Trip rate from development	Total
AM peak	79	136	215
PM peak	119	91	210

Trip Distribution

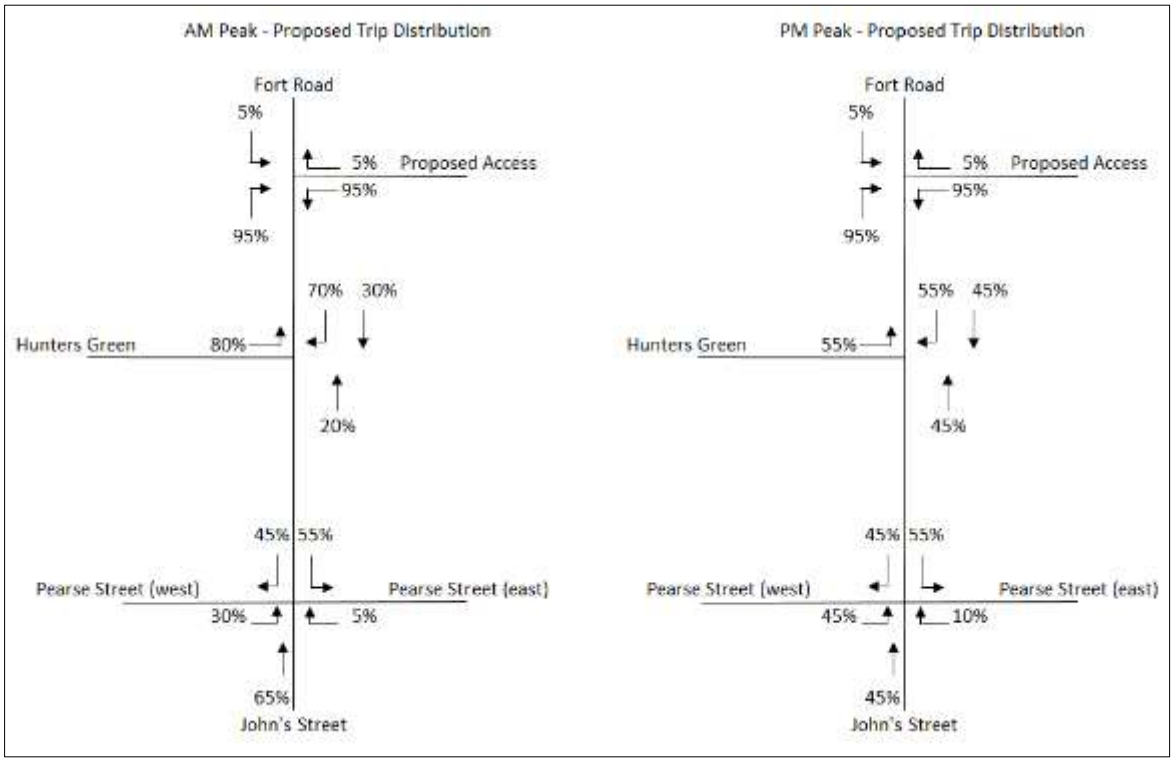
Currently a large proportion of traffic turning north from Willow Park onto Fort Road travel via Hunter's Green Estate link road which provided access to the three existing primary schools located to the northwest of Gorey town. In addition, the Hunter's Green Estate link road also provided a route for commuters, living to the north of Gorey town, access to the M11 and the N11 without having to travel via Gorey town centre.

Therefore, for the proposed development it is assumed that 5% of the development traffic will arrive / depart via Fort Road north direction and 95% of the development traffic will arrive / depart via Fort Road south direction.

It is assumed that, the distribution of development traffic at the existing Fort Road / Pearse St / John St crossroads junction will be similar to the current distribution of existing traffic at the junction.

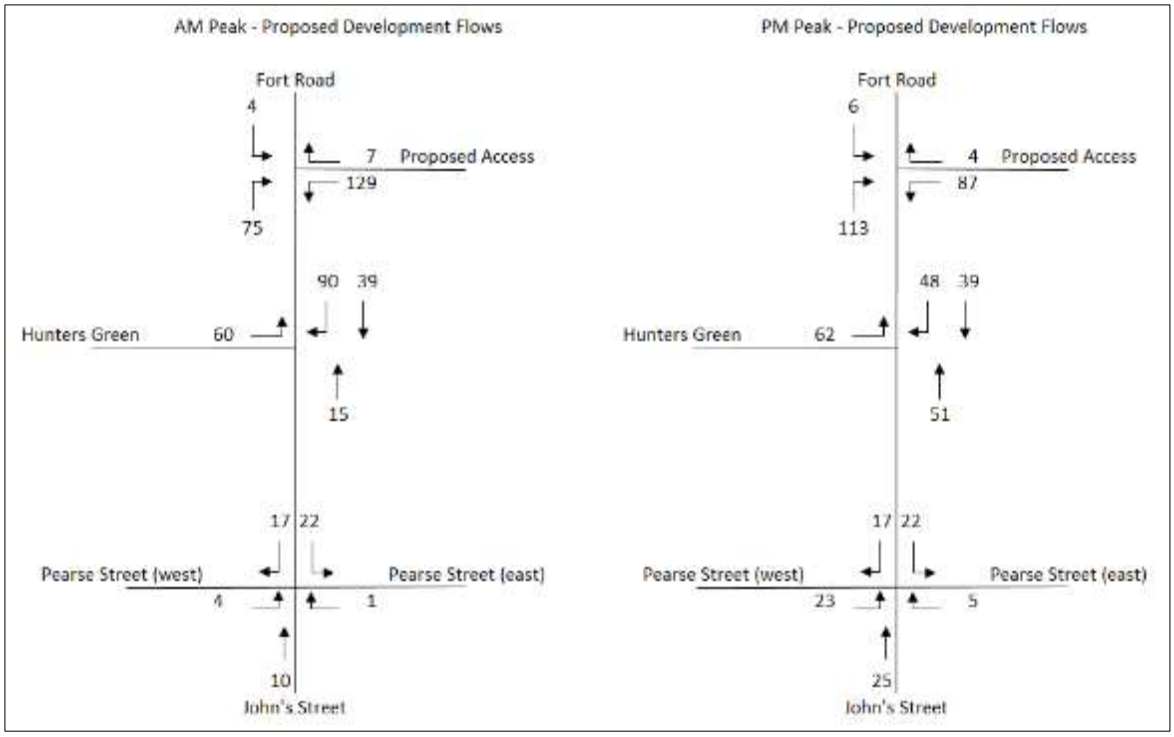
The following diagram shows the proposed traffic distribution percentage for the AM and PM peak hours.

Figure 10.4 – AM and PM Peak Trip Distribution Percentage



Using the proposed directional splits shown above and the trips generated by the proposed development outlined in 4.1, the following diagrams show the turning movements of predicted development traffic during the AM and PM peak hours on the road network.

Figure 10.5 – AM and PM Peak Development Flows



10.5.3 Sensitivity Testing Of Future Community Development

There is a proposal for future development of lands adjacent to the residential development. The adjoining CE Community zoned land will provide a nursing home, sheltered accommodation and a medical centre.

A capacity assessment has been undertaken to determine the impact that the possible future will have on the existing Fort Road / Willow Park / Creagh Demesne crossroads junction and the Fort Road / Pearse Street / John's Street crossroads junction in the design year 2036 with the proposed development also operational.

The description and size of the future development is shown in table below.

Table 10.14 – CE Zoned land Future Development

Item	Unit
Sheltered Housing Units	18 units
Medical Centre	2,000sqm
Nursing Home	60 beds

Access to the above development will be via a priority junction onto Fort Road. The proposed access will be located to the south of the proposed access to the residential development.

The TRICS database has been used to predict the trip generation to and from the proposed development for the AM and PM peak periods. Full details of the TRICS information used for the assessments are provided in Appendix D - TRICS information of the Roadplan Traffic and Transportation Report.

Sheltered Accommodation

The category of "Residential – Sheltered Accommodation" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.15 – Trip rates per number of Units

	Trip rate to development	Trip rate from development
AM Peak	0.09	0.06
PM Peak	0.07	0.06

For the proposed 18 dwellings, this would give the following trips to and from the proposed development:

Table 10.16 – Trip Generation – 18 Sheltered Accommodation

	Trip rate to development	Trip rate from development
AM Peak	2	1
PM Peak	1	1

Medical Centre

The category of "Health – Clinics" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.17 – Trip rates per 100 sqm

	Trip rate to development	Trip rate from development
AM Peak	1.672	0.331
PM Peak	0.789	1.514

For the proposed 2,000sqm Medical, this would give the following trips to and from the proposed development:

Table 10.18 – Trip Generation – 2,000 sqm

	Trip rate to development	Trip rate from development
AM Peak	33	7
PM Peak	16	30

Nursing Home

The category of "Health – Nursing Homes" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.19 – Trip rates per Residents

	Trip rate to development	Trip rate from development
AM Peak	0.148	0.082
PM Peak	0.043	0.068

For the proposed 60 bed nursing home, this would give the following trips to and from the proposed development:

Table 10.20 – Trip Generation – 60 Bed

	Trip rate to development	Trip rate from development
AM Peak	9	5
PM Peak	3	4

10.5.4 Total Development Trip Generation Summary

To summarise, the combined trips that are predicted to be generated by the proposed residential development are shown in the table below:

Table 10.21 – Trip Generation – Total Development

	Trip rate to development	Trip rate from development	Total
AM peak	44	13	57
PM peak	20	35	55

10.5.5 Sensitivity Testing Of Future Residential Development

There are lands adjacent to the proposed development which are zoned residential. Access to this potential future development would be via the proposed Fort Road / Residential Access priority junction.

A capacity assessment has been undertaken to determine the impact that the possible future residential development will have on the existing Fort Road / Willow Park / Creagh Demesne Crossroads junction, the Fort Road / Pearse Street / John's Street Crossroads Junction and the proposed Fort Road / Residential Access priority junction in the design year 2036 with the proposed residential development also operational.

The description and size of the future development is shown in table below:

Table 10.22 – Residential Development to North

Item	Unit	Quantity
Residential Dwellings	2, 3 & 4 bed	85

The TRICS database has been used to predict the trip generation to and from the proposed development for the AM and PM peak periods. Full details of the TRICS information used for the assessments are provided in Appendix D - TRICS information of the Roadplan Traffic and Transportation Report.

The category of "Residential – Houses Privately Owned" has been interrogated as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below:

Table 10.23 – Trip rates per number of Units

	Trip rate to development	Trip rate from development
AM Peak	0.20	0.66
PM Peak	0.52	0.25

For the anticipated proposed 85 residential dwellings, this would give the following trips to and from the proposed development:

Table 10.24 – Trip Generation – 85 Residential Dwellings

	Trip rate to development	Trip rate from development
AM Peak	17	56
PM Peak	44	21

10.5.6 Future Year Traffic Growth

The TII issues a range of forecasts: low growth, medium growth and high growth. The implementation of policies relating to Smarter Travel will also act a deterrent to high growth in car-based travel. Low growth factors are however likely to be equally unrealistic at present in the Gorey area, so we have used medium growth factors in our assessment.

The zone in which the site is located is numbered 669 in the TII National Traffic Model. The growth factors are as follows:

Table 10.25 – Growth Factors

Zone	2017 Existing	2021 development completion	2025 5 years after dev. completion	2035 15 years after dev. completion
669	0%	6.15%	14.39%	22.95%

These percentages have been used to predict the increase in background traffic that will occur in future years. Full summary tables and predicted future traffic flows for 2021, 2026 and 2036 future years are included in Appendix C – Traffic Flow Sheets of the Roadplan Traffic and Transportation Report.

10.5.7 Junction Assessment

Traffic generated by the proposed development will have some affect on the local road network surrounding the site. The following junctions were assessed:

- Proposed Fort Road / Development Access Priority Junction
- Fort Rd / Willow Park / Creagh Demesne Crossroads Junction
- Pearse Street / Johns Street Crossroads Junction

Proposed Fort Road / Development Access Priority Junction

Capacity assessments have been undertaken using the computer program PICADY for the AM and PM peak hours.

The following tables summarises the effects that the new residential development will have on proposed junction in 2021, 2026 and 2036 using the existing and predicted traffic flows shown in Appendix C – Traffic Flow Sheets. Full PICADY printouts are provided in Appendix E – PICADY Results both in the Roadplan Traffic and Transportation Report.

- The parameters shown in the tables are defined as follows:
- Ratio of Flow to Capacity (RFC) is a factor indicating the flow on a junction arm relative to its capacity. An RFC of 1.0 means the junction has reached its ultimate capacity and an RFC of 0.85 means that the junction has reached its reserve capacity.
- Avg. Queue is the average number of vehicles queued over the time period on the junction approach.
- Queue delay is the average number of seconds delay to each vehicle in the time period.
- Total Delay is the total number of vehicle hours of delay to all vehicles at the junction over the time period.

Design Year Assessments (2021 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the proposed junction using the predicted traffic flows for 2021.

Table 10.26 – AM Peak – 2021 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.460
Proposed Access	0.236	0	8	
Fort Rd (south)	0.142	0	8	

Table 10.27 – PM Peak – 2021 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.438
Proposed Access	0.154	0	7	
Fort Rd (south)	0.216	0	8	

The summary predictions shown in the tables above indicate that there will be no queues and minimal delays in the AM and PM peak hours at the proposed junction in 2021, planned year of opening.

Design Year Assessments (2026 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the proposed junction using the predicted traffic flows for 2026.

Table 10.28 – AM Peak – 2026 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.458
Proposed Access	0.236	0	8	
Fort Rd (south)	0.140	0	8	

Table 10.29 – PM Peak – 2026 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.440
Proposed Access	0.154	0	7	
Fort Rd (south)	0.215	0	8	

The summary predictions shown in the tables above indicate that there will be no queues and minimal delays in the AM and PM peak hours at the proposed junction in 2026, five years after development completion.

Design Year Assessments (2036 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the proposed junction using the predicted traffic flows for 2036.

Table 10.30 – AM Peak – 2036 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.463
Proposed Access	0.237	0	8	
Fort Rd (south)	0.143	0	8	

Table 10.31 – PM Peak – 2036 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.446
Proposed Access	0.154	0	7	
Fort Rd (south)	0.219	0	8	

The summary predictions shown in the tables above indicate that there will be no queues and minimal delays in the AM and PM peak hours at the proposed junction by 2036, fifteen years after development completion.

Design Year Assessments (2036 Sensitivity Test)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the proposed junction using the predicted traffic flows for 2036 and the predicted sensitivity flows.

Table 10.32 – AM Peak – 2036 Sensitivity Test

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.688
Proposed Access	0.339	1	9	
Fort Rd (south)	0.177	0	8	

Table 10.33 – PM Peak – 2036 Sensitivity Test

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	-	-	-	0.640
Proposed Access	0.195	0	7	
Fort Rd (south)	0.304	0	10	

Sensitivity testing of lands adjacent to the proposed development indicate that there will be no queues and some delays in the AM and PM peak hours at the junction by 2036, fifteen years after development completion.

Fort Road / Willow Park / Creagh Demesne Crossroads Junction

Capacity assessments have been undertaken using the computer program PICADY for the AM and PM peak hours.

The following tables summarise the existing situation and the effects that the proposed residential development will have on this junction in 2021, 2026 and 2036 using the existing and predicted traffic flows shown in Appendix C – Traffic Flow Sheets. Full PICADY printouts are provided in Appendix E – PICADY Results, both in the Roadplan Traffic and Transportation Report.

Existing Assessment (2017 Base Flows)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the existing traffic flows.

Table 10.34 – AM Peak – 2017 Base Flows

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.013	0	5	0.448
Willow Park	0.425	0	11	
Fort Rd (south)	0.052	0	6	
Creagh Demesne	0.087	0	8	

Table 10.35 – PM Peak – 2017 Base Flows

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.005	0	5	0.212
Willow Park	0.127	0	8	
Fort Rd (south)	0.065	0	6	
Creagh Demesne	0.015	0	7	

The summary predictions shown in the tables above indicate that there are no queues and minimal delays at this junction at present during the busiest peak hours.

Design Year Assessments (2021 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2021 including the proposed development.

Table 10.36 – AM Peak – 2021 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.013	0	5	0.513
Willow Park	0.472	0	13	
Fort Rd (south)	0.055	0	7	
Creagh Demesne	0.095	0	8	

Table 10.37 – PM Peak – 2021 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.005	0	5	0.232
Willow Park	0.140	0	8	
Fort Rd (south)	0.067	0	6	
Creagh Demesne	0.016	0	7	

The summary predictions shown in the tables above indicate that there will be no queues and minimal delays in the AM and PM peak hours at the junction in 2021, planned year of opening.

Design Year Assessments (2026 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2026 including the proposed development.

Table 10.38 – AM Peak – 2026 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.015	0	5	0.590
Willow Park	0.520	1	13	
Fort Rd (south)	0.059	0	7	
Creagh Demesne	0.105	0	8	

Table 10.39 – PM Peak – 2026 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.005	0	6	0.255
Willow Park	0.152	0	8	
Fort Rd (south)	0.073	0	6	
Creagh Demesne	0.018	0	7	

The summary predictions shown in the tables above indicate that there will be minimal queues and small delays in the AM and PM peak hours at this junction in 2026, five years after development completion.

Design Year Assessments (2036 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2036 including the proposed development.

Table 10.40 – AM Peak – 2036 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.015	0	5	0.593
Willow Park	0.522	1	14	
Fort Rd (south)	0.057	0	7	
Creagh Demesne	0.105	0	8	

Table 10.41 – PM Peak – 2036 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.005	0	6	0.258
Willow Park	0.154	0	8	
Fort Rd (south)	0.074	0	6	
Creagh Demesne	0.018	0	7	

The summary predictions shown in the tables above indicate that there will be minimal queues and small delays in the AM and PM peak hours at the junction by 2036, fifteen years after development completion.

Design Year Assessments (2036 Sensitivity Test)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2036 including the proposed development flows and the sensitivity flows.

Table 10.42 – AM Peak – 2036 Sensitivity Test

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.017	0	6	0.705
Willow Park	0.585	1	15	
Fort Rd (south)	0.069	0	7	
Creagh Demesne	0.118	0	8	

Table 10.43 – PM Peak – 2036 Sensitivity Test

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Rd (north)	0.007	0	6	0.286
Willow Park	0.168	0	9	
Fort Rd (south)	0.082	0	7	
Creagh Demesne	0.019	0	7	

Sensitivity testing of lands adjacent to the proposed development indicate that there will be small queues and delays in the AM and PM peak hours at the junction by 2036, fifteen years after development completion.

Fort Road / Pearse Road / Johns Street Crossroads Junction

Capacity assessments have been undertaken using the computer program PICADY for the AM and PM peak hours.

The following tables summarise the existing situation and the effects that the new concrete plant will have on this junction in 2021, 2026 and 2036 using the existing and predicted traffic flows shown in Appendix C – Traffic Flow Sheets. Full PICADY printouts are provided in Appendix E – PICADY Results, contained in the Roadplan Traffic and Transportation Report.

Existing Assessment (2017 Base Flows)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the existing traffic flows.

Table 10.44 – AM Peak – 2017 Base Flows

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.156	0	7	0.863
Pearse St (east)	0.109	0	10	
Johns Street	0.039	0	7	
Pearse St (west)	0.564	1	14	

Table 10.45 – PM Peak – 2017 Base Flows

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.092	0	7	0.760
Pearse St (east)	0.066	0	9	
Johns Street	0.066	0	7	
Pearse St (west)	0.361	1	11	

The summary predictions shown in the tables above indicate that there are minimal queues and small delays at this junction at present during the busiest peak hours.

Design Year Assessments (2021 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2021 including the proposed development.

Table 10.46 – AM Peak – 2021 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.194	0	8	0.963
Pearse St (east)	0.119	0	10	
Johns Street	0.042	0	7	
Pearse St (west)	0.622	1	16	

Table 10.47 – PM Peak – 2021 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.131	0	8	1.020
Pearse St (east)	0.082	0	10	
Johns Street	0.070	0	7	
Pearse St (west)	0.438	1	13	

The summary predictions shown in the tables above indicate that there will be minimal queues and small delays in the AM and PM peak hours at the junction in 2021, planned year of opening.

Design Year Assessments (2026 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2026 including the proposed development.

Table 10.48 – AM Peak – 2026 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.207	0	8	1.228
Pearse St (east)	0.131	0	10	
Johns Street	0.046	0	7	
Pearse St (west)	0.680	1	17	

Table 10.49 – PM Peak – 2026 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.141	0	8	1.145
Pearse St (east)	0.089	0	10	
Johns Street	0.076	0	7	
Pearse St (west)	0.473	1	14	

The summary predictions shown in the tables above indicate that there will be minimal queues and small delays in the AM and PM peak hours at the junction in 2026, five years after development completion.

Design Year Assessments (2036 With Development)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2036 including the proposed development.

Table 10.50 – AM Peak – 2036 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.211	0	8	1.265
Pearse St (east)	0.131	0	10	
Johns Street	0.046	0	7	
Pearse St (west)	0.688	1	17	

Table 10.51 – PM Peak – 2036 with development

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.150	0	8	1.285
Pearse St (east)	0.096	0	10	
Johns Street	0.082	0	7	
Pearse St (west)	0.510	1	14	

The summary predictions shown in the tables above indicate that there will be minimal queues and small delays in the AM and PM peak hours at the junction by 2036, fifteen years after development completion.

Design Year Assessments (2036 Sensitivity Test)

The following tables show the predicted RFC values (Ratio of Flow to Capacity), average queue lengths, average vehicle delay and total delays for the existing junction using the predicted traffic flows for 2036 including the proposed development flows and the sensitivity flows.

Table 10.52 – AM Peak – 2036 Sensitivity Test

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.235	0	9	1.535
Pearse St (east)	0.143	0	10	
Johns Street	0.055	0	7	
Pearse St (west)	0.749	1	20	

Table 10.53 – PM Peak – 2036 Sensitivity Test

Approach	Predicted RFC value	Avge Queue (vehicles)	Queue delay (secs./veh.)	Total Delay (veh.hrs.)
Fort Road	0.171	0	8	1.432
Pearse St (east)	0.098	0	11	
Johns Street	0.083	0	7	
Pearse St (west)	0.538	1	16	

Sensitivity testing of lands adjacent to the proposed development indicate that there will be minimal queues and small delays in the AM and PM peak hours at the junction by 2036, fifteen years after development completion.

10.6 REMEDIAL AND MITIGATION MEASURES

10.6.1 Mitigation Construction Phase

A Construction Management Plan (an outline CMP accompanies the application) and the associated Construction Traffic Management Plan (CTMP) in addition to the application accompanying Construction and Waste Management Plan will be developed by the appointed contractor and submitted to Wexford County Council for approval prior to commencement of works.

The Construction Management Plan will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed developments on-site construction activities.

To minimise disruption to the surrounding environment, the following mitigation measures will be implemented:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- A dedicated ‘construction’ site access / egress junction will be provided during all construction phases.
- Provision of sufficient on-site parking and compounding to ensure no potential overflow of construction generated traffic onto the local network.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas.

- A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.
- A series of '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 the local authority prior to the commencement of constructions activities on-site.
- Truck wheel washes will be installed at construction entrances if deem necessary and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to.
- On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.
- The proposal includes the construction of an underground pipeline from the subject site to the Arklow Road. . 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.
- As part of the road opening licence, it is anticipated that a Construction Traffic Management Plan would be agreed with Wexford County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

10.6.2 Mitigation Operational Phase

Road Safety

The Wexford County Development Plan 2013 – 2019 sets out sightline requirements for proposed access / egress to public roads outside of a 50kph or 60 kph speed limit. The following are the indicative sightline requirements:

- National Road = 230m
- Regional Roads Class 1 = 220m
- Regional Roads Class 2 = 135m
- Local / Country Roads = 65m

The Fort Road would be considered as a Class 2 Regional Road due to the traffic volumes currently using Fort Road. Therefore, a sightline of 135m at a 3m set-back shall be achieved in both directions.

At the proposed access onto Fort Road a 135m sightline at a 3m set-back can be achieved in both directions. The visibility splay to the north and south of the proposed access is measured from a 3m set-back to the nearside kerb of the road.

Pedestrians

2m wide footpaths will be provided internally to cater for pedestrian movement within the development. In addition, a 2m wide footpath will be provided along the boundary of the proposed development adjacent to Fort Road and connecting to the existing footpaths at Willow Park. Full details of footpaths provided are provided are shown on the architects drawing which is provided in Appendix B – Drawings, in the Roadplan Traffic and Transportation Report.

Cyclists

A 2m wide cycle path will be provided within the proposed development which will cater for cyclist's movement within the development. A 2m wide cycle path will also be provided along the boundary of the development adjacent to Fort Road and will terminate at the existing junction to Willow Park. Full details of cycle paths provided are provided are shown on the architects drawing which is provided in Appendix B – Drawings, in the Roadplan Traffic and Transportation Report.

Internal Layout

Within the development the spine road is 6m wide and all internal access roads are 4.8m wide.

The 4.8m wide internal access roads will act as a shared surface for pedestrians and vehicles. The Design Manual for Urban Roads and Streets indicates that the minimum width for local streets with a shared surface is 4.8m wide.

Parking is provided to the front and rear of each residential dwelling. In addition, on-street parking is provided within the development. The parking bays are 2.5m wide x 5m long. Disabled parking spaces are provided through out the development.

HGV access to the site will be via the proposed access onto the Fort Road. The types of HGV's accessing the site would be emergency vehicles and a bin lorry. The internal layout can facilitate HGV movement within the site.

Once the pipeline is constructed, there would be no significant impacts during the operation phase in respect of traffic. Ongoing maintenance would be undertaken in a manner to reduce the impact to local residents.

10.6.3 Accidents & Disasters

Construction Phase

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. Measures will be put in place to access and risk of road traffic accidents during the construction phase. Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used and no unusual substance or underground tunnelling works required or predicted.

10.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

10.7.1 Construction Phase and Operational Phase

Provided the above mitigation measures and management procedures are incorporated during the construction phase, the residual impact upon the local receiving environment is predicted to be temporary in nature and slight in terms of effect.

The main conclusions of this study are summarised as follows:

- The development flows to and from the site have been predicted using the TRICS database.
- The existing Fort Road / Willow Park / Creagh Demesne crossroads junction will operate within capacity with small queues and delays when the proposed development is completed in 2021, year of opening, 2026, five years after completion and in 2036, fifteen years after completion.
- Sensitivity testing carried out on lands adjacent to the proposed development indicates that the existing Fort Road / Willow Park / Creagh Demesne crossroads junction will operate within capacity with small queues and delays when the proposed development is operational in 2036.
- The existing Fort Road / Pearse Street / Johns Street crossroads junction will operate within capacity with small queues and delays when the proposed development is completed in 2021, year of opening, 2026, five years after completion and in 2036, fifteen years after completion.
- Sensitivity testing carried out on lands adjacent to the proposed development indicates that the existing Fort Road / Pearse Street / Johns Street crossroads junction will operate within capacity with small queues and delays when the proposed development is operational in 2036.
- The proposed Fort Road / Development Access priority junction will operate within capacity with no queues and minimal delays when the proposed development is completed in 2021, year of opening, 2026, five years after completion and in 2036, fifteen years after completion.

- Sensitivity testing carried out on lands adjacent to the proposed development indicates that the proposed Fort Road / Development Access priority junction will operate within capacity with no queues and minimal delays when the proposed development is operational in 2036.
- The development provides adequate car parking spaces when assessed in accordance with the development plan.
- Sightlines at the proposed access onto Fort Road are in compliance with the Wexford County Development Plan.
- Pedestrian and cycle facilities are provided within the proposed development and along Fort Road.
- The internal roads within the proposed development are in compliance with the Design Manual for Urban Roads & Streets.

10.8 MONITORING

10.8.1 Construction Phase

During the construction stage the following monitoring exercises are likely to be required. The specific compliance exercises to be undertaken in regard to the range of measures detailed in the final construction management plan will be agreed with the planning authority.

- Compliance with construction vehicle routing practices,
- Compliance with construction vehicle parking practices,
- Internal and external road conditions and
- Timings of construction activities.

10.9 REINSTATEMENT

Reinstatement is not applicable to the Traffic and Transportation Section of this EIAR.

11.0 MATERIAL ASSETS – WASTE MANAGEMENT

11.1 INTRODUCTION

This chapter discusses the proposed waste management measures as part of the proposed development at Ballyownen/Ramsfort, Gorey, Co. Wexford, in addition to assessing the potential impact of waste management upon the surrounding area. Waste management for both the construction and operational phases is addressed.

11.2 STUDY METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on waste management in the area. The desktop study assessed potential impacts using EPA licensing and waste management information, relevant waste plans and strategic documents, and mapping data from EPA Envision and myplan.ie. The assessment of potential impacts arising from waste management at the proposed development has taken cognisance of the relevant legislation policies and plans as outlined in Section 11.2.1.

11.2.1 Legislative Framework and Planning Policy

Legislative Context

The main legislation pertaining to waste management in Ireland and of potential relevance to the proposed development includes the following:

EU Legislation:

- Council Directive 1999/31/EC on the Landfilling of Waste;
- Waste Framework Directive 2008/98/EC;
- European List of Waste, Commission Decision 2000/532/EC;
- Council Directive 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;
- WEEE Directive 2012/19/EU.

Irish Legislation:

- Waste Management Act 1996 as amended;
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. 821 of 2007) and (Amendment) Regulations (S.I. 86 of 2008, S.I. 320 of 2014, S.I. 198 of 2015);
- Waste Management (Licensing) Regulations 2000 (S.I. 185 of 2000) , 2004 (S.I. 395 of 2004), (Amendment) Regulations 2010 (S.I. 350 of 2010);
- Waste Management (Planning) Regulations 1997 (S.I. 137 of 1997);
- Waste Management (Collection Permit) Regulations 2007 (S.I. 820 of 2007) and (Amendment) Regulations 2008 to 2016;
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. 163 of 1998) and Waste Management (Hazardous Waste) (Amendment) Regulations 2000 (S.I. 73 of 2000);
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), European Union (Household Food Waste and Bio-waste) Regulations 2013 (S.I. 71 of 2013) and European Union (Household Food Waste and Bio-waste) Regulations 2015 (190 of 2015);

- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (WEEE) (S.I. 149 of 2014);
- Litter Pollution Act 1997, Litter Pollution Regulations 1999 (S.I. 359 of 1999) and Litter Pollution (Increased Notice Payment) Order 2007 (S.I. 558 of 2007);
- Waste Management (Landfill Levy) Regulations 2015 (S.I. 189 of 2015);
- Waste Management (Prohibition of Waste Disposal by Burning) Regulations 2009 (S.I. 286 of 2009) and (Amendment) Regulations (S.I. 504 of 2013, S.I. 538 of 2015, S.I. 599 of 2017);
- European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011), (Amendment) Regulations 2016 (S.I. 315 of 2016), and European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. 223 of 2015), European Union (Waste Directive) (Recovery Operations) Regulations 2016 (S.I. 372 of 2016);
- Local Government Act and associated regulations.

Planning Policies, Plans and Other Guidance

Policies, plans and guidance documents pertaining to waste management and of potential relevance to the proposed development include the following:

- European Waste Catalogue and Hazardous Waste List (2002), Environmental Protection Agency;
- National Waste Prevention Programme Annual Report for 2016, Environmental Protection Agency;
- Southern Region Waste Management Plan 2015-2021 and Associated Reports;
- Wexford County Development Plan 2013-2019;
- Gorey Town and Environs Local Area Plan 2017-2023.

Southern Region Waste Management Plan 2015-2021

The proposed development site is located on the outskirts of Gorey town, Co. Wexford, and is therefore within the area covered by the Southern Region Waste Management Plan 2015-2021. This plan covers the ten local authority areas of Carlow, Clare, Cork County, Cork City, Limerick City and County, Kerry, Kilkenny, Tipperary, Waterford City and County Wexford. The vision of the waste management plan is as follows:

"*The strategic vision of the regional waste plan is to rethink our approach to managing waste, by viewing our waste streams as valuable material resources, leading to a healthier environment and sustainable commercial opportunities for our economy*".

The plan sets out a number of waste management policies for the region, in accordance with the main strategic principals of the plan including waste management hierarchy, source segregation, opportunity, self-sufficiency and proximity, protection, co-operation, balanced and sustainable infrastructure and the polluter pays principle.

Targets of the South Region Waste Management Plan include a 50% reuse / recycling rate of municipal waste by 2020 and a 70% reuse / recycling / material recovery rate of construction and demolition waste (excluding soil and stones) by 2020.

Wexford County Development Plan 2013-2019

Wexford County Development Plan 2013 – 2019 outlines thirteen waste management objectives for the county, with the relevant objectives to the proposed development outlined in the table below.

Table 11.1 – County Development Plan Waste Management Objectives Relevant to the Proposed Development

Policy Reference	Policy
WM01	To implement the provisions of the Joint Waste Management Plan for the South East Region 2006-2011, and any updated version published during the lifetime of the Plan, subject to compliance with Article 6 of the Habitats Directive.
WM02	To increase public awareness of the importance of waste management, in particular prevention and minimisation of waste. The Council will encourage local communities, schools and businesses to become involved in environmental awareness activities and community based recycling or environmental management initiatives that will lead to local sustainable waste management practices.
WM03	To implement the National Waste Prevention Programme and any updated version published during the lifetime of the Plan. The Council will continue to support initiatives such as the "Green Business Initiative" and the "Green Schools Programme" which promote waste prevention in businesses and schools.
WM04	To encourage the development of waste minimisation strategies for domestic, commercial and industrial waste.
WM06	To ensure hazardous household waste is disposed of in accordance with the provisions of the National Hazardous Waste Management Plan 2008-2012, and any updated version published during the lifetime of the Plan, subject to compliance with Article 6 of the Habitats Directive.
WM07	To encourage and facilitate the development of new alternatives and technological advances in relation to waste management such as Organic Waste to Energy/Combined Heat and Power
WM10	To promote the recycling and reuse of aggregates from Construction and Demolition waste.
LM01	To implement the provision of the Litter Management Plan 2010-2013 for County Wexford and any updated version of this Plan.

Gorey Town and Environs Local Area Plan 2017-2023

The Gorey Town and Environs Local Area Plan 2017-2023 does not contain specific targets or objectives for waste, but notes that the council will "*continue to facilitate appropriate waste management facilities in the plan area*".

11.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The collection of municipal and commercial waste in County Wexford is undertaken by private waste contractors, who are regulated by Wexford County Council. As outlined in the Wexford County Development Plan 2013-2019, Wexford County Council encourages all waste contractors to provide the three-bin collection system (dry recyclables, organic waste and residual waste). Waste contractors operating in the Gorey region include AES, Greenstar and Ray Whelan Ltd.

A recycling facility, Gorey Recycling Centre, is located in Gorey Business Park at Ramstown and accepts a wide variety of recyclable materials. There are four Civic Amenity Centres in Wexford County operated by Wexford County Council: one at Enniscorthy, one at Holmestown and two in New Ross. There are four recycling bring-bank locations in Gorey, located on Pearse Street, Dublin Road and at Gorey Community School and St. Aidan's Daycare Centre. The proposed development site can be described as comprising of an area of grassland to the north and a brownfield area to the south. In its current condition, the following waste types are present from previous demolition activities of the Walsh Mushrooms facility:

- Excavated soils and stone;
- Concrete;
- Masonry / rubble;
- Metal;
- Timber;
- Electrical wiring.

11.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development would comprise of the construction of a residential estate, with a variety of housing and apartment types and designs, and a childcare facility at Creagh, Gorey, Co. Wexford. Details of the proposed development works are as follows:

- Demolition and site clearance works of remaining infrastructure from the previous mushroom facility;
- Construction of a total of 297 residential dwellings including:
    - 4 five-bedroom houses;
    - 77 four-bedroom houses;
    - 125 three-bedroom houses;
    - 26 two-bedroom houses;
    - 36 two-bed apartments;
    - 29 three-bed apartments.
- Construction of dwellings would be either two or three storeys in height, depending on their location and number of bedrooms;
- Construction of stormwater and foul sewer drainage systems;
- Construction of a childcare facility, within the area zoned for Community and Education use;
- Construction of all ancillary development works including internal road surfacing, boundary construction and provision of outdoor artificial lighting;
- Construction of two site access roads;
- Landscaping of public amenity areas.

Construction works, including the demolition of remaining infrastructure, are estimated to take five years over a phased basis, with hours of operation from 8am to 6pm, Monday to Saturday. A temporary site compound would be established near the entrance of the proposed site, housing the site offices, storage facilities and staff welfare facilities such as a canteen and toilets.

The proposed development would generate certain waste types during both the construction and operational phases. During construction works, construction and demolition waste would be generated, including waste currently at the site as a result of previous demolition activities of the Walsh Mushrooms site. Waste would be segregated onsite, and would be reused in infilling processes and landscaping where permitted and where possible, with remaining wastes sent for recycling or disposal as appropriate. The operational phase would generate typical municipal-type wastes, which would be collected via a kerb-side waste collection service, by a suitably licenced waste contractor.

New surface water and domestic wastewater drainage systems would be constructed. Surface water, comprised of rainwater run-off from roofs and paved areas, would be collected via a system of gullies and stormwater drains and would connect with the existing storm drainage network of the Creagh area. Domestic wastewater would be directed to Gorey town's public sewer, which would undergo treatment at the Courtown-Gorey Wastewater Treatment Plant prior to discharge.

11.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

11.5.1 Construction Phase

The development will require the excavation of approximately 30,292 m^3 of soil/subsoil for foundation construction. The proposed cut and fill plan has outlined that there will be an estimated net excess volume of 4,470 m^3 of soil/subsoil once the on-site foul and storm water cut and fill drainage network is constructed after the balance of these soils filled into the proposed development.

Where feasible non-hazardous excavation material may be re-used within the proposed scheme as engineering fill or in landscaping. This will be investigated by the contractor and is subject to appropriate testing to ensure material is suitable for its proposed end use. Where excavation material may not be re-used within the proposed scheme the Contractor will endeavour to send material for authorised recovery or recycling so far as is reasonably practicable. All wastes generated from the proposed development will be delivered to authorised waste facilities granted a Waste Licence, Waste Facility Permit or Certificate of Registration.

11.5.2 Description of Proposed Development Site Activities

The range of development works to which this Waste Management Plan will be integrated into during the design phase, construction phase and operation phase of the site are summarised as follows:

- Ground preparation works;
- Development of site infrastructure;
- Construction of buildings and hardstanding areas;
- Landscaping of entire site including open soft landscaped areas;
- Waste Management for the Operational Phase of the development

During the construction phase of the development, construction and demolition waste (commonly referred to as “C&D waste”) would be generated at the site, with the main likely waste streams outlined in the table below.

For estimated construction waste quantities, please refer to Table 5 of the Construction and Demolition Waste Management Plan.

Table 11.2 – Predicted Main Construction Waste Streams

Waste Type	EWC Code	Origin
Concrete	17 01 01	Waste concrete currently exists at the site in the form of rubble from previous demolition activities at the proposed development site. Waste concrete may also arise due to surplus concrete from pouring activities.
Bricks	17 01 02	Waste bricks may exist at the site as a result of previous demolition activities at the site. Damaged / defected brick waste may arise during the construction of the residential buildings and the childcare facility.
Tiles and Ceramics	17 01 03	Waste tiles / ceramics may arise during the construction of residential buildings and the childcare facility.
Mixture of Concrete, Bricks, Tiles and Ceramics	17 01 07	As detailed in 17 01 01, 17 01 02 and 17 01 03 above.

Waste Type	EWC Code	Origin
Wood	17 02 01	Small volumes of timber waste are currently present at the development site. Wood waste may also arise during construction works, including building and shuttering works, due to damaged / defected wood, off-cuts and surplus wood.
Glass	17 02 02	Glass waste may arise due to damaged / defected glass and accidental breakages.
Plastic	17 02 03	Plastic waste may arise due to damaged / defected products.
Metals (including alloys)	17 04 01 - 07	Waste metal currently exists at the site in the form of metal rebar within concrete and building structures. Waste metal may also arise during construction activities due to damaged / defected metal, off-cuts and surplus metal.
Soils and Stones	17 05 04	During site clearance works and earth-moving activities, moderate amounts of excavated soils and stones waste would arise.
Insulation Materials	17 06 04	Waste may arise due to damaged / defected insulation panels and off-cuts.
Bituminous mixtures, coal tar and tarred products	17 03	Waste may arise due to surplus material from tarring of internal road network.
Biodegradable waste	20 02 01	Green waste will arise during site clearance works, with the removal of existing vegetation at the site.

The temporary site compound, which would house the site offices and staff welfare facilities such as a canteen, would generate limited amounts of waste, including the following:

- Paper and cardboard – EWC 15 01 01 and EWC 20 01 01;
- Biodegradable / food waste – EWC 20 01 08;
- Plastics – EWC 15 01 02 and EWC 20 01 39;
- Metals – EWC 20 01 40;
- Mixed municipal waste – EWC 20 03 01;
- Sanitary waste – EWC 20 03 04.

Other waste materials which may arise during construction works in small volumes include:

- Waste Oils and Liquid Fuels – EWC 13 02 and EWC 13 07;
- Waste from Electrical and Electronic Equipment – EWC 16 02;
- Cables – EWC 17 04 11;
- Paints – EWC 20 01 28;
- Wood Preservatives – EWC 03 02;
- Batteries – EWC 16 06;

- Gypsum – EWC 17 08 02.

Wastes from EWC fractions EWC 13 02, EWC 13 07, EWC 16 02, EWC 03 02 and EWC 16 06 may be hazardous.

No asbestos waste would be generated during the construction phase of the development, as no buildings or roofing materials currently exist at the site and this material would not be used in the construction of the new dwellings and associated infrastructure.

Throughout the construction phase, the construction works contractor would manage the wastes generated in order of priority in accordance with Section 21A of the Waste Management Act 1996, as amended, as per the waste hierarchy below.

Figure 11.1 – Waste Hierarchy

Wastes would be segregated as much as possible in order to avoid cross contamination. Where practical, the construction works contractor would reduce the generation of wastes at source through measures such as the efficient ordering and purchasing of materials to reduce surplus materials, the return of uncured concrete to the batching plant where possible and the re-using of shutters for concrete works. Where it is not possible to avoid the generation of wastes, wastes would be sent for recycling or recovery as a priority. The generation of waste for disposal would be minimised as much as is practical.

Suitable waste receptacles would be provided during the construction phase, with skips / bins allocated to specific waste streams to avoid contamination. It is proposed to locate these waste receptacles at the temporary site compound.

The collection of wastes from the site would be undertaken by suitably authorised waste hauliers, and would only be recycled / recovered or disposed of at suitably licenced waste facilities. The construction works contractor would maintain records and documentation of all waste transported off-site, with waste volumes tracked to measure overall environmental performance. The construction works contractor would ensure that copies of all waste contractors' collection permits and licences would be available for inspection.

Where practical, and where permitted, certain waste streams would be used during infilling works These wastes include concrete (EWC 17 01 01), bricks (EWC 17 01 02), and excavated soils and stones (EWC 17 05 04). A mobile crusher would be used onsite to crush these materials to a size suitable for infilling.

During earth-moving activities, soil would be separated into topsoil and subsoil and appropriately stored onsite. Following the completion of construction works, topsoil and subsoil would be reused for the reinstatement and landscaping of the proposed development area.

Any metal or wood waste material would be removed off-site for recycling. Remaining C&D type waste streams, in addition to waste generated at the site compound, would be segregated and sent for recycling or disposal, as necessary. Sanitary waste from the site compound welfare facilities would be collected in integrated waste holding tanks / self-contained port-a-loo units and would be removed from the site by a licenced waste contractor for suitable treatment.

Wastes from EWC fractions EWC 13 02, EWC 13 07, EWC 16 02 and EWC 16 06 may be hazardous. These wastes would be segregated, stored appropriately and collected by a suitably licenced hazardous waste contractor and treated at a licenced hazardous waste facility.

As waste arising during the construction phase would be managed in accordance with the waste hierarchy, as per Section 21A of the Waste Management Act 1996, as amended, and given that only suitably licenced waste hauliers, contractors and facilities would be used, it is not anticipated that wastes arising from the construction phase of the proposed development would have a significant impact upon the environment.

11.5.3 Operational Phase

The 2016 EPA Publication, "*Ireland's Environment – An Assessment 2016*", states, "*Household waste is a core component of municipal waste. Preliminary data indicate that 1.52 Mt of household waste was generated in 2014 (331kg per person), which is similar compared to the EU-28 average*". A value of 0.907 Kg of waste generated per person per day has been therefore assumed for the purposes of this report to estimate the volume of waste to be generated at the proposed development.

Table 11.3 – Estimated Operational Waste Quantities

Waste Type	% Waste	Waste Kg/Day	M^3/Day	M^3/Week
Residential				
Organic Waste	34.5	497.7	0.312	0.96
Cardboard	5.6	81	0.051	0.41
Paper	16.8	242.7	0.152	1.18
Plastic	11.3	163.3	0.103	4.07
Glass	5	72.3	0.045	0.07
Metals	3.6	52	0.033	0.02
Textiles	4.1	59.2	0.037	0.64
Mixed Non-Recyclable	19.2	276.7	0.174	1.39
Total	100	1,444.9	0.907	8.75

Crèche				
Organic Waste	34.5	497.7	0.312	0.96

Cardboard	4.7	0.467	0.005	0.019
Paper	3.5	0.35	0.003	0.014
Plastic	2	0.034	0	0.008
Glass	3.3	0.056	0.001	0.013
Metals	38	17.81	0.175	0.15
Textiles	0.3	0.016	0	0.001
Mixed Non-Recyclable	4	0.597	0.006	0.016
Total	100	34.118	0.334	0.394

Yearly Total Kg				
Residential Total Per Year	-	**52,7386.9**	-	-
Per occupancy per day	-	0.907028	-	-
Crèche Total Per Year	-	**12,453.19**	-	143.962
Per occupancy per day	-	0.334494	-	-

During the operational phase of the development, the likely wastes that would be generated by households and the childcare facility would include the following:

- Paper and cardboard – EWC 20 01 01;
- Glass – EWC 20 01 02;
- Food waste – EWC 20 01 08 and 20 01 25;
- Clothes and textiles – EWC 20 01 10 and EWC 20 01 11;
- Chemicals such as solvents, paints, detergents, – EWC 20 01 13*, EWC 20 01 28, EWC 20 01 30,
- Batteries – EWC 20 01 33*/34;
- Waste electrical and electronic equipment – EWC 20 01 35*/36;
- Wood – EWC 20 01 38;
- Plastics – EWC 20 01 39;
- Metals – EWC 20 01 40;
- Garden wastes – EWC 20 02 01/02/03;
- Mixed municipal waste – EWC 20 03 01;
- Waste packaging – EWC 15 01 01 – 15 01 07.

The collection of the above municipal and packaging wastes would be undertaken by private waste contractors, regulated by Wexford County Council, and who would preferably provide the three-bin collection service. The proposed development residents and childcare facility personnel would also have the option to partake of free recycling services located at four bring-bank centres within Gorey town.

11.5.4 Potential Cumulative Impacts

Considering the nature of the proposed development and nearby residential and commercial properties, there would be a potential cumulative impact upon waste management during both the construction and operational phases, with nearby properties generating similar types of waste as the proposed development. In addition the CE zoned lands and the residential zoned lands to the north, will generate waste. However, the potential cumulative impacts would not be considered significant, as the area is suitably serviced by licenced waste contractors, and given that good waste management practices would be implemented onsite during construction works as standard practice.

11.5.5 'Do Nothing' Impact

Should the proposed development not proceed, wastes would not be generated at the site and therefore waste management would not be required. However, the existing wastes from previous demolition works of the Walsh Mushrooms facility (including rubble and scrap metal), would remain on the site.

11.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

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 and there will be a waste management plan in accordance with best practice.

Prior to the commencement of development, the Construction / Project Manager shall identify a permitted Waste Contractor who shall be employed to collect and dispose of all wastes arising from the project works. In addition, the Construction / Project Manager shall identify and all waste licensed / permitted facilities that will accept all expected waste exported off-site and will maintain copies of all relevant Waste Permits / Licences as required.

Waste materials arising from 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.

The Waste Management Plan specifically addresses the following points:

- Analysis of waste arisings / material surpluses;
- Specific Waste Management objectives for the Project including the potential to re-use existing on-site materials for further use in the construction phase;
- Methods proposed for Prevention, Reuse and Recycling;
- Waste Handling Procedures;
- Waste Storage Procedures;
- Waste Disposal Procedures;
- Waste Auditing; and
- Record Keeping.

Waste Minimisation

Waste minimisation and prevention shall be the primary responsibilities of the Construction Project Manager.

The following purchasing procedures will be implemented where feasible to reduce excessive material wastage from site:

- Ordering of appropriate quantities of materials, with a just-in-time philosophy and in an , to prevent over supply,
- Immediate and careful storage of materials delivered to the site to minimise generation of damaged materials/waste e.g. keeping deliveries packaged until they are ready to be used,
- Storing materials which are vulnerable to damage by rain under cover and raised above the ground,
- Careful handling of materials, using appropriate equipment, to avoid undue damage,
- Designation of separate storage areas for different types of waste, in order to maximise the reuse and recycling potential of the waste,
- Ensuring correct sequencing of operations, and
- Assigning individual responsibility (through appropriate contractual arrangements) to subcontractors for the purchase of raw materials and for the management of wastes arising from their activities, thereby ensuring that available resources are not expended in an extravagant manner at the expense of the main contractor.

Sub-contractors will be responsible for similarly managing their wastes.

Programme of Waste Management for Construction Works

It is proposed that the construction Contractor, as part of regular site inspection audits, will determine the effectiveness of the waste management statement and will assist the project manager in determining the best methods for waste minimisation, reduction, re-use, recycling and disposal as the construction phase progresses and waste materials are generated.

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.

In order to ensure that the construction contractor correctly segregate waste materials, it is the responsibility of the site construction manager to ensure all staff are informed by means of clear signage and verbal instruction and made responsible for ensuring site housekeeping and the proper segregation of construction waste materials.

It will be the responsibility of the Project Construction Project Manager to ensure that a written record of all quantities and natures of wastes exported -off site are maintained on-site in a Waste File at the Project office.

It is the responsibility of the Project Manager or his/her delegate that all contracted waste haulage drivers hold an appropriate Waste Collection Permit for the transport of waste loads and that all waste materials are delivered to an appropriately licenced or permitted waste facility in compliance with the following relevant Regulations:

- *Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)*
- *Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008)*

- *Waste Management (Facility Permit and Registration) Regulations S.I.821 of 2007 and the Waste Facility Permit under the Waste Management (Facility Permit and Registration) Amendment Regulations S.I.86 of 2008.*

It is proposed that waste materials will be collected and stored in separate clearly labelled skips in a predefined waste storage area in the temporary site compound and that these materials will be collected by a Permitted Waste Contractor holding an appropriate Waste Collection permit in compliance with Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007) and Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008) and that they will be sent for disposal or further processing to appropriately Permitted / Licensed Waste Facilities in compliance with Waste Management (Facility Permit and Registration) Regulations S.I. No. 821 of 2007 and the Waste Management (Facility Permit and Registration) Amendment Regulations S.I. No. 86 of 2008.

Prior to the commencement of the Project, the Construction / Project Manager shall identify a permitted Waste Contractor who shall be employed to collect and dispose of all wastes arising from the project works. In addition, the Construction / Project Manager shall identify and all waste licensed / permitted facilities that will accept all expected waste exported off-site and will maintain copies of all relevant Waste Permits / Licences as required.

On-Site Waste Reuse and Recycling Management

Where prevention is not feasible, ways to reuse or recycle waste will be sought, preferably on-site to avoid the impacts arising from transportation. Excavation works below the existing ground level will be required during the construction of the development. Excavated soils and stones will be re-used as engineered fill on site. The re-use of this material will be subject to testing to establish suitability for its proposed re-use.

Construction waste material such as damaged or broken concrete slabs, blocks, bricks and tiles generated that is deemed by the Project Engineer to be suitable for reuse on the Project site for ground-fill material will be processed if necessary by on-site mobile crushing plant. This initiative shall provide a positive environmental impact to the construction phase as follows:

- Reduction in the requirement for virgin aggregate materials from quarries;
- Reduction in energy required to extract, process and transport virgin aggregates;
- Reduced HGV movements associated with the delivery of imported aggregates to the site;
- Reduced noise levels associated with reduced HGV movements;
- Reduction in the amount of landfill space required to accept C&D waste.

Inert Wastes

The waste material generated by site construction works will be mixed Construction & Demolition (C&D) waste, comprising of soil and stone, concrete, tiles, ceramics, and bricks. Material will be processed on site if necessary using an on-site crusher unit, which will process fill material into suitable size classes for the reuse as on-site construction materials. Mixed C&D waste with large non-uniform stone or compacted soils will be passed through a mobile crusher unit which will render the backfill material into a uniform shape and size which will allow for improved backfilling and compaction to required engineering standards.

All wood waste generated by site works will be inspected and examined and will be segregated as re-useable wood and scrap wood waste.

Where on site re-use is not feasible, opportunities to reuse or recycle the waste off-site will be investigated. If this is not feasible, then waste will be sent to an energy recovery facility, and only where there is no alternative, will waste be disposed of to landfill. To achieve this, existing waste management programmes and networks will be used such as the *National Waste Prevention Programme* (implemented by the *Environmental Protection Agency*) and material exchange networks.

Construction wastes arising from construction at the site will be appropriately segregated to facilitate recycling.

All waste removed from the site will be collected only by contractors with valid waste collection permits (under the *Waste Management (Collection Permit) Regulations 2001 as amended*).

Hazardous Wastes

The management of all hazardous waste arisings if they occur, shall be coordinated in liaison with Health and Safety Management. Hazardous waste will be managed in accordance with the Waste Management (Hazardous Waste) Regulations 1998 and 2000. Any Waste Electronic and Electrical Equipment (WEEE) will be source separated and the contractor will arrange for its removal from site for recovery or disposal.

Contaminated Soil

In the unlikely event of any evidence of soil contamination being found during work on site, the appropriate remediation measures will be employed. Contaminated areas of ground will be isolated and tested 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. The hazardous material will be sent for appropriate treatment / disposal to an appropriately Permitted / Licenced Waste Facility.

Any work of this nature would be carried out in consultation with, and with the approval of the Environmental Protection Agency and the Environmental Department of Wexford County Council.

Record Keeping

The contractor is responsible for ensuring the following:

- Waste from the proposed development will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 and the Waste Management (Collection Permit) (Amendment) Regulations, 2008.
- Waste from the proposed development will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996-2010.
- Any interim storage facilities have the appropriate waste licences or waste facility permits in place.

It is the responsibility of the Project Manager or his/her delegate that a written record of all quantities and natures of wastes reused / recycled during the project are maintained in a Waste File at the Project office.

Copies of relevant waste collection permits, certificates of registration, facility permits and waste licences will be retained on site. Where these have expired an up to date copy will be obtained from waste collectors by the Contractor.

The Project Manager will ensure that fully detailed records are maintained of any “incident/event” likely to cause harm to the environment. Contractors who report an incident will ensure details are identified and recorded.

11.6.1 Construction Phase

The following mitigation measures would be implemented during the construction phase to ensure the prevention and reduction of wastes arising onsite, and to ensure wastes are appropriately recovered, recycled and disposed of in an efficient manner:

- Waste would be managed in accordance with the waste hierarchy, as per Section 21A of the Waste Management Act 1996, as amended;
- Waste streams would be segregated as much as possible, to avoid cross contamination;
- Waste would be stored in suitably contained waste receptacles;
- Waste receptacles would be located in designated areas, within the temporary site compound, and would be appropriately labelled;
- Waste collection would only be undertaken by suitably authorised waste hauliers and would be treated at suitably licenced waste facilities;
- Removal of waste from the site would be undertaken on a regular basis, preventing large volumes of waste accumulating onsite;
- Waste records would be maintained onsite and copies of all waste contractors' collection permits and licences would be available on file;
- The construction works contractor would ensure the efficient ordering and purchasing of materials, to prevent waste being generated due to over-ordering or due to material degradation from long storage times;
- Where possible, materials would be re-used to prevent waste, such as the re-using of shutters for concrete works;
- Should surplus uncured concrete arise onsite, this would be returned to the batching plant where possible;
- Where practical and where permitted, certain waste streams would be used during infilling works;
- Where possible, subsoil and topsoil would be reused for the reinstatement and landscaping of the development site;
- Where hazardous wastes are generated, these would be stored within designated hazardous waste receptacles and disposed of to a licenced hazardous waste facility.

See Section 3.5 of the Construction and Demolition Waste Management Plan for further mitigation measures.

11.6.2 Operational Phase

Waste management during the operational phase of the development would be undertaken by private waste contractors, regulated by Wexford County Council. Therefore, no mitigation measures to be implemented by the developer are necessary.

11.6.3 'Worst Case' Scenario

The worst case scenario with regards waste would be the potential for poor waste management practices during construction works to result in pollution to soils and surface waters, and the potential for litter issues to arise. However, even in the absence of the mitigation measures outlined in Section 12.6.1 below, this would be considered unlikely to occur, given that waste management practices are implemented as standard practice during construction works.

11.7 PREDICTED IMPACTS WITH MITIGATION

11.7.1 Excavation and Construction Waste Impacts

The management of wastes generated during the construction of the proposed development will be in accordance with a Construction and Demolition Waste Management Plan (an outline of which is included with the SHD application). As long as the construction is completed in accordance with the plan it is envisaged that the impact of the construction (excavation and construction waste) phase will be temporary, slight and negative. There are several facilities with the necessary EPA licences and waste facility permits for soils recovery in the region. There is considered to be adequate capacity to receive the wastes likely to be generated by the construction of the proposed development, even in the 'worst-case' scenario, which is where excavated material cannot be reused in the proposed. Following the implementation of mitigation measures outlined in Sections 11.6.1, and given that all wastes arising as part of the construction phase would be managed in accordance with the waste hierarchy as outlined in Section 21A of the Waste Management Act 1996, as amended, it is considered that the proposed development would have a short-term and negligible environmental impact. The operational phase of the proposed development would give rise to a variety of municipal and packaging type wastes. However, waste management would be undertaken by suitably licenced waste contractors. Therefore, it is considered that the operational phase of the proposed development would have a long-term and negligible environmental impact.

11.8 MONITORING

11.8.1 Construction Phase

The construction works contractor would maintain records and documentation of all waste transported off-site, with waste volumes tracked to measure overall environmental performance. The construction works contractor would ensure that copies of all waste contractors' collection permits and licences would be available for inspection.

11.8.2 Operational Phase

No monitoring would be required for waste management during the operational phase of the proposed development.

11.9 REINSTATEMENT

In the event of the proposed development being discontinued, the construction works contractor would undertake measures to ensure that wastes at the site would not impact upon the environment, including the following:

- All wastes present throughout the site would be transported to the site compound and segregated appropriately;
- Where possible, surplus building materials would be returned to the supplier, sold or sent for recycling;
- Waste contractors would be contacted to remove the remaining wastes at the site, for recovery/recycling or disposal at licenced waste facilities;
- Stockpiled soil would be used to reinstate areas where possible.

11.10 DIFFICULTIES ENCOUNTERED IN COMPILING

No difficulties were encountered during the assessment of potential impacts of the proposed development on material assets.

12.0 MATERIAL ASSETS – UTILITIES

12.1 INTRODUCTION

This section outlines the remaining material assets that would potentially be affected by the proposed housing development and childcare facility during both the construction and operational phases.

Material assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Economic assets of human origin, i.e. utilities are considered in this chapter. Economic assets of natural origin are addressed in other chapters of this EIAR, namely *Chapter 6, Soils, Geology and Hydrogeology, Chapter 11, Waste Management* and *Chapter 13, Cultural Heritage*.

The purpose of this chapter is to assess the impacts of the proposed utilities on the existing utility network which includes the following infrastructure:-

- Electricity;
- Water;
- Foul sewer;
- Storm water (surface water) drainage;
- Gas;
- Telecommunications and public lighting;
- Traffic signalling; and
- Utilities owned by other stakeholders.

12.2 METHODOLOGY

A desk study of records received in digital format from the various utility companies was undertaken.

12.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

Gorey Town and surrounds is served by public mains water, supplied by water treatment plants at Creagh and Barnadown, which are operated by Irish Water, in addition to a smaller borehole at Ballykale. The proposed development site is located within the Gorey Regional Creagh water supply zone.

Gorey Town and surrounds is serviced by a public sewer, with treatment occurring at Courtown-Gorey Wastewater Treatment Plant (WWTP). Courtown-Gorey WWTP is operated by Irish Water and holds a Waste Water Discharge Licence with the EPA (D0046-01). The WWTP provides secondary treatment of wastewater with phosphorous removal. The WWTP has been designed for an agglomeration (population equivalent) size of 36,000 and currently services an agglomeration (population equivalent) of approximately 18,000.

There are two power line systems within the vicinity of Gorey town; a 220 kV line between Arklow and Crory and a 110 kV line between Arklow and Crane. A 220 kV station is located at Arklow, and 110 kV stations are located at Arklow, Banoge, Crory and Crane.

The Gorey area is not currently serviced by a gas network. The nearest gas line is at Arklow town, approximately 15km from Gorey town. However, there are currently no planned extensions to service Gorey town.

Gorey town has a number of broadband, phone and television channel providers, including Eir, Sky, Virgin and Vodafone. Gorey town is included in SIRO's (a joint venture company between ESB and Vodafone) Phase 1 plan to deliver fibre broadband with speeds of up to 1,000 Mbps.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development would comprise of the construction of a residential estate, with a variety of housing and apartment types and designs, and a childcare facility at Creagh, Gorey, Co. Wexford. Details of the proposed development works are as follows:

- Demolition and site clearance works of remaining infrastructure from the previous mushroom facility;
- Construction of a total of 297 residential dwellings including:
    - 4 five-bedroom houses;
    - 77 four-bedroom houses;
    - 125 three-bedroom houses;
    - 26 two-bedroom houses;
    - 36 two-bed apartments;
    - 29 three-bed apartments.
- Construction of dwellings would be either two or three storeys in height, depending on their location and number of bedrooms;
- Construction of stormwater and foul sewer drainage systems;
- Construction of a childcare facility, within the area zoned for Community and Education use;
- Construction of all ancillary development works including internal road surfacing, boundary construction and provision of outdoor artificial lighting;
- Construction of two site access roads;
- Landscaping of public amenity areas.

Construction works, including the demolition of remaining infrastructure, are estimated to take five years over a phased basis, with hours of operation from 8am to 6pm, Monday to Saturday. A temporary site compound would be established near the entrance of the proposed site, housing the site offices, storage facilities and staff welfare facilities such as a canteen and toilets.

A new stormwater drainage system would be constructed. Storm water, comprised of rainwater run-off from roofs and paved areas, would be collected via a system of gullies and stormwater drains and would pass through a Class I Bypass Separator and Attenuation System prior to connecting with the Ballyowen Stream.

A new domestic wastewater system would also be constructed. Domestic wastewater would be directed to Gorey town's public sewer, which would undergo treatment at Courtown-Gorey Waste Water Treatment Plant prior to discharge. This would involve the construction of an underground foul sewer pipeline, approximately 1.1km in length, from the proposed site to the public sewer line.

Artificial outdoor lighting would be installed along the internal access network.

12.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

12.5.1 Construction Phase

Power and water would be required during construction activities and servicing of the temporary site compound. The development site would be connected to the local electricity grid 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 would 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 would 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 construction works contractor would liaise with the relevant utilities provider prior to works commencing, with ongoing consultation throughout the proposed development. Where new services would be required, the construction works contractor would apply to the relevant utility provider and adhere to the requirements outlined in the connection permit / licence.

12.5.2 Operational Phase

The development would require power during the operational development for normal day-to-day residential and childcare activities. According to the Commission for Energy Regulation (2017), the average electricity consumption for a household is 4,200 kWh per annum. With 297 proposed dwellings, this would equate to approximately 1,250 MWh per annum. However, this figure is indicative only, as it has been based upon an average three-bedroom house. The estimated power requirement would not be considered significant in the overall context of the proposed development, and would not be anticipated to significantly impact upon the local power supply.

Given the range of telecommunications providers in the area, the proposed housing development would not have a significant impact upon local telecommunications.

The proposed development would include for the installation of artificial outdoor lighting along the internal access network, which would be connected to the electricity grid.

The estimated water demand for the proposed residential development comprising of 297 dwellings and crèche would be 181.65 m^3/day and 5.5 m^3/day respectively. No significant impact would be anticipated upon the Gorey Regional Creagh water supply zone. Further details are discussed in Chapter 6 of this EIAR.

The estimated foul discharge for the proposed residential development and crèche would be 242.2 m^3/day and 5.5 m^3/day respectively. As mentioned in Section 12.3.5, Courtown-Gorey WWTP has a capacity for an agglomeration (population equivalent) of 36,000, while currently servicing an agglomeration (population equivalent) of approximately 18,000. Irish Water have confirmed that the WWTP would have the capacity to accept the estimated foul discharge generated during the operational phase of the proposed development. Further details are discussed in Chapter 6 of this EIAR.

12.5.3 Potential Cumulative Impacts

The proposed development is located within an area of high residential use, with a number of housing estates located within the vicinity, including Ashwood Grove, Willow Park, Cois Doire, Sean Drive, Ramsfort Avenue, Park Avenue and Allenwood Drive to the south-east, Creagh Demesne and Hunter's Green (under construction) to the south-west, Woodlands Manor and Woodlands Drive to the north-east and Ramsfort Park to the north. In addition to the residential estates, a number of detached dwellings are linearly dispersed along the Fort Road network. It should also be noted

that the lands immediately to the north of the proposed development site may also be developed into residential housing (not by the applicant).

The lands adjacent the residential development are zoned for Community and Education purposes. The future development of these lands would potentially include a nursing home, catering for approximately 60 beds and including approximately 12 sheltered units, and a mixed / medical centre.

Considering the nature of the proposed development and the adjacent existing and proposed residential developments and future proposed community and education development, it is considered that the main potential cumulative impacts would be an increased demand on local utilities, including power, water supply, telecommunications and wastewater treatment, in addition to increased traffic volumes.

However, it is considered that utilities in the area have adequate capacity to accommodate the estimated requirements of the proposed development, during both the construction and operational phases, and therefore there would be no significant cumulative impact upon local utilities. No significant cumulative traffic impacts are anticipated, given that the traffic impact assessment has concluded that the proposed development would not result in significant queues or delays to junctions in the area.

12.6 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

12.6.1 Construction Phase

The construction works contractor should 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 should 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.

12.6.2 Operational Phase

The proposed development would be serviced by existing utilities, with the capacity to accommodate the proposed residential development. Therefore, no mitigation measures are necessary.

There would also be a potential risk of disruptions to the local utility network; however, this would be temporary and therefore not considered significant. In the event that existing pipelines for water supply and wastewater treatment were undersized to deliver / accept estimated volumes, they would be replaced with pipelines of greater diameter.

12.7 PREDICTED IMPACTS WITH MITIGATION

Given the nature of the proposed development and following the implementation of mitigation measures as outlined in Sections 9.6.1 and 9.6.2, it is considered that residual impacts would be imperceptible.

12.8 MONITORING

12.8.1 Construction Phase

No monitoring would be required regarding material assets - utilities during the construction phase of the proposed development.

12.8.2 Operational Phase

Meters for water and electricity would be installed in the residential dwellings and childcare facility, in accordance with the requirements of Irish Water and electricity providers.

12.9 DIFFICULTIES ENCOUNTERED IN COMPILING

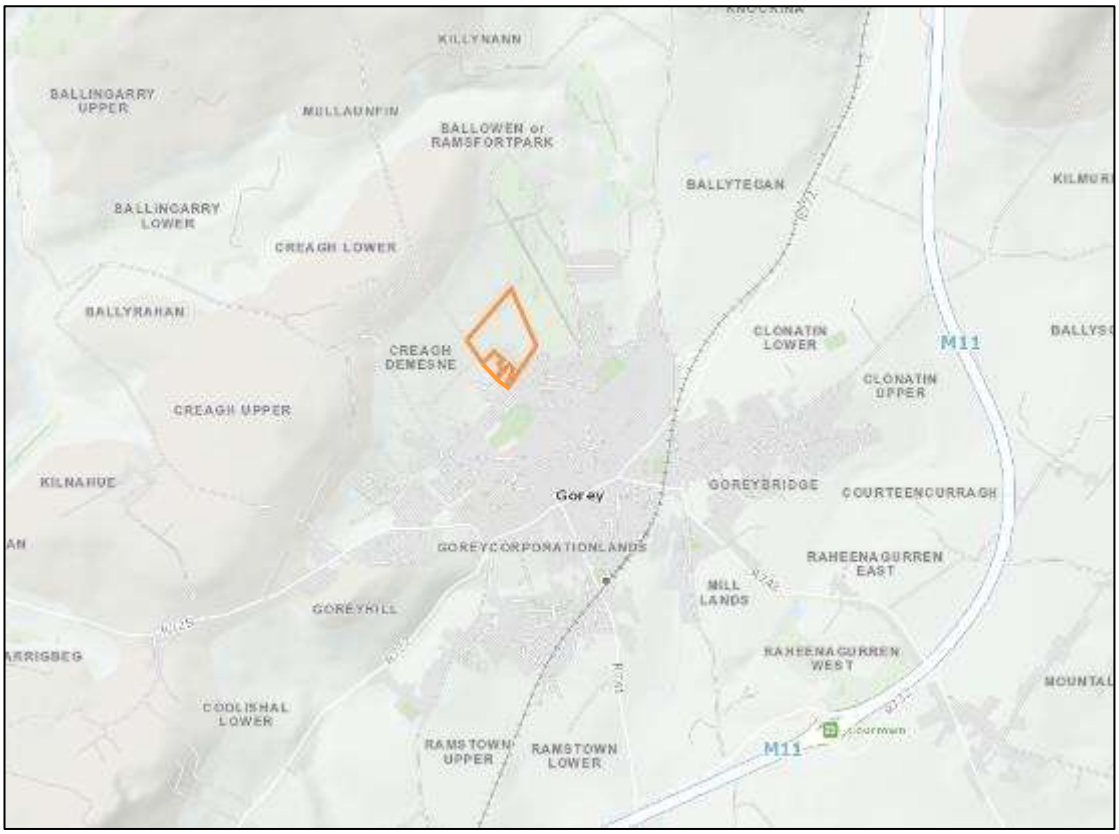
No difficulties were encountered during the assessment of potential impacts of the proposed development on material assets.

13.0 ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE

13.1 INTRODUCTION

This chapter discusses the cultural, archaeological and architectural heritage environment, and assesses the predicted impact of the proposed *"Creagh Housing"* residential development in the townland of Ballowen/Ramsfortpark, Gorey, Co. Wexford. The proposed residential development covered in this report consists of a mixed development of residential units with associated community and education facilities (Figure 13.2). This chapter comprises consultation of existing archaeological records, readily available documentary and cartographic sources, and a visual site inspection. Proposals are set out for evaluating the nature, extent and significance of potential sub-surface archaeological and architectural remains, and extant architectural heritage, and for mitigating the predicted impact of the development pre-, during and post-operation phase.

Figure 13.1 – Location of proposed development *(site outlined in orange).*



Note: (site outlined in orange) located at Ramsfortpark, Gorey, Co. Wexford (OSI Licence EN 0077918).

13.1.1 Definition of Cultural, Archaeology and Architectural Heritage

The term ‘cultural heritage’ is broadly used to describe any combination of archaeological, architectural and cultural heritage features.

- Archaeological heritage comprises objects, monuments, buildings or landscapes that generally pre-date AD1700.
- Architectural heritage, also referred to as built heritage, comprises structures, buildings, their settings and contents that generally post-date AD1700.
- Cultural heritage also comprises less tangible aspects of heritage such as folklore and cultural associations.

Figure 13.2 – Proposed site layout.

Note: Creagh Housing (*outlined red*), with community and education zoned areas (*outlined black*), Ramsfortpark, Gorey, Co. Wexford.

Figure 13.3 – Location of development area.

Note: (site outlined blue) showing proposed storm-water and sewer pipelines (in red) located outside the primary development site (OSI Licence EN 0077981).

13.2 STUDY METHODOLOGY

A desk-based study of existing archaeological and architectural heritage records and other relevant cartographic and documentary sources was undertaken. This was conducted in conjunction with a field inspection to assess the proposed development site and record any additional features of interest. A list of all consulted sources is provided in bibliographic form. The EPA Revised Guidelines on the information to be contained in Environmental Impact Assessments (May 2017) were taken into account in the preparation of this chapter.

13.2.1 Record of Monuments and Places and Sites and Monuments Record

The Record of Monuments and Places (RMP) is a list of archaeological monuments known to the National Monuments Service. There are over 120,000 Recorded Monuments in the RMP. This RMP list is based on the earlier Sites & Monuments Record (SMR) files housed at the National Monuments Service. The SMR was initially based on cartographic, documentary and aerial photographic sources, revised through fieldwork and forms the basis of the statutory RMP. The record is updated on a constant basis.

There are no RMP sites within the proposed development site. There are in excess of fifty RMP sites within 3km of the development area; of these a total of five RMP sites are located within an 800m radius of the proposed development (listed in Appendix E). The closest RMP site, a ritual well (WX007-032) in the townland of Gorey Corporation Lands is situated 100m south/south-west of the proposed development.

Ameliorative measures are recommended for those RMP sites and National Monuments which are situated within 800m of the proposed development. These are detailed in Chapter 13.6.

13.2.2 Development Plan and National Inventory of Architectural Heritage

Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Act 2000 (as amended) and contains a Record of Protected Structures; a list of buildings which cannot be materially altered or demolished without grant of permission under the Act. Wexford County Development Plan 2013-2019 and Gorey Local Area Plan 2017-2023, list in excess of sixty structures within 1.5km of the development area as part of its RPS. The vast majority of these are associated with the historic town of Gorey situated 800m to the south of the development area and are located in the townland of Gorey Corporation Lands, with further examples in the townlands of Ballytegan and Clonattin Lower. None are located within the townland of Creagh Demesne.

Only two structures are located within 700m of the development area. A house *"St. Anne's*" (WCC0224) is situated 600m south/south-east, and Mayfield House (WCC0259) is situated 700m to the south of the development area. The others, a selection of which is listed in Appendix E, are more than half a kilometre from the development and as such are not taken into account.

The National Inventory of Architectural Heritage (NIAH) is an ongoing survey within the Department of Arts, Heritage and the Gaeltacht. The work of the NIAH involves identifying and recording the architectural heritage of Ireland, from AD1700 to the present day and includes country houses, churches, mills, bridges and other buildings of note. The NIAH survey was carried out in 2004. In excess of fifty structures included in this Inventory are situated in the wider proximity to the proposed line of development; however only one structure Mayfield House (NIAH: 15601024) is located within 500m of the development area (Appendix E).

13.2.3 Documentary and Cartographic Sources

Documentary sources are a valuable means of completing the written archaeological and architectural record of an area and gaining insight into the history of the receiving environment. A list of all consulted sources is provided in bibliographic form.

A wide range of maps were consulted (see Chapter 13.3.4), a full list of which is provided in the bibliography. Information gathered from cartographic sources is fundamental to the identification of archaeological and architectural heritage sites and demesne landscapes which are now located based on cartographic records alone. For example, the earliest Ordnance Survey maps date to the late 1830s and 1840s. Much change has occurred in the use and treatment of the landscape in the intervening years, particularly during the second half of the 20th century. The cartographic sources consulted provide valuable information about the subject lands, which will be discussed in greater detail in the coming sections.

13.2.4 Topographical Files of National Museum of Ireland

The topographical files of the National Museum of Ireland (NMI) are the national archive of all known antiquities recorded by the NMI. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The NMI's files present a catalogue of objects reported to the institution from 1928-95. The find-spots of artefacts can be an important indication of the archaeological potential of the related or surrounding area. No artefacts have been recorded in the townlands of Creagh Demesne and Ramsfortpark (see chapter 13.3.2).

13.2.5 Excavations Bulletin and Excavations Database

The Excavations Bulletin is both a published annual directory and an on-line database (www.excavations.ie) that provides summary accounts of all the excavations carried out in Ireland from 1970 to 2013. The database provides access to summary descriptions of almost 24,000 reports (see chapter 13.3.3).

13.2.6 Placenames Database of Ireland

The Placenames Database of Ireland website (wwww.logainm.ie) hosts online bi-lingual placename research and archival records for townlands. A townland name may preserve valuable information relating to its archaeology, history, folklore, pervious ownership, topography or land use. Many placenames were anglicised by the Ordnance Survey which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable (see chapter 13.3.6).

13.2.7 Site Inspection

Site inspection offers the opportunity to observe the landscape of the study area. This is essential in determining the nature and extent of any surviving above-ground evidence and in projecting the potential impact of the proposed development. The site inspection was conducted by Michael Greiner for Shanarc Archaeology on 20th December 2017 (see chapter 13.3.5).

13.2.8 Legislation, Standards and Guidelines

Cultural, archaeological and architectural heritage in Ireland is protected by national and international policies.

Ireland has ratified several international and European conventions on the protection of cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments and Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Grenada Convention) 1985;
- European Council Directive on Environmental Impact Assessment (85/337/EEC) 1995 and amending Directive by (97/11/EC) 1997 and (2003/35/EC) 2003.

National legislation protecting cultural heritage sites comprises (for further detail, see Appendix E):

- National Monuments Act 1930, amended 1954, 1987, 1994 and 2004;
- Heritage Act 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and
- Planning and Development Act 2000(as amended)

The following standards and guidelines were also consulted as part of this assessment:

- Frameworks and Principles for the Protection of the Archaeological Heritage (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- Policy and Guidelines on Archaeological Excavation (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- The Heritage Council, 2000. Archaeology & Development: Guidelines for Good Practice for Developers (2000), The Heritage Council;
- Revised Guidelines on the information to be contained in Environmental Impact Statements (Draft) (2015), Environmental Protection Agency;
- Advice notes on current practice in the preparation of Environmental Impact Assessment Reports (May 2017), Environmental Protection Agency;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Scheme (2005), National Roads Authority; and
- Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes (2005), National Roads Authority.

13.2.9 Assessment Criteria

Impacts to cultural, archaeological and architectural heritage are generally categorised as one of three types, as described in Table 13.1.

Table 13.1 – Type of Impact

Category of Impact	Description
Direct	Occurs where an archaeological, architectural or cultural heritage feature, site or structure is physically located within the footprint of the proposed development, resulting in the partial or total removal of that feature or site.
Indirect	Occurs where an archaeological, architectural or cultural heritage feature, site or structure, or its setting, is located in close proximity to the footprint of the proposed development.
None predicted	Occurs where an archaeological, architectural or cultural heritage feature, site or structure is not adversely or positively affected by the proposed development.

The impacts on cultural, archaeological and architectural heritage are assessed in terms of their quality, as described in Table 13.2.

Table 13.2 – Quality of Impacts

Quality of Impact	Description
Negative	A change that will detract from or permanently remove an archaeological, architectural or cultural heritage feature, site or structure.
Neutral	A change that will not affect an archaeological, architectural or cultural heritage feature, site or structure.
Positive	A change that will improve or enhance the setting of an archaeological, architectural or cultural heritage feature, site or structure.

The level of impact is assessed, as described in Table 13.3.

Table 13.3 – Significance of Impacts

Level of Impact	Description
Profound	An impact that completely and irreversibly destroys an archaeological, architectural or cultural heritage feature, site or structure. Mitigation is unlikely to remove adverse effects. Reserved for adverse, negative effects only.
Significant	An impact that, by its magnitude, duration or intensity alters the character and/or setting of an archaeological, architectural or cultural heritage feature, site or structure. These effects arise where an aspect or aspects of the archaeological, architectural or cultural heritage are permanently impacted on, leading to a loss of character, integrity and data about the feature/site/structure. Appropriate mitigation is likely to reduce the impact.
Potentially significant	An impact to a potential feature/area of archaeological, architectural or cultural heritage that could be significant without mitigation measures being implemented, e.g. potential sub-surface archaeological remains.

Level of Impact	Description
Not significant	An impact which causes noticeable changes in the character of an archaeological, architectural or cultural heritage feature, site or structure, but without noticeable consequences.
Very significant	An impact which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of an archaeological, architectural or cultural heritage feature, site or structure.
Moderate	An impact that results in a change to an archaeological, architectural or cultural heritage feature, site or structure, which, although noticeable, does not compromises the integrity of the heritage. These effects arise where an archaeological, architectural or cultural heritage feature, site or structure can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.
Slight	An impact that causes a minor change in the character of the environment, which, although noticeable, does not directly impact or affect the integrity of an archaeological, architectural or cultural heritage feature, site or structure. Such impacts are generally reversible and of relatively short duration.
Imperceptible	An impact on an archaeological, architectural or cultural heritage feature, site or structure, which can be measured, but without noticeable consequences.

The magnitude of impact, as described in table 13.4, is assessed and discussed in chapter 13.6.

Table 13.4 – magnitude of effects

Level of Impact	Description
Extent	The size of the area, the number of sites, and proportion of a population affected by an effect.
Duration	The period of time over which the effect will occur.
Frequency	How often the effect will occur.
Context	Whether the extent, duration or frequency will conform or contrast with established (baseline) conditions.

The probability of effects as described in table 13.5, is assessed and discussed in 13.6.

Table 13.5 – The probability of effects

Level of Impact	Description
Likely	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.

Level of Impact	Description
'Worst case' effects	The effects arising from a project in the case where mitigation measures substantially fail

The duration of effects as described in table 13.6, is assessed and discussed in chapter 13.6.

Table 13.6 – The duration of effects

Level of Impact	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years

The types of effects are described, as in table 13.7.

Table 13.7 – The types of effects

Level of Impact	Description
Cumulative	The addition of many small effects to create one larger, more significant effect.
'Do nothing effect'	The environment as it would be in the future should no project of any kind be carried out.
Indeterminable	When the full consequences of a change in the environment cannot be described.
Irreversible	When the character distinctiveness is permanently lost
Residual	The degree of change which will occur after the proposed mitigation measures have taken effect
Synergistic	Where the resultant effect is greater than the sum of its constituents.
Indirect	Effects that arise off-site or are caused by other parties that are not under control of the developer
Secondary	Effects that arise as a consequence of a project.

13.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

13.3.1 Site Description

The northern half of the proposed development is located on a greenfield site currently in use for agricultural purposes, while the southern half is located on a brownfield site previously the location of the now demolished 'Walsh Mushrooms' industrial complex. The perimeter of the development follows local roadways and existing field boundaries.

13.3.2 Archaeological Investigations within the Vicinity of the Proposed Development Area

A search of the Excavations Bulletin website for previous archaeological investigations within the proposed development area produced no results. A number of investigations have been undertaken within the wider vicinity.

Pre-development testing (2005:1643) was undertaken at a proposed 100 house development site in Creagh Demesne/Gorey Corporation Lands in 2005; revealing the remains of a red-brick kiln/furnace/chimney, an apparent stockpile of large hand-made red bricks and a loose stone bank, as well as associated charcoal rich deposits (Delaney, F., 2005).

A programme of monitoring (2012:632) was carried out as part of the construction of a proposed shopping centre (Tesco Gorey) at Ramstown Lower and Gorey Corporation Lands, Gorey, Co. Wexford, in November 2012. Excavations identified an number of Fulachta fiadh/fia with associated burnt mounds/spreads at Ramstown Lower, and a key-hole shaped Kiln at Gorey Corporation Lands (Bailey, F., 2012).

An assessment (2008:1283) was carried out on the site of a development at Gorey Hill, Gorey. Two burnt spreads were discovered during testing (O'Hara, R., 2008).

Monitoring at Ballytegan Park (2007:1939), and Creagh Demesne (2007:1951) produced no archaeological results (McLoughlin, C., 2007 / Shine, D., 2007).

13.3.3 Archaeological Finds recorded in the Topographical Files of the NMI

The topographical files held at the National Museum of Ireland identify recorded artefacts that have been reported to the State in accordance with national monuments legislation. The find-spots of artefacts can be an important indication of the archaeological potential of the related or surrounding area.

No finds were recovered within the proposed development site, or within the immediate vicinity.

13.3.4 Archaeological and Historical Context

The extent of prehistoric and historic activity within the wider study area is attested to by the number and range of known archaeological monuments within the surrounding landscape.

The Record of Monuments and Places (RMP) lists in excess of fifty monuments within a 3km radius of the proposed development site. There are eleven RMP sites within 1km of the development area; these are listed in AppendixE.

13.3.5 Prehistoric Period

There are numerous prehistoric monuments located within approximately 3km of the development area. The majority of these consist of fulachta fia and burned mounds.

There are at least nine known fulachta fia within 3km of the development site with the majority being located along the line of the new M11 Gorey to Arklow link Road; such as examples (SMR's: WX012-034003, WX012-034001, WX012-034002) at Raheenagurren West, 2.5km to the south-east of the development area. There are two fulachta fia in Ramstown Lower 1.2km to the south of the development (SMR's: WX007-085004, WX007-085002). This archaeological site type is characteristically defined by large quantities of heat-shattered stone surrounding a trough. These sites commonly date to the Bronze Age (c. 2200-500 BC), although examples dating from the Neolithic through to the medieval period are known. They have been primarily interpreted as cooking places. However, other theories to explain the function of these sites include sweathouses, industrial use, brewing and dyeing.

Burnt Mounds are often associated, and in some cases are considered to be synonymous with fulachta fia; though this is not always the case. The classic burnt mound is a relatively low grassy mound of crescent or U-shaped plan

(Waddel, 2000, 174). There are at least seven known examples of burnt mounds within 2.5km of the development area. Three burnt mounds (SMR's: WX007-085006, WX007-085003, WX007-085007) are located in Ramstown Lower, 1.2km to the south of the development area. Two further burnt mounds are located at Raheenagurren West (SMR's: WX012-034008, WX012-034009), 2.5km to the south-east of the proposed development area. In both locations the burnt mounds seem to be associated with fulachta fia (Bailey, F., 2012 / Breen, T., 2008).

There is an Iron Age corn-drying kiln (WX007-085005) approximately 1km to the south of the development area (Bailey, F., 2012).

There are individual standing stones both in Gorey Corporation Land (WX007-061), and Ballingarry Lower (WX006-087- / WX006-049).

When considering the discussed monuments in conjunction with other recorded monuments in this area, such as the urn burial in Gorey Corporation Land (WX007-055- & WX007-055001), prehistoric pottery from Gorey Corporation Land (WX007-080), and the ring-ditch (WX012-033001) and cremation pit (WX012-033002) at Coolnaveagh 2.5km to the south of the development area, it becomes clear that there was significant human activity in the wider Gorey area from at least the Early Bronze Age.

13.3.6 Historic Period

Early – Late Medieval Period c. AD500-1600

There are at least eleven known raths to be found within 1.5-3km of the development area. Most of these are located along the line of the M11 Gorey-Arklow link road to the South and East of Gorey. The closest rath (WX007-017), is located at Ballowen/Ramsfortpark 600m to the north of the development area; the nearest cluster of raths is located at Ballyrahan (SMR's: WX006-059001-, WX006-059002, WX006-085) 1.9km to the west of the development area. Another rath cluster is located at Raheenagurren West (SMR's: WX012-030-, WX012-001, WX012-002, WX012-003) at a distance of 2.5km, to the south-east of the development area. There are further examples of raths at Coolnastud (WX011-008), and Courteencurragh (SMR's: WX007-035, WX007-036). Raths also commonly known as ringforts are the most numerous and widely distributed monuments in the Irish landscape. These enclosed medieval homesteads are generally dated to c.500-1200AD. While raths are not uniform, the most common form is that of a moderate size with a single bank and ditch enclosing a space of 25-60m. They are generally considered to be dispersed homesteads, and traces of houses have been excavated within a number of raths. (Mitchell, F. & Ryan, M. 2007, 254-261). Though raths are generally associated with the Early Medieval period, and are occasionally shown to have been inhabited till after the Norman Invasion, it has occasionally been proposed that some may have Iron Age origins (Mitchell, F. & Ryan, M. 2007, 254-261)(Edwards, N. 2000, 6-33).

A metal working site (WX007-082) has been dated to the early Anglo-Norman period (Bolger 2009; 2010).

There may have been a settlement at Gorey (WX007-033) in the thirteenth century as a payment of 13 shillings was made by 'the community of the town (ville) of Gorey' in 1296, but nothing further is known until the 17th century when Gorey emerges a planned town (Moore, M., 1996).

Post-Medieval Period c. AD1600-1800

Gorey emerges as a planned town in the 17th century as part of the early 17th century plantation of north county Wexford. It received its first charter in 1619 as Newtown or Newborough at the behest of Bishop Ram, the Protestant bishop of Ferns who lived at Gorey. The town was laid out on a grid pattern covering c. 14 acres (c. 5.5 ha), and it might never have been defended with a wall, although there are passing references to ramparts in the early 18th century. The graveyard and 17th century church site (WX007-033001) with the Ram tomb (WX007-03303-) are within the town. Archaeological testing within the town has yet to produce any related material. (Bradley and King 1990, 88-91; Hore 1900-11, vol. 6, 609-34).

The Episcopal palace in Gorey was, in 1641, attacked by the parliamentarians, who burned the library; the house was subsequently converted into an inn, and afterwards into a barrack (Lewis, S., 1837).

William Petty's Down Survey Maps of 1656-58 show the town and fort of Gory(Gorey) to be in the Barony of Gory and the Parish of Kilmaclogue/Killmackelouge (Figures 13.4, 13.5). The Down Survey Terrier for Killmackelouge Parish states "In this Parrish stands the Garrison of Gory with a church and a Town formerly a Corporation Town" (Petty, W. 1655) (Figure 13.6).

"In the disturbances of 1798, the town, after the defeat of Col. Walpole at Tubbernearing, fell into the hands of the insurgents, who destroyed the mansions of Ramsfort and Clonatin, the handsome seats of the family of Ram, and several houses belonging to their opponents. After the battle of Vinegar Hill, many of the inhabitants of the town and neighbourhood, who had taken refuge in Wicklow, thinking that order had been restored, ventured to return to their respective homes, but were met by a large party of retreating insurgents and many of them were put to death". (Lewis, S., 1837)

Nineteenth & Twentieth Centuries

Samuel Lewis' 1837 "*A Topographical Dictionary of Ireland, Volume 1"* portrays Gorey as a pleasant successful market-town with a courthouse and a church, surrounded by plantations. "There is an extensive brewery; flour-mills have been recently erected, and it is in contemplation to erect some cotton-mills and a distillery. A savings' bank has been established in the town. The market is on Saturday, and is abundantly supplied with provisions of all kinds and poultry, especially chickens, for which the place is noted" (Lewis, S,. 1837). In the early-mid 19th century at least two separate mill complexes were established in Gorey along the Banoge River to the south-east of the town; these are shown on the 6"Cassini and the 1888-1913 25" Ordnance Survey maps. A brewery is also shown to the south-east of the town on the 1st edition 6" Ordnance Survey Maps.

Samuel Lewis describes the town of Gorey as consisting principally of one long street neatly and uniformly built, partially paved and containing 548 houses, with an ample supply of water from a fountain located in the park. Of the surroundings Lewis states "the neighbourhood is pleasantly diversified with hill and dale, wood and water; and within the circuit of a few miles are several elegant seats and villas standing in grounds tastefully laid out and enriched with thriving plantations" (Lewis, S., 1837).

There are numerous wells and holy/ritual wells located around the town of Gorey, with a slight concentration to the north and north-east of the town, the majority have dates ranging from the 1830's - 1890's and several have RMP status. The closest well to the development area is located 100m to the south of the site; this well (WX007-032) is known as "Tobermuire" and is labelled on the 1st edition Ordnance Survey as a "Boiling Well". Two RMP wells; an unnamed holy well (WX007-019) and Lady Charlotte Ram's well (WX007-083) are located in Ballytegan Park the former estate of Ramsfort House (NIAH: 15700711), 700m and 1.3km respectively to the north-east of the development area.

In 1828 a fever hospital and dispensary were established just outside the town (Lewis, S,. 1837), shown in Mill Lands on the 1st edition Ordnance Survey Maps. In the 1840's a Union Workhouse complex (NIAH: 15701132 & 15701133), and a new fever hospital were established in Ramstown Lower.

In the 1860's the railway arrived in Gorey; as part of the 1834-1882 development of the Rosslare to Dublin line by the "Dublin, Wicklow and Wexford Railway Company (DWWR) (later the Dublin and South Eastern Railway (DSE)), the line as far as and station at Gorey (NIAH: 15601090) were opened in 1863.

13.3.7 Cartographic Analysis

Historic Mapping

A wide range of historic maps were consulted, a full list of which is provided in the bibliography. Relevant extracts are presented from the following historic maps:

- Down Survey map of the Barony of Gory/Gorey, 1656-58 (Figure 13.4);
- Down Survey map of the Parish of Kilmaclogue/Killmackelogue 1656-58 (Figure 13.5);
- Down Survey map Terrier for Parish of Kilmaclogue/Killmackelogue (Figure 13.6);
- Taylor and Skinner's Map, 1777 (Figure 13.7);
- First edition Ordnance Survey 6" Map, 1837-43 (Figure 13.8);
- 1888-1913 edition Ordnance Survey 25" Map, (Figure 13.9); and

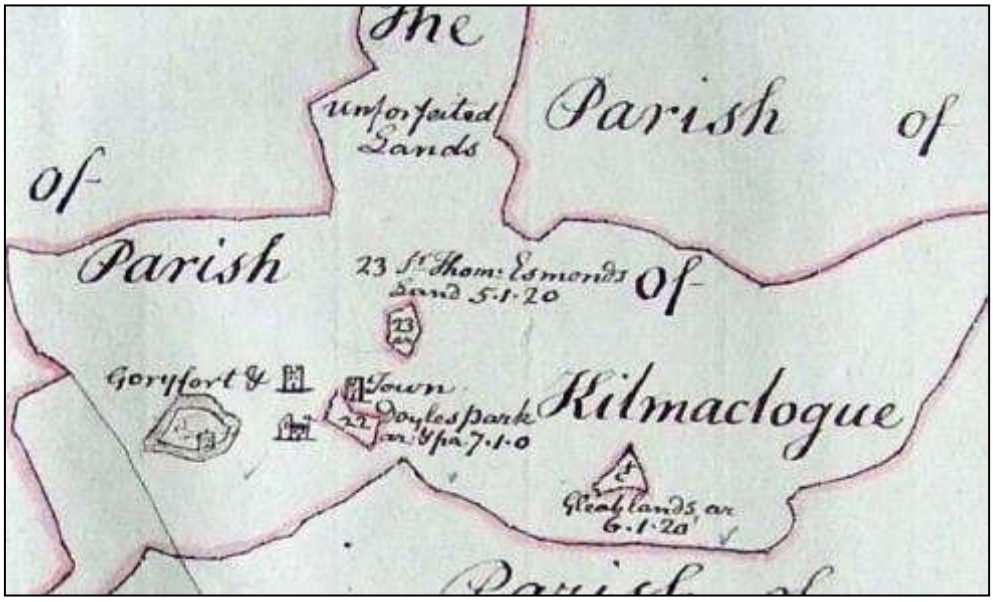
- 1940's Ordnance Survey 6" Cassini Map (Figure 13.10)

Figure 13.4 – Extract from Sir William Petty's Down Survey

Note: 1656-58 map showing Barony of Gory and Gory Towne (Gorey). (http://downsurvey.tcd.ie ©2017)

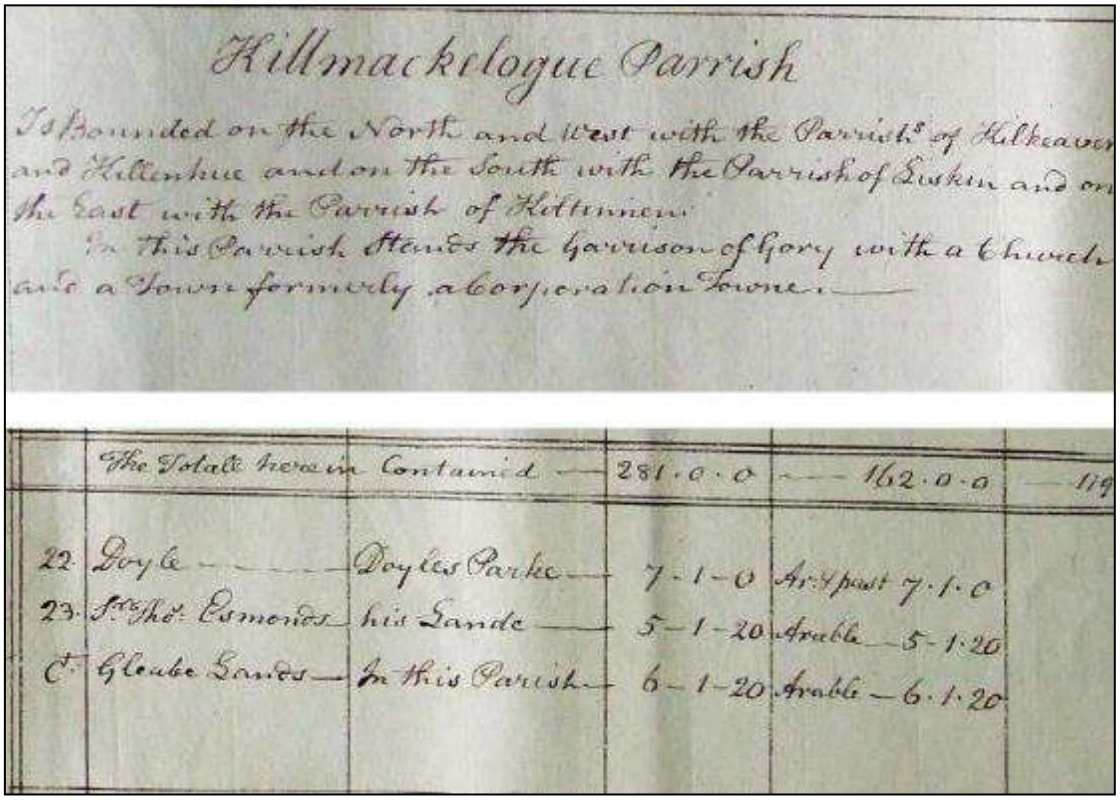
William Petty's Down Survey Maps of 1656-58 show the town and fort of Gory(Gorey) to be in the Barony of Gory and the Parish of Kilmaclogue/Killmackelouge (Figures 13.4, 13.5). The Down Survey Terrier for Killmackelouge Parish states "In this Parrish stands the Garrison of Gory with a church and a Town formerly a Corporation Town" (Petty, W. 1655) (Figure 13.6).

Figure 13.5 – Down Survey Map of the parish of Kilmaclogue



Note: Showing Goryfort and Town. (http://downsurvey.tcd.ie ©2017)

Figure 13.6 – Down Survey Map Terrier for the Parish of Kilmaclogue/Killmackelogue



Killmackelogue Parrish

Is Bounded on the North and West with the Parrish[s] of Kilkeavan and Killenkue and on the South with the Parrish of Duskin and on the East with the Parrish of Kiltinnan

In this Parrish Stands the Garrison of Gory with a Church and a Towne formerly a Corporation Towne.

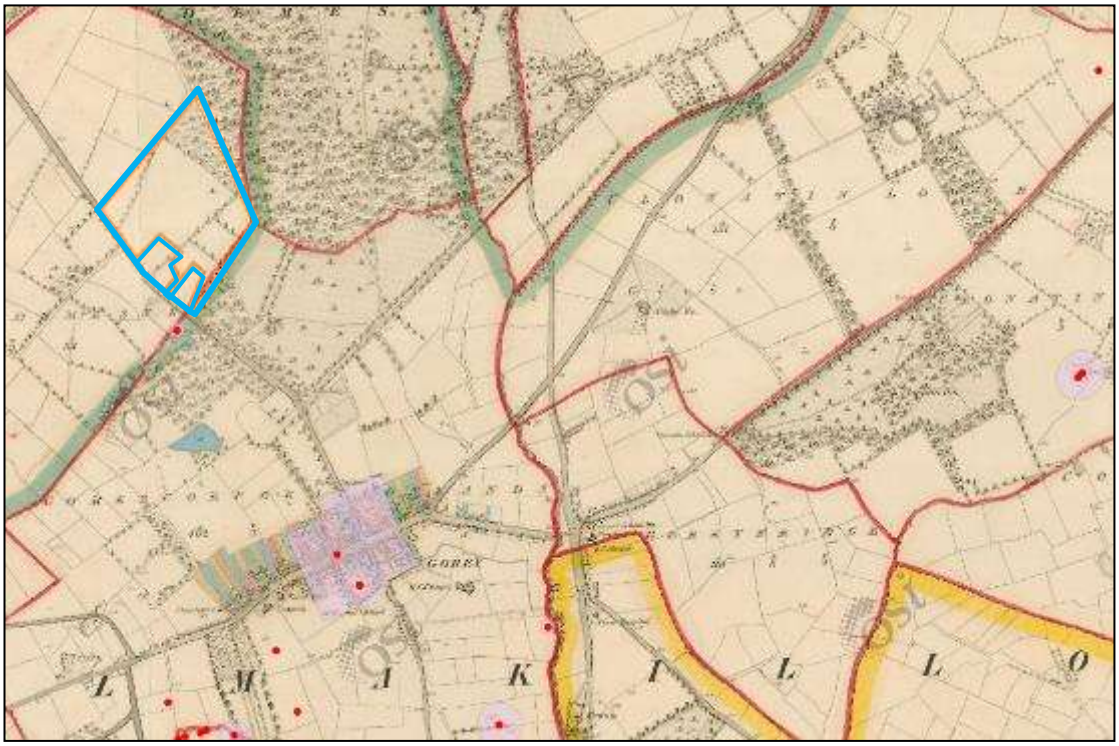
	The Totall here in Contained		281-0-0	162-0-0	119
22	Doyle	Doyles Parke	7-1-0	Ar: & past 7-1-0	
23	S[r] Tho: Esmonds	his Lande	5-1-20	Arable 5-1-20	
C[t]	Glebe Lands	In this Parish	6-1-20	Arable 6-1-20	

Figure 13.7 – Extract from Taylor & Skinner's map of roads 'From Dublin to Wexford' 1777.

Taylor & Skinners 'Maps of the roads of Ireland' was based on a survey undertaken in 1777. This extract from Map number 142 covers the area around Gorey (Figure 13.7). The map shows both the Ram house at Clonatin and the Ram house at Ramsfort. According to Samuel Lewis (see section 3.3.2), both these structures were destroyed during the 1798 rebellion. The current Clonatin House (NIAH: 15700716) and Ramsfort House (NIAH: 15700711) are given provisional dates of 1799-1820 on the NIAH database, and were presumably constructed/rebuilt as replacements.

The proposed development area falls into the section of the map marked with the number 46, adjacent to the Enniscorthy road, and is depicted as at least partially wooded land.

Figure 13.8 – 1837-43 1st edition Ordnance Survey Map



Note: (development area, outlined in blue) showing RMP sites (red dots) and NIAH sites (blue dots) (OSI Licence EN 0077918).

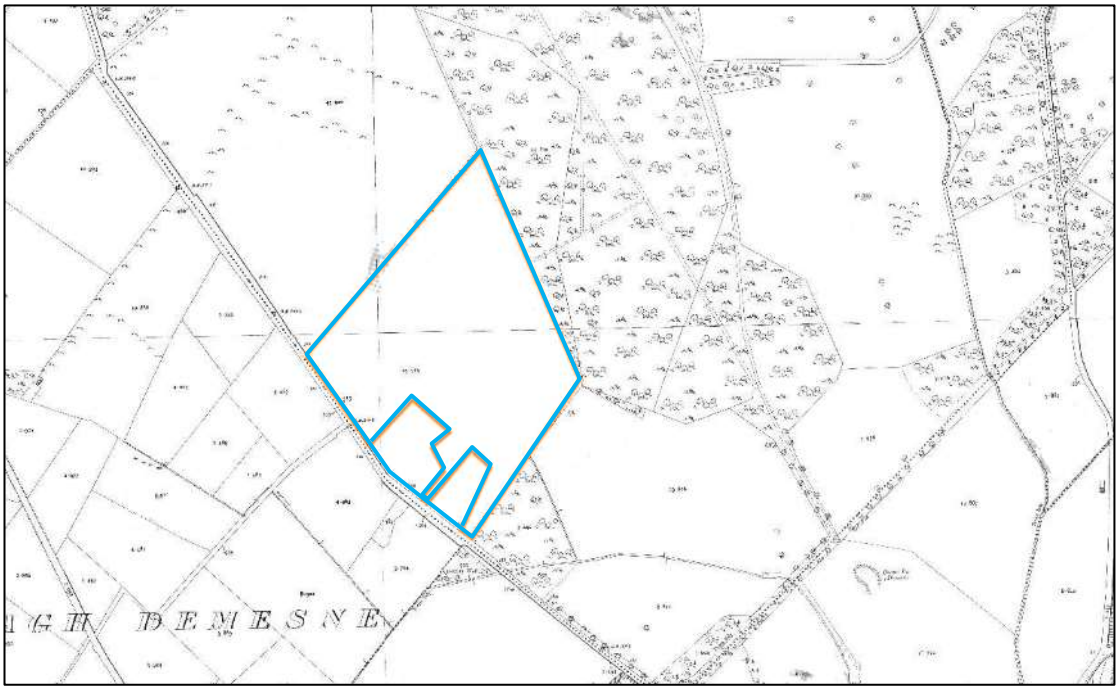
The 1st edition Ordnance Survey Map of the area in which the development is proposed to take place depicts a field system enclosed by hedgerows, roads and parkland/woodland. The development area is historically shown as being located in Creagh Demesne. The south-eastern edge of the development area follows the historic townland boundary between Creagh Demesne and Gorey Corporation Lands. To the south-west the development area is bordered by a road, and to the north-west there are further fields (Figure 13.8).

On its north-east the development area is bordered by the townland of Ramsfortpark Demesne and its associated parks/woodland. Though there seems to be a field boundary line between Ramsfortpark/forest and the development area, some of the woodland does extend into the north-eastern sections of the development area.

In modern times the townland electoral division boundary between Ramsfortpark and Creagh Demesne was moved westwards so as to be aligned with the Fort Road, meaning that the development area is now located in the townland of Ramsfortpark/Ballowen (Figure 13.11).

No architectural heritage features or archaeological monuments are depicted within the development area, though a ritual well (WX007-032) “Boiling Well” is shown located just outside the southernmost corner of the site.

Figure 13.9 – 1888-1913 edition 25" Ordnance Survey Map.

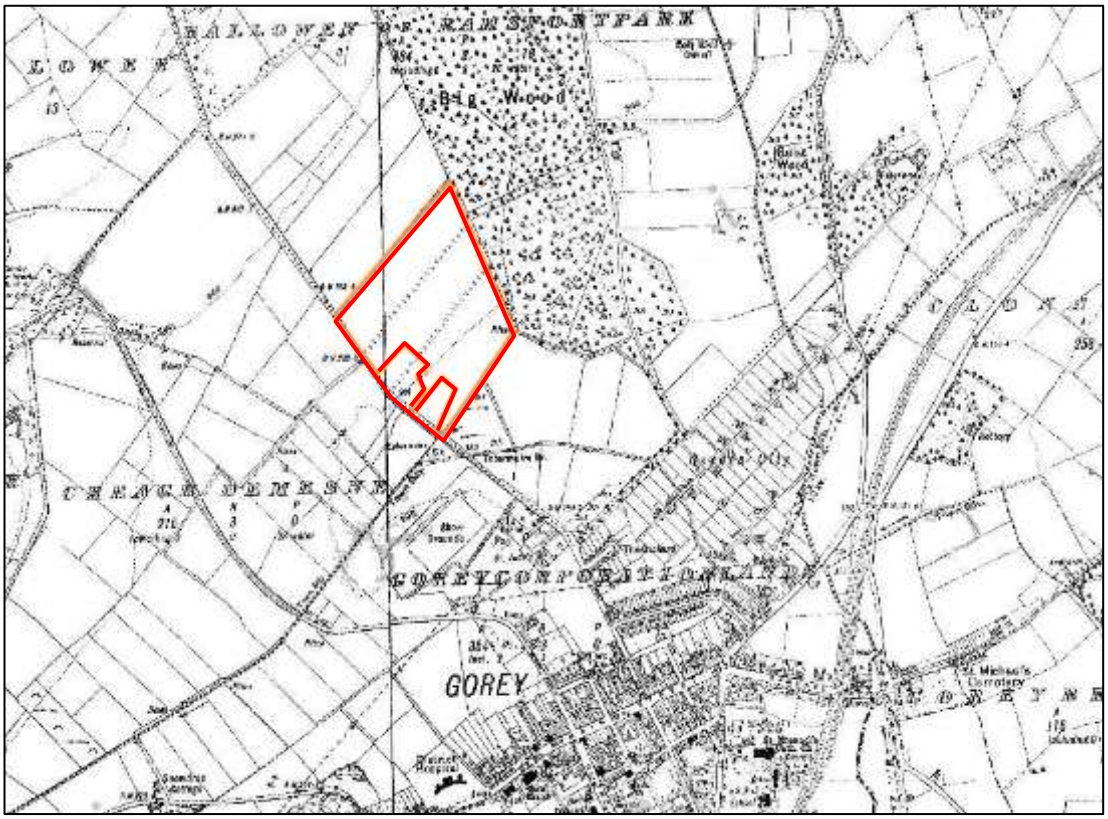


Note: Development area in blue (OSI Licence EN 0077918).

The 1888-1913 edition 25" Ordnance Survey map and the 6" Cassini maps, show the changing of field boundary lines within the development area. The woodland previously shown on the 1st edition Ordnance Survey map (1837-43) as extending from Ramsfortpark into north-eastern sections of the proposed development area has been cleared, providing a more obvious boundary line (Figures 13.9 & 13.10). There is no other significant change along the perimeter of the development area.

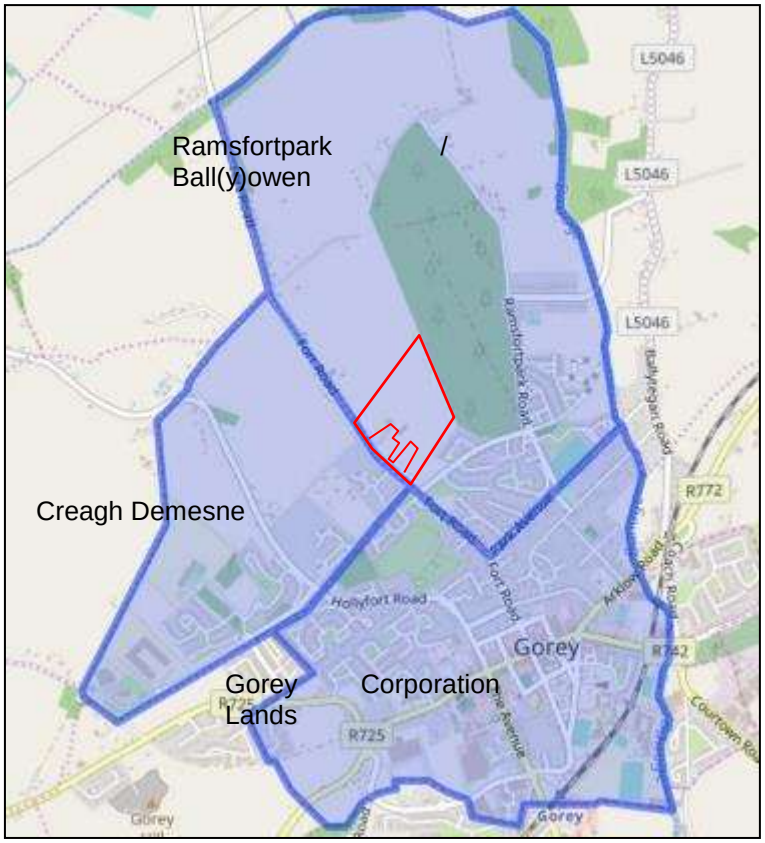
There are no structures within the development area and no new structural features of note within the immediate proximity.

Figure 13.10 – 1940's Ordnance Survey of Ireland 6" Cassini Map.



Note: D*evelopment area in red*, (OSI Licence EN 0077918).

Figure 13.11 – Modern townland boundaries map



Note: D*evelopment area in red*; showing a realignment of the historical boundaries (www.townlands.ie © OpenStreetMap)

Satellite Imagery and Aerial Photography

Analysis of satellite imagery and aerial photography is valuable in identifying archaeological features by the presence of 'cropmarks', 'shadow-marks' or 'soil-marks' which may represent the presence of earlier structures.

While no archaeological features are identifiable in aerial images of the site, the images do show the modern use and development of the site. The south/south-eastern half of the site is covered by an industrial/commercial complex (Walsh Mushrooms); still active on the 2005 aerial photo (Figure 13.12), but seemingly abandoned and partially demolished by 2011/13 (Figure 13.13). The north/north-western half of the site is shown to be in continued use as farming land.

In spite of the addition of the internal industrial complex and significant development outside the proposed site, particularly to the south and south-east, the external boundary lines of the proposed development area have not noticeably changed since the 1830's.

Figure 13.12 – Ordnance Survey of Ireland 2005 Aerial Photograph of development area.

Note: Development area in red, (OSI Licence 0077918)

Figure 13.13 – Aerial Image of the development area.

Note: Development area *in orange*; c.2011-2013 (digital globe @ geohive.ie)

Figure 13.14 – Ordnance Survey of Ireland, Aerial Photograph of the development area.

Note: Development area in red. (OSI Licence 0077918).

13.3.8 Site Description and Field Inspection

The site investigation was undertaken by Michael Greiner of Shanarc Archaeology on Wednesday, 20th December 2017. Weather conditions were overcast with a light misty drizzle. The proposed development site is located on land which is currently in use for agricultural purposes. For the most part the site perimeter follows exactly the lines of existing field boundaries.

The site terrain is relatively even, with occasional light undulations. There is a slight but steady fall towards the south-east. The site can be approximately divided in half, with the northern half consisting of an agricultural greenfield site, and the southern half consisting of a brownfield site housing the demolished remains of a former demolished 'Walsh Mushrooms' industrial complex.

Northern greenfield area of site

Other than the remains of a field boundary separating the northern and southern halves of the site, there are no other visible internal features within the northern area of the site.

Plate 13.1: Overview of northern greenfield area of site; looking east.

Plate 13.2: Overview of northern greenfield area of site; looking north-east.

Plate 13.3: Overview of northern greenfield area of site; looking south-east.

Plate 13.4: Overview of northern greenfield area of site; looking south.

To the south-west the site is bordered by the north-west to south-east orientated Fort Road, and to the north-west it adjoins further agricultural fields. Both the south-west and north-west field boundaries consist of low earthen banks topped by mature deciduous trees and heavily overgrown with bramble. In some places there are the remains of post and wire fences. Along the inside of these field boundaries is a 3-5m wide strip of low bramble and fern scrub.

Plate 13.5: North-western edge of site, looking north-east.

Plate 13.6: North-western edge of site, looking north-east.

Plate 13.7: North-western field boundary, looking north-west.

On its north-eastern edge the site is bordered by Ramsfortpark forest, a mixed but predominantly coniferous forest. The field boundary on this side consists of a post and wire fence with a line of moderately mature trees; principally holly and oak with occasional birch; this field boundary is itself separated from Ramsfortpark forest by a gravel footpath.

At the extreme south-east of the site, this field boundary has an additional large internal drainage ditch approximately 4m wide and 2-3m deep, with an internal bank measuring 2-3m wide and 1-1.5m in height.

Plate 13.8: Northern half of site; looking north-east towards north-eastern field boundary

Plate 13.9: North-eastern field boundary, looking south-east.

Plate 13.10: North-eastern boundary, looking north-east.

Plate 13.11: Internal drainage ditch and earth bank at south-east end of north-eastern boundary.

Plate 13.12: Remains of field boundary between northern green field and southern brown field areas of the site, looking south-west.

On its southern edge the northern green field area of the site is bordered by a demolished former industrial site / Walsh Mushrooms. The field boundary between the northern green field and southern brown field areas of the site has largely been removed, but were extant it consists of a very low earth bank with a post and wire fence and occasional scrub and small trees; principally willow with a small number of young oaks.

Plate 13.13: Field boundary between northern green field and southern brown field areas of the site; looking south-west

Southern brownfield area of site

The southern half of the development area consists of a previous industrial brownfield site, formerly 'Walsh Mushrooms' mushroom farm; the ground within this area differs significantly from the greenfield areas of the northern portion of the site. The ground in this area of the site has been heavily disturbed as a result of construction and landscaping work during the site's previous use as an industrial mushroom farm. Much of the visible surface consists of overgrown stone/hard-core, and there are frequent large mounds of stone, earth and rubble some of which are overgrown; these are presumably the results of previous ground clearance as well as site demolition work. There are several areas of concrete paving, and numerous exposed concrete foundations and structural remains. There is evidence of extensive dumping and the burning of scrub and rubbish.

Plate 13.14: South-eastern corner of site, looking south; showing burnt area and several mounds of earth/rubble.

Plate 13.15: Large overgrown mound of earth, stone and rubble at south-east of site, looking south.

Plate 13.16: Overview of southern brownfield area of site; looking east.

Plate 13.17: Overview of southern brownfield area of site; looking north.

Plate 13.18: Central area of brownfield site; looking south-west.

Plate 13.19: Eastern area of brownfield site; looking south-west.

Plate 13.20: Overview of brownfield area; looking south-east.

Plate 13.21: Overview of brownfield area; looking south.

Plate 13.22: Remains of concrete road, flanked by ornamental hedge & leading to site entrance within brownfield area; looking west.

Vegetation within the southern brownfield area of the development site consists primarily of dense ground covering moss with patches of grass and frequent reeds/rushes; there is occasional willow scrub and occasional furze. The eastern most section of the site is covered in dense low bramble.

Plate 13.23: Stone hard-core surface densely covered in moss, with furze and willow in background; looking north.

Plate 13.24: Dense low bramble covering south-eastern area of site; looking south-east.

To the south-west the site is bordered by the NW-SE orientated Fort Road; which correlates with the modern realigned townland boundary between Ramsfortpark and Creagh Demesne. The site boundary of the brownfield area on this side consists of security fencing with a low external hedge.

Plate 13.25: Security fencing along south-west perimeter of brownfield site; looking south.

On its eastern/north-eastern edge the brownfield area of the site is bordered by Ramsfortpark forest, a mixed but predominantly coniferous forest. The field boundary on this side consists of a post and wire fence with a line of moderately mature trees; principally holly and oak with occasional birch; this field boundary is itself separated from Ramsfortpark forest by a gravel footpath.

Inside of this field boundary there is an additional large drainage ditch approximately 2m-6m wide and 3-4m deep, with an internal bank measuring 2-3m wide and 1-1.5m in height.

The southern-most sections of this boundary correlate with the historic meeting point of three townland boundaries Creagh Demesne **(AP6)**, Ramsfortpark **(AP7)** and Gorey Corporation Lands.

Plate 13.26: East/north-east boundary of brownfield site; looking south-east.

Plate 13.27: South-eastern boundary of brownfield site; looking north-east.

The south-eastern site boundary correlates with the historic townland boundary **(AP6)** between Gorey Corporation Lands and Ramsfortpark.

The current site boundary consists of the remains of a post and wire fence and a hedge of mature cedars interspersed with brushwood and small native trees. Immediately outside the wire fence is a shallow narrow ditch/gully flanked on either side by a low earth bank; this is most likely the remains of the former townland boundary **(AP6).** The ditch becomes deeper towards the north-east, where it joins the drainage ditch on the boundary towards Ramsfortpark forest.

Plate 13.28: Narrow ditch and banks just visible outside wire fence at south-east of site; looking east.

Plate 13.29: Narrow ditch and banks just visible outside wire fence at south-east of site; looking south-west.

Plate 13.30: Deeper section of south-eastern boundary ditch, just prior to joining point with Ramsfortpark boundary drainage ditch; facing north-east.

No previously unrecorded features of archaeological interest were noted during the site inspection; neither within the northern greenfield or the southern brownfield areas of the proposed development.

13.3.9 Toponomy

A townland name may preserve valuable information relating to its archaeology, history, folklore, pervious ownership, topography or land use. Many placenames were anglicised by the Ordnance Survey which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable.

The proposed development is located in the modern townland of Ramsfortpark (also known as Ballowen/Ballyowen) in the Barony of Gorey, were it borders the townlands of Creagh Demesne to the west, and Gorey Corporation Lands to the south. Historically the development area was located in the townland of Creagh Demesne (Figure 13.8); however the modern townland boundary between Ramsfortpark and Creagh Demesne was moved west so as to be aligned with the Fort Road; meaning the development area now lies in Ramsfortpark townland (www.townlands.ie).

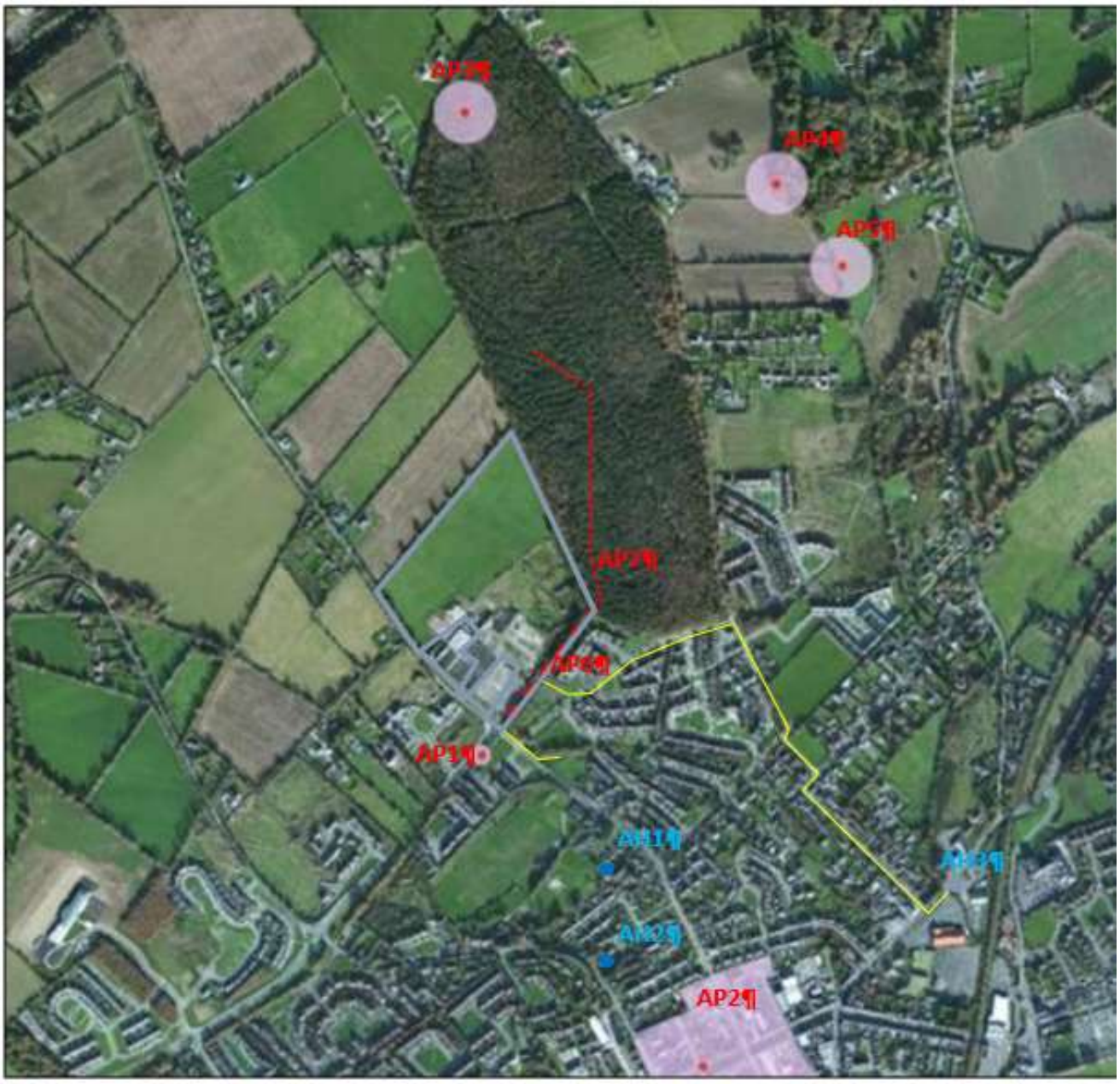
Creagh Demesne is known in Irish as Diméin na Craobhaí. While the term Demesne is commonly defined as a portion of land attached to a manor and retained by the owner for their own use, the word Creagh is somewhat more difficult to define. The Irish term for Creagh "Craobhaí/Chraobhach" most likely translates to branches or branched; when combined with demesne it suggests wooded parkland, perhaps suggesting an association with the extensive Ramsfort parklands to the east. (www.logainm.ie, & www.teanglann.ie, accessed 28 November 2017).

The townland of Ramsfortpark derives its name from the Ram family name, and the extensive parklands surrounding their residence at Ramsfort House (NIAH: 15700711). The fort element of the name is somewhat less defined. While Gorey did originally have a fort at an unidentified location it would be pure conjecture to suggest it was located in this area; a more likely possibility is that the fort in the townland name stems from the small rath (WX007-017) located within the townland. Ramsfortpark is also sometimes referred to as Ballowen from the Irish "Bhaile Eoghain" (Baile *'townland, town, homestead'* of *Eoin/Eóghan*). It is possible that this was the original townland name prior to the development of the area into parkland by the Ram family.

13.3.10 Inventory of Architectural Heritage Sites and Area of Archaeological Potential

The following inventory details all identified sites of heritage significance within a 600m radius of the proposed development. It consists of two architectural heritage sites **(AH1 and AH2)** and seven areas of archaeological potential (**AP1, AP2, AP3, AP4, AP5, AP6 and AP7**). An additional architectural heritage site **(AH3)** is located 850m to the south of the site, but within 10m of the termination point of the proposed storm-water and sewer lines (Figure 13.15) to be constructed outside the primary development area. Entries provide locational information, a description of each site, an outline of the potential impact of the development, and recommendations towards the mitigation of this impact.

Figure 13.15 – Location of identified sites within 600m of the development area.



Note: Development outlined in blue. Also showing additional Architectural Heritage site AH3 located 850m from site but within 10m of proposed storm-water/sewer pipelines (yellow line).

Table 13.8 – Inventory of Architectural Heritage Sites

SITE AH1	**Figure 13.15**
TOWNLAND	Gorey Corporation Land
COUNTY	Wexford
GRID REFERENCE	715135, 660013
IDENTIFICATION	Extant, RPS
SITE TYPE	House
SITE NAME	St. Anne's, Fort Road, Gorey
NATIONAL INVENTORY OF ARCHITECTIRAL HERITAGE REF. NO.	-
RECORD OF PROTECTED STRUCTURES REF. NO.	WCC0224
REFERENCES	Gorey Local Area Plan 2017-2023
PROXIMITY	400m to the SSE of the development area
DESCRIPTION -	

SITE AH2	**Figure 13.15**
TOWNLAND	Gorey Corporation Land
COUNTY	Wexford
IDENTIFICATION	Extant, Cartographic
GRID REFERENCE	715124, 659841
SITE TYPE	House
SITE NAME	Mayfield, North Parade, Gorey, County Wexford
NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE REF. NO.	15601024
RECORD OF PROTECTED STRUCTURES REF. NO.	WCC0259
REFERENCES	www.buildingsofireland.ie
PROXIMITY	500m to the SSE of the development area

DESCRIPTION
Dated 1842 – 1901. Detached three-bay two-storey medical officer's house, occupied 1901, on a square plan with three-bay two-storey side elevations. Hipped slate roof on a U-shaped plan with clay ridge tiles, paired red brick Running bond central chimney stacks having stringcourses below capping supporting terracotta or yellow terracotta pots, and replacement uPVC rainwater goods on rendered eaves. Creeper- or ivy-covered rendered, ruled and lined walls. Square-headed central door opening with chamfered timber mullions on step threshold supporting chamfered timber transom, and concealed dressings framing timber panelled door having sidelights on panelled risers below overlight. Square-headed window openings with cut-granite sills, and concealed dressings framing one-over-one timber sash windows. Interior including (ground floor): central hall retaining carved timber surrounds to door openings framing timber panelled doors; and carved timber surrounds to door openings to remainder framing timber panelled doors with timber panelled shutters to window openings. Set back from line of street in landscaped grounds with rendered chamfered piers to perimeter having "Cyma Recta"- or "Cyma Reversa"-detailed pyramidal capping supporting cast-iron double gates.

APPRAISAL
A house representing an integral component of the late nineteenth-century domestic built heritage of Gorey with the architectural value of the composition suggested by such attributes as the compact, near square plan form centred on a restrained door case; and the slight diminishing in scale of the openings on each floor producing a feint graduated visual impression. Having been well maintained, the elementary form and massing survive intact together with substantial quantities of the original fabric, both to the exterior and to the interior where contemporary joinery; Classical-style chimneypieces; and sleek plasterwork refinements, all highlight the modest artistic potential of a house having historic connections with a succession of medical officers assigned to Gorey

District Poor Lawn Union including Francis Nolans (1870-1922), 'Medical Practitioner' (NA 1901; cf. 15601016); and Eugene G. Connolly MD (Irish Medical Directory and Hospital Yearbook 1950, 39).

SITE AH3	**Figure 13.15**
TOWNLAND	Gorey Corporation Lands
COUNTY	Wexford
IDENTIFICATION	Extant, Cartographic
GRID REFERENCE	715778, 659986
SITE TYPE	Bridge
SITE NAME	Bridge
NATIONAL INVENTORY OF ARCHITECTURAL HERITAGE REF. NO.	15601038
RECORD OF PROTECTED STRUCTURES REF. NO.	-
REFERENCES	www.buildingsofireland.ie
PROXIMITY	<10m
DESCRIPTION Bridge (1700 – 1840); located on road outside Lidl supermarket. Single-arch road bridge over river, extant 1840. Part creeper- or ivy-covered coursed rubble stone walls with overgrown rubble stone coping to parapets. Single elliptical or segmental arch with granite ashlar voussoirs centred on cut-granite keystones. Sited spanning the Banoge River with unkempt banks to river. APPRAISAL A bridge representing an integral component of the civil engineering heritage of Gorey with the architectural value of the composition suggested not only by the silver-grey granite dressings demonstrating good quality workmanship, but also by the elegant "sweep" of the arch making a pleasing visual statement at a crossing over the stream-like Banoge River.	

Table 13.9 – Inventory of Area of Archaeological Potential

SITE AP1	**Figures 13.15**
TOWNLAND	Gorey Corporation Lands
CIVIL PARISH	Kilmakilloge,
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	714900, 660227
IDENTIFICATION	Cartographic, RMP
SITE TYPE	Ritual site - holy well
RECORD OF MONUMENTS & PLACES NO,	WX007-032
ZONE OF ARCHAEOLOGICAL POTENTIAL NO,	R146431
RECORD OF PROTECTED STRUCTURES REF. NO.	-
PROXIMITY	100m S of the development area.
DESCRIPTION Described as a 'Boiling Well' on the 1839 ed. of the OS 6-inch map and as ‘Tobermuire - Mary's Well’ on the 1940 ed. Situated at the bottom of a SE-facing slope, it is the source of a stream that runs off to the SW, but no well structure is visible. There is no physical evidence of veneration but it had been resorted to for eye ailments, although this had been long discontinued by 1940 (OSFM). Archaeological testing (05E0901) in the vicinity produced evidence of a brickworks in the area just N of the Holy well. There is no record of a brick works here, and it is presumably 18th or 19th century in date. (Delaney 2008, Moore 1996/2012)	

SITE AP2	Figure 13.15
TOWNLAND	Gorey Corporation Lands
CIVIL PARISH	Kilmakilloge,
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	715315, 659643
IDENTIFICATION	Cartographic, Extant
SITE TYPE	Historic town
RECORD OF MONUMENTS & PLACES NO,	WX007-033
ZONE OF ARCHAEOLOGICAL POTENTIAL NO,	R146414
RECORD OF PROTECTED STRUCTURES REF. NO.	-
PROXIMITY	600m+. The Zone of Archaeological Potential associated with the historic town of Gorey, begins 600m to the S of the development area.
DESCRIPTION There may have been a settlement at Gorey in the thirteenth century as a payment of 13 shillings was made by 'the community of the town (ville) of Gorey' in 1296, but nothing further is known until the 17th century when Gorey emerges a planned town, part of the early 17-century plantation of north county Wexford. It received its first charter in 1619 as Newtown or Newborough. Bishop Ram, the Protestant bishop of Ferns lived at Gorey. The town was captured by Rebels in 1641. The town was laid out on a grid pattern covering c. 14 acres (c. 5.5 ha), and it might never have been defended with a wall, although there are passing references to ramparts in the early 18th century. Main Street runs ENE-WSW through the centre of the original town area, which extends from Pearse St. at N to Church Lane at S, The Avenue at W to Church St. at E. The graveyard and church site (WX007-033001-) with the Ram tomb (WX007-03303-) are within the town. Archaeological testing within the town has yet to produce any related material. (Bradley and King 1990, 88-91; Hore 1900-11, vol. 6, 609-34) The above description is derived from the published 'Archaeological Inventory of County Wexford' (Dublin: Stationery Office, 1996/Moore, 1996).	

SITE AP3	Figure 13.15
TOWNLAND	Ballowen or Ramsfortpark
CIVIL PARISH	Kilmakilloge,
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	714869, 661434
IDENTIFICATION	Cartographic
SITE TYPE	Rath
RECORD OF MONUMENTS & PLACES NO.	WX007-017
ZONE OF ARCHAEOLOGICAL POTENTIAL NO,	R146446
RECORD OF PROTECTED STRUCTURES REF. NO.	-
PROXIMITY	600m to N of development area
DESCRIPTION Marked only on 1940 ed. of the OS 6-inch map, and situated on an E-facing slope. This is a circular area (diam. 21m) defined by low earthen bank (Wth 3.5-4m; int. H 0.4m; ext. H 0.4-1m) and outer fosse (Wth of base 1.2m; D 0.4-0.6m). There is no visible entrance, and it is within a coniferous forest. The above description is derived from the published 'Archaeological Inventory of County Wexford' (Dublin: Stationery Office, 1996). In certain instances the entries have been revised and updated in the light of recent research (Moore, 1996/2012).	

SITE AP4	Figure 13.15
TOWNLAND	Ballowen or Ramsfortpark
CIVIL PARISH	Kilmakilloge,
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	715454, 661300
IDENTIFICATION	Cartographic
SITE TYPE	Burial Ground
RECORD OF MONUMENTS & PLACES NO.	WX007-018
ZONE OF ARCHAEOLOGICAL POTENTIAL NO,	R146442
RECORD OF PROTECTED STRUCTURES REF. NO.	-
PROXIMITY	600m to the NE of the development area
DESCRIPTION Described as 'Site of Grave Yard' in italic script on the 1839 ed. of the OS 6-inch map where it is depicted faintly as an oval area (dims. c. 40m E-W; c. 25m N-S), which was described by J. O' Donovan c. 1840 as destroyed and forgotten (O'Flanagan 1933, vol. 1, 11). Situated at the crest of a slight S-facing slope in a low-lying landscape. There are local traditions of the graveyard, but no feature is visible at ground level in pasture. A holy well (WX007-018----) is located c. 200m to the SSE. The above description is derived from the published 'Archaeological Inventory of County Wexford' (Dublin: Stationery Office, 1996).	

SITE AP5	Figure 13.15
townland	Ballytegan Park
CIVIL PARISH	Kilkavan
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	715577, 661144
IDENTIFICATION	Cartographic
SITE TYPE	Ritual site - holy well
RECORD OF MONUMENTS & PLACES NO.	WX007-019
ZONE OF ARCHAEOLOGICAL POTENTIAL NO,	R146439
RECORD OF PROTECTED STRUCTURES REF. NO.	-
PROXIMITY	600m to the NE of the development area
DESCRIPTION Described as a Holy Well on the 1839 ed. of the OS 6-inch map and as the site of a holy well on the 1940 ed. It is situated in a low-lying landscape with a N-S stream immediately to the W. It is not visible at ground level (Moore, 1996/2012).	

SITE AP6	Figures 13.15
TOWNLAND	Creagh Demesne, Ramsfortpark, & Gorey Corporation Lands
CIVIL PARISH	Kilnahue & Kilmakilloge,
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	714998, 660384
IDENTIFICATION	Cartographic
SITE TYPE	Historic/former townland and civil parish boundary
RECORD OF MONUMENTS & PLACES NO.	-
RECORD OF PROTECTED STRUCTURES REF. NO.	-

PROXIMITY	0m. The historic townland and civil parish boundary forms the entire south-eastern boundary of the proposed development.
DESCRIPTION The historic boundary between the townlands of Creagh Demesne and Gorey Corporation Lands is depicted on the 1837-43 first edition 6" OS map (Figure 13.8,). The former is situated within the civil parish of Kilnahue and in the barony of Gorey, while the latter is situated within the civil parish of Kilmakilloge, and in the barony of Gorey. The modern townland boundaries have been moved and realigned (Figure 13.11). Surface traces of an earth-cut ditch, or a similar earthwork that marked this boundary, may survive. For this reason, the townland boundaries are considered an Area of Archaeological Potential. Townland boundaries should have an exclusion zone ideally 5m in width.	

SITE AP7	Figures 13.15
TOWNLAND	Creagh Demesne & Ramsfortpark
CIVIL PARISH	Kilnahue & Kilmakilloge,
BARONY	Gorey
COUNTY	Wexford
GRID REFERENCE	715082, 660586
IDENTIFICATION	Cartographic
SITE TYPE	Historic/former townland and civil parish boundary
RECORD OF MONUMENTS & PLACES NO.	-
RECORD OF PROTECTED STRUCTURES REF. NO.	-
PROXIMITY	0m-100m to the E of the development area. The historic townland and civil parish boundary forms part of the east/north-eastern boundary of the overall proposed 2 site development
DESCRIPTION The historic boundary between the townlands of Creagh Demesne and Ramsfortpark is depicted on the 1837-43 first edition 6" OS map (Figure 13.8,). The former is situated within the civil parish of Kilnahue and in the barony of Gorey, while the latter is situated within the civil parish of Kilmakilloge, and in the barony of Gorey. Historically the easternmost corner of the development area coincides with the meeting point of the townland boundaries of Creagh Demesne to the west, Ramsfortpark to the north-east and Gorey Corporation Lands to the south (Figure 13.8). The modern townland boundaries have been moved and realigned and the discussed area is now completely within the townland of Ramsfortpark (Figure 13.11). Surface traces of an earth-cut ditch, or a similar earthwork that marked this boundary, may survive. For this reason, the townland boundaries are considered an Area of Archaeological Potential. Townland boundaries should have an exclusion zone ideally 5m in width.	

13.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed scheme comprises the development of 297 residential dwellings and an associated childcare facility on a site of 9.57 hectares at Ballyowen / Ramsfortpark, Gorey, Co Wexford. The proposal includes units in a variety of house sizes, types and designs, with corner sites defined by small (2- 3 unit) apartment/duplex blocks. The site forms part of the Creagh Key Development Site, with the layout based on the urban block typology, all as referenced under the Gorey Town & Environs Local Area Plan 2017-2023. The site layout and arrangement of buildings is also generated by the sloping topography of the site and the intended landscape strategy.

The proposed development project shall comprise 297 dwellings, consisting of 232 two, three, four and five bedroom houses and 65 two and three bedroom apartments and duplexes. The dwellings are arranged in a wide variety of units of both two and three storeys, depending on their location and its relationship to the urban setting.

The design of the development has been closely based on the precepts and specific layout indicated under the Gorey Town & Environs Local Area Plan 2017-2023, which identifies the Creagh locale as a Key Development Site. In particular, the residential layout is based on twelve distinct urban blocks, each of which includes a variety of unit types and sizes, which provide both choice of location and accommodation. This approach also facilitates the permeability that is missing from many traditional housing estates, which are 'hermetically' sealed off from their surroundings, inhibiting the connectivity that enables pedestrians and cyclists to travel safely in and around the town.

The western edge of the site contains the two main vehicular entrances, as well as pedestrian entrances from the Fort Road, leading to the town centre and schools established on Creagh Avenue. The southern boundary is shared with the existing Ashwood Grove/Willow Park development, linked through the landscape spaces and pedestrian/cycle access. The eastern boundary connects through the central landscape place into Ramsfortpark Forest, while the northern boundary includes a primary road/pedestrian/cycle links into the adjacent site. Gorey Town Park is situated immediately to the south of the site.

The proposal also includes connecting the subject site to the public sewer network which requires trenching works along the public road (Figure 13.3). The proposed sewer and storm-water drains will be located to the south of the site; with the principle line following the road to the north of Willow Park, and south of Ashwood Grove eastwards before turning south on Ramsfort Avenue and Garden City, and finishing on the Arklow Road approximately opposite Lidl supermarket; this trench will have a total length of approximately 1.1km. A second shorter pipeline will be located on the Fort Road, running south-east for approximately 100m from the southern corner of the site.

13.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

13.5.1 Construction Phase

Ground reductions associated with a development of this kind have the ability to uncover and disturb hitherto unrecorded sub-surface features, deposits, structures and finds of archaeological interest and potential. Besides the historic townland boundaries (AP6 & AP7; Table 13.9) no known archaeologically significant sites or features are located directly within the proposed development area, and no new features of archaeological potential were noted from a study of cartographic and aerial photographic sources or during field inspections of the site. However, there remains the possibility that subsurface archaeological features or material may exist within the proposed development area

A total of nine heritage sites, two of Architectural Heritage and seven areas of Archaeological Potential, were identified within 600m proximity to the proposed development area; with an additional Architectural Heritage site being located in proximity to proposed drainage pipes 850m to the south-east of the site. These are illustrated in Figure 13.15 and the potential impact on each site is discussed in chapter 13.6.

13.5.2 Operation Phase

The proposed residential development site is confined within existing field boundaries, and all known areas of archaeological potential are located a substantial distance outside these boundaries. In some instances a development may change the surroundings of a heritage asset, thus impacting on its significance; this typically occurs in the form of visual impacts. However in this instance all recorded Archaeological and Architectural Heritage sites are separated from the development area either by Ramsfortpark Forest or by existing developments, which in turn will not be effected or altered by the proposed development. Therefore the operational phase of this proposed site within its larger development area is not predicted to impact upon any areas of cultural heritage significance.

13.5.3 Potential Cumulative Impact

The study area includes both the ‘*’Creagh Housing”* mixed residential development and the associated adjoining Community and Education development zoned lands and residential lands to the north (under separate ownership) which will form part of a separate future planning application.

Discussion of Impacts

AH1 & AH2: St. Anne’s and Mayfield houses.

Due to their substantial distance of 400m-500m from the development area, and their relative positions within previously built-up residential estates no direct or indirect impacts are predicted for St. Anne’s house (AH1) or for Mayfield house (AH2), as a result of the proposed development.

AH3: Bridge

This bridge is located approximately 850m from the development area, however it is located less than 10m from the termination point of the proposed storm-water and sewer pipelines that will link the development to existing services. Any excavations directly at the bridge may result in a direct negative impact to this historic structure.

AP1: Ritual Well/Holy Well

A Ritual/Holy Well (WX007-032) (AP1) shown as the ‘Boiling Well’ on the 1st edition OS maps (Figure 13.8), and as ‘Tobermuire/Marys Well’ on the 1940’s 6” Cassini map (Figure 13.10), is located 100m to the south/south-west of the development area. This site is located within the landscaped grounds within a neighbouring residential estate. Due to its location no direct impact with the well/spring is predicted; however excavations in 2005 produced evidence of a brickworks in the area just north of the Holy well (Delaney, F., 2005/2008), and there is a slight possibly that related material may extend into the southernmost section of the development area.

AP2: Gorey historic town

The zone of Archaeological Potential (AP2) associated with the historic town of Gorey has its northernmost perimeter approximately 600m to the south of the development area (Figure 13.12). This site (AP2) is separated is separated from the development area by numerous modern residential and commercial developments. No direct or indirect impacts are predicted as a result of the proposed development.

AP3-AP5: Rath, Burial-ground and Holy Well

A rath (WX007-017) (AP3), a burial-ground (WX007-018) (AP4) and a ritual well (WX007-019) (AP5) are all located 600m to the north and north-east of the development area (Figure 13.12). These sites are separated from the development area by Ramsfortpark forest; which will not be impacted by the development. Due to their distance from the development area no direct or indirect negative impact is predicted for these three sites.

AP6: Historic Townland/Civil Parish Boundary

The former townland and civil parish boundary between Creagh Demesne (Kilnahue civil parish, barony of Gorey) and Gorey Corporation Lands (Kilmakillogue civil parish, barony of Gorey), shown on the 1st edition Ordnance Survey maps forms the south-eastern edge of the proposed development area running SW-NE from the development areas most southerly point at the Fort Road, to its most westerly point at Ramsfortpark forest (Figure 13.8). This may preserve a Gaelic *tuath* territorial boundary. A ditch would have originally marked this boundary and its vestiges may be apparent in the existing field boundary. The pre-construction phase of work on the site includes the proposed removal of a number of large non-native trees along this boundary line, while a potential southern access and cycle lane have also been proposed. Any excavation work carried out along the south-eastern boundary line of the site will have a direct impact upon any remains of AP6 which may exist both above ground and sub-surface. The worst case effect of this would be a permanent and irreversible effect as the archaeological deposit or feature will have been removed, however with mitigation the feature would be recorded or protected.

AP7: Historic Townland/Civil Parish Boundary

The former townland and civil parish boundary between Creagh Demesne (Kilnahue civil parish, barony of Gorey) and Ramsfortpark/Ballowen (Kilmakillogue civil parish, barony of Gorey), shown on the 1st edition Ordnance Survey maps is located at the eastern most corner of the development site; this area forms the point where the townland boundaries of Creagh Demesne, Ramsfortpark and Gorey Corporation Lands join (Figure 13.8). This may preserve a Gaelic *tuath* territorial boundary. A ditch would have originally marked this boundary and its vestiges may be apparent in the existing field boundary. The construction phase of this work will have a direct impact upon any remains that may exist due to its close proximity. The worst case effect of this would be a permanent and irreversible effect as the archaeological deposit or feature will have been removed, however with mitigation the feature would be recorded or protected.

13.5.4 Impact Categorisation

The predicted impacts of the proposed development on the nine heritage sites, two of Architectural Heritage and seven of Archaeological Potential, are detailed in Table 13.10.

Table 13.10 – Impact Categorisation

Site No.	Nature of Impact	Type and Quality	Impact Level
AH1	St. Anne's (House), Fort Road, Gorey (RPS: WCC0224)	No predicted impact	None
AH2	Mayfield (House), Hollyfort Road, Gorey (RPS: WCC0259 / NIAH: 15601024)	No predicted impact	None
AH3	Bridge, Arklow Road, Gorey (NIAH: 15601038)	Potential Direct, negative	Potentially significant
AP1	Ritual site/holy well Known as Boiling Well and as Tobermuire/Marys Well'	No predicted impact	None
AP2	Historic Town, Gorey	No predicted impact	None due to distance
AP3	Rath (WX007-017), Ballowen/Ramsfortpark	No predicted impact	None due to distance
AP4	Burial-ground (WX007-018), Ballowen/Ramsfortpark	No predicted impact	None due to distance
AP5	Ritual site/holy well (WX007-019), Ballyteganpark	No predicted impact	None due to distance
AP6	Townland (Creagh Demesne & Gorey Corporation Lands), and civil parish (Kilnahue & Kilmakillogue), historic boundary	Direct, negative	Potentially significant

Site No.	Nature of Impact	Type and Quality	Impact Level
AP7	Townland (Creagh Demesne & Ramsfortpark), and civil parish (Kilnahue & Kilmakillogue), historic boundary	Direct, negative	Potentially significant

13.6 DO NOTHING SCENARIO

In the case that the development did not proceed, there would be no impact on the local cultural heritage, or on any structure of heritage value. Over a considerable amount of time, and without any conservation being undertaken, the sites referred to above may succumb to a certain level of natural degradation.

13.7 MITIGATION MEASURES

Mitigation measures, both at pre-construction and construction phases, are required to be undertaken in compliance national policy guidelines and statutory provisions for the protection of archaeological and architectural heritage, including the National Monuments Acts 1930 – 2004, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Acts 2000 - 2014.

13.7.1 Avoidance of Impact

Avoidance of direct and indirect impacts upon all cultural, archaeological and architectural heritage sites is preferable with regards to the proposed development. As this is not always feasible due to the nature of the development, pre-, during and post-construction recommendations are offered to provide ameliorative measures when avoidance and preservation *in situ* are not possible. A buffer zone of 5m applied to AP6 and AP7 would mitigate against significant direct impact to these AP's.

13.7.2 Recommendations Prior to Construction

It is recommended that the following measures be undertaken well in advance of the construction phase. This will allow for a satisfactory timeframe in which the mitigation measures can be conducted and the results assessed without causing delays to construction.

Removal of vegetative root systems

Should the removal of vegetative root systems be required, it is recommended that this work be supervised by a suitably qualified archaeologist.

Archaeological Investigations

Archaeological investigations in the form of targeted test trenching in the vicinity of recorded monuments is recommended to further refine the nature, date, extent and significance of the remains present.

This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland. The results of this investigation will determine whether redesign to allow for preservation in situ, full archaeological excavation and/or monitoring are required. The investigation report will include mitigation proposals for dealing with the discovery of archaeological deposits and material during development. This work should be conducted by a suitably qualified archaeologist.

It is envisaged that the following will apply:

i. Should investigation yield evidence of archaeologically significant material or structures, preservation *in situ* may be recommended. Strategies for the *in situ* preservation of archaeological remains are conducted in consultation with the statutory authorities, and may include avoidance, if possible, of the remains during construction, or preservation in situ.

ii. Should investigation yield evidence of archaeologically significant material or structures that cannot be preserved *in situ*, archaeological excavation and recording, to full resolution, is recommended.
iii. Where less substantial archaeology is anticipated, it is proposed that groundworks are monitored by a suitably qualified archaeologist, with the provision for full excavation of any archaeologically significant material uncovered at this time (if an impact cannot be avoided)(see chapter 13.9 on Archaeological Monitoring below).
iv. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

Advance Topsoil Stripping

The proposed development will potentially have a direct impact on any sub-surface architectural or archaeological features or material at the site.

It is recommended that archaeologically-directed topsoil stripping be undertaken across the proposed development site prior to construction. Insertion of machine-excavated test trenches at intervals is an effective method for locating archaeological sites in advance of construction. This allows for resolution in advance of construction, thus minimising potential delays during the construction phase. Should topsoil stripping yield evidence of archaeologically significant material or structures, it is envisaged that the scenario set out in chapter 13.9 Archaeological Investigations would apply.

Architectural Survey

No additional architectural survey is required prior to construction commencing.

13.8 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT

The requirement that an archaeologist be present during the programmes of topsoil stripping will ensure that in the event of archaeological features being uncovered or archaeological artefacts being recovered, appropriate measures can be implemented in consultation with the requisite authorities.

13.9 RESIDUAL IMPACTS

The final or intended impact is that which occurs after the proposed mitigation measures have taken effect as planned' e.g. establishment of tree screening (EPA Guidelines, May 2017, 43). When the recommended mitigation measures are taken into consideration, the level of impact is reduced. The residual impacts of the proposed development are presented in Table 13.11 (Below).

13.9.1 'Do nothing' scenario

In the case that the development did not proceed, there would be no impact on the local cultural heritage, or on any structure of heritage value. Over a considerable amount of time, and without any conservation being undertaken, the sites referred to above may succumb to a certain level of natural degradation.

13.9.2 Worst Case Impact

The 'Worst Case' scenario with regard to archaeology would arise where the development is commenced without the appointment and/or attendance of an archaeologist. In such a scenario, should features or material of archaeological interest be uncovered during topsoil stripping, then it is likely that such might not be noted and recorded. Such a scenario is considered to be unlikely.

Table 13.11 – Residual Impacts

Impact Phase	Cultural, Archaeological or Architectural Heritage Feature/Site/Structure	Impact Type	Impact Level	Mitigation Measure	Residual Impact
Construction	AH1 St. Anne's (House), Fort Road, Gorey (RPS: WCC0224)	No predicted impact, no visual impact.	N/a	N/a	N/a
	AH2 Mayfield (House), Hollyfort Road, Gorey (RPS: WCC0259 / NIAH: 15601024)	No predicted impact, no visual impact.	N/a	N/a	N/a
	AH3 Bridge, Arklow Road, Gorey (NIAH: 15601038)	Potential direct, negative	Potentially significant	Design and appropriate screening of the development from the structure.	Temporary while works are being carried out.
	AP1 Ritual site/holy well Known as Boiling Well and as Tobermuire/Marys Well'	No predicted impact, no visual impact.	N/a	N/a	N/a
	AP2 Historic Town, Gorey	No predicted impact, no visual impact.	N/a	N/a	N/a
	AP3 Rath (WX007-017), Ballowen/Ramsfortpark	No predicted impact, no visual impact.	N/a	N/a	N/a

Impact Phase	Cultural, Archaeological or Architectural Heritage Feature/Site/Structure	Impact Type	Impact Level	Mitigation Measure	Residual Impact
	AP4 Burial-ground (WX007-018), Ballowen/Ramsfortpark	No predicted impact, no visual impact.	N/a	N/a	N/a
	AP5 Ritual site/holy well (WX007-019), Ballytegan park	No predicted impact, no visual impact.	N/a	N/a	N/a
	AP6 Townland (Creagh Demesne & Gorey Corporation Lands), and civil parish (Kilnahue & Kilmakillogue), historic boundary	Direct, negative	Potentially significant	Monitoring and recording of impacted section of the boundary	Permanent impact to the boundary albeit a small section.
	AP7 Townland (Creagh Demesne & Ramsfortpark), and civil parish (Kilnahue & Kilmakillogue), historic boundary	Direct, negative	Potentially significant	Monitoring and recording of impacted section of the boundary	Permanent impact to the boundary albeit a small section.

13.10 ARCHAEOLOGY MONITORING

13.10.1 Recommendations during Construction

Archaeological Monitoring

Based on the results of Advance Topsoil Stripping (see chapter 13.7.2.3), archaeological monitoring of all ground works associated with the development may be recommended, with the provision for full excavation of any archaeologically significant material uncovered at this time.

The development is located within a combination of greenfield and former industrial brownfield site. In addition to the site inspection, aerial photographs were consulted. Nothing of an archaeological nature was noted on these. However, there remains the potential for archaeological features to be present at a very low above ground register, which may not manifest on aerial photography; though none were noted during the archaeological field inspection. There remains the possibility that subsurface unrecorded archaeological remains may be impacted during the development process.

It is envisaged that the following will apply:

i. In the event of archaeological features or material being uncovered during construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.
ii. Should archaeological features or material be uncovered during construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.
iii. This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland.

Post-Construction Recommendations

If in the event that archaeological material is uncovered in the course of the development works it is suggested that an information panel about the findings on the site be erected to inform the public of the investigations on the area. Allowances (financial) should be made to allow for the publication of an article in a peer review journal and a main stream publication like a local newspaper or an archaeological magazine.

PLEASE NOTE: All of the above recommendations are based on maps provided by the client at the time of writing. Should any alterations be made to these design drawings, further assessment may be necessary.

Recommendations are subject to approval by the Department of the Arts, Heritage and Gaeltacht.

13.11 REINSTATEMENT

No reinstatement is necessary from an archaeological or cultural heritage perspective.

13.12 DIFFICULTIES ENCOUNTERED IN COMPILING

No difficulties were encountered in compiling this assessment.

14.0 INTERACTIONS OF THE FORGOING AND CUMULATIVE IMPACTS

14.1 INTRODUCTION

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 Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates.

The purpose of this requirement of an EIAR is to draw attention to significant interaction and interrelationships in the existing environment. John Spain Associates, Planning & Development 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 above, JSA require that a specific section on Interactions is included in each of the environmental topic chapters of the EIAR. This approach is considered to meet with the requirements of Part X of the Planning and Development Act 2000, as amended, and Part 10, and Schedules 5, 6 and 7 of the Planning and Development Regulations 2001-2018.

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 under each topic Chapter by the relevant specialist consultant.

The primary interactions can be summarised as follows:

- Engineering bridge design with biodiversity and archaeology;
- Landscape design, engineering services with biodiversity and archaeology;
- Visual impact with biodiversity;
- Biodiversity with water and soils;
- Noise and vibration and traffic; and
- Air quality and climate and traffic.

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.

14.2 SUMMARY OF PRINCIPAL INTERACTIONS

The following are the interactions anticipated from the proposed development:-

Table 14.1 – Summary of Potential Interactions / Inter-relationships

Subject	Interaction With-	Interactions / Inter-Relationships
Population and Human Health	Climate	The completed development will generate additional emissions to the atmosphere due to 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, as set out in the *Dust Control Management Programme* which include a range of measures such as wheel washes and covering of fine materials will minimise the impact on air quality. 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.
Air Quality	Soils	Exposed soil during the construction phase of the proposed development may give rise to increased dust emissions. However, the implementation of the dust management and dust control measures will ensure that the proposed development will not give rise to the generation of any significant quantities of dust.
Material Assets	Air Quality	The proposed development is located in a semi-rural area, with agricultural activities to the north. The production of dust during construction has a nuisance value and livestock may be at risk to eye irritation from high levels of wind blowing dust particles. Given the proposed mitigation measures for dust control and dust suppression, the potential for dust to impact upon livestock would be considered very low.
Population and 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 moderate, transient and temporary. No significant impacts on the local noise and vibration climate are predicted during the operational phase of the proposed development.

Subject	Interaction With-	Interactions / Inter-Relationships
Population and Human Health	Visual	The extent of interaction in this regard depends on the extent to which the proposed development is visible and, if visible, the extent to which it is considered appropriate or otherwise. The development has been designed in careful reference to the existing development in the area and presents an attractive appearance externally.
Population and Human Health	Biodiversity	The proposed development would result in an increase of human activity in the area, which may impact upon fauna through disturbance, including noise and traffic. However, given the site's proximity to adjacent housing developments and Gorey town, it would be considered that fauna would be somewhat accustomed to the urban environment. Therefore, it is not considered that human activity would result in a significant impact upon biodiversity at the development site. The provision of additional planting and trees associated with the proposed development, together with associated landscape improvements is expected to have a positive beneficial impact upon Population and Human Health including residents in the general locality and the future residents of the proposed development.
	Material Assets	There will be unavoidable localised temporary impacts on the community during the construction phase of the proposed development including increased traffic associated with the construction process. Construction (traffic) Management Plan will be developed to minimise disruption and to accommodate local traffic flows.
Population and Human Health	Land and Soils	There is an interaction between the potential of the underlying bedrock to emit radon and human health and this is dealt with in Chapter 3 Population and Human Health
Water	Biodiversity	A deterioration in water quality in nearby watercourses, which would adversely impact aquatic biodiversity, could occur during the construction phase of the proposed development due to rainwater run-off containing sediments, concrete and hydrocarbon spillages, and during the operational phase due to the discharge of domestic wastewater. 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, the supervision of all concrete works and use of appropriate silt control features where required. 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, as all domestic wastewater would be directed to the Courtown-Gorey Waste Water Treatment Plant for treatment prior to discharge.

Subject	Interaction With-	Interactions / Inter-Relationships
Material Assets Waste	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, as mentioned above, waste would 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, as discussed in the sections above, 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.
Water	Material Assets – Waste Management	There is an interaction between the water environment and waste management as there may be the requirement for removal of contaminated soil off site to a suitable licensed facility to prevent contamination of water. This is dealt with in Chapter 11 Waste Management.

Subject	Interaction With-	Interactions / Inter-Relationships
Material Assets - Waste	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. Water pollution is discussed in Section 11.10.2. During the construction phase, wastes would be segregated and stored in suitably contained waste receptacles at the site compound. This would considerably reduce the potential risk of pollution to soils and water. Waste would be removed from the development on a regular basis, to avoid the accumulation of high waste volumes, which could cause nuisance. 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 and childcare facility 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 – Waste	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. Currently, a portion of the proposed development site is comprised of a “brownfield” area, with leftover rubble and other demolition wastes present. The proposed development would be considered to have a positive impact upon the landscape of the area by converting the derelict and visually unattractive site to a residential area with green spaces, which blends into the surrounding housing developments.

Subject	Interaction With-	Interactions / Inter-Relationships
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 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 and large area of forestry to the east/north-east of the site.
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 adjoining trees 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.

Subject	Interaction With-	Interactions / Inter-Relationships
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.
Noise	Biodiversity	Noise generated during the construction and operational phases of the proposed development has the potential to impact upon 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, which may impact upon fauna within the vicinity of the development. Control and mitigation measures would be implemented to reduce noise, including measures relating to equipment operation and maintenance 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 fauna. The development's operational phase would have no significant impact upon the existing noise environment of the area, given the proximity to adjacent housing developments and Gorey town.

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 west and south, with the town 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 tree cover associated with the development. The long-term effects of the retention and enhancement of existing hedgerows and the planting of new native trees will have a slightly positive effect. Further consultation with the Ecological Consultant will take place at detailed design, implementation and monitoring stages to ensure adherence to best practice and sound ecological principles.
Surface Water / Groundwater	Soils/geology/Waste Management	There is an interaction between the lands, soil and water as the development of the site and particular the linear park. Suds features and finished road levels will manage and control flooding in the vicinity of the lands. There is a close link between soils & geology and water (hydrogeology and hydrology). For example, the erosion of sediments during the construction phase can, if not mitigated result in additional siltation in nearby surface watercourses. Due to this inter-relationship, the impacts discussed in this section will be considered applicable to both the geological water and ecological environment. Impacts on the geological environment will also affect the agricultural environment. The removal of agricultural soils during the proposed construction project is inevitable. 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.
Material Assets	Biodiversity	The proposed development would alter flora cover and the species of fauna supported due to land take and soil disturbance works. This impact would be slight, given that the majority of the existing habitats are modified and of low ecological value.

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 – 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 10, Traffic and Transportation and the geotechnical characterisation of the scheme is considered in Chapter 5, Soils and Geology.
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 in section 10.6.1.
Land and Soils	Material Assets – Waste Management	There is an interaction between soil and waste management as there may be the requirement for removal of contaminated soil off site to a suitable licensed facility. This is dealt with in Chapter 11 Waste Management.
Land and Soils	Water and Groundwater	There is an interaction between land/soils on the site and groundwater, where removal of soil/subsoils can increase groundwater vulnerability and result in sediment run-off. There is also an interaction between land/soils and water where potentially PCB contaminated soils/subsoils could contaminate surface water and groundwater. This is dealt with in Chapter 5 Land & Soils.

14.3 CUMULATIVE IMPACTS

As outlined in Chapter 2 this EIAR where relevant the EIAR also takes account of other development within the area. These impacts have been addressed in the relevant chapters of the EIAR.

To determine traffic impacts in Chapter 10 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. adjacent to the north) as well as the CE zoned lands to the west.

For the noise impact assessment in Chapter 8 the potential noise emissions arising from the proposed development during construction and operation are combined (using cumulative AADT figures from Traffic chapter) with background noise levels (predominantly road traffic) were assessed.

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.

15.0 SUMMARY OF EIA MITIGATION AND MONITORING MEASURES

15.1 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 John Spain 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 Rory Kunz, BA (MOD), MScERM, MAT&CP, Dip EIA Mgmt., Executive Director with John Spain Associates.

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.

15.2 MITIGATION STRATEGIES

15.2.1 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).

15.2.2 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 2.

15.2.3 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.

15.2.4 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.

15.2.5 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).

15.2.6 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.

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.

15.3 PROJECT DESCRIPTION & ALTERNATIVES EXAMINED

15.3.1 Construction Management Strategy

It is envisaged that the development of the lands subject of the proposed development will occur over a 48-54 week period. Given the nature of the project and the need for flexibility to respond to market demand, the development phases are indicative. An Outline Construction Environment Plan has been prepared by Stutec Consulting Engineers, has been reviewed by the relevant EIAR consultants and is included in the SHD application.

Construction Traffic Management Plan

A Construction Traffic Management Plan (CTMP) will be prepared by the main contractor and agreed with the Planning Authority prior to commencement of development in the event of a grant of permission. The main construction access route will be from the Fort Road.

15.4 POPULATION AND HUMAN HEALTH

15.4.1 Construction Phase

15.4.2 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 15 of this EIAR document which summarises all of the remedial and mitigation measures proposed as a result of this EIA.

POP & HH CONST 1:

In order to protect the amenities enjoyed by nearby residents, premises and employees a full Construction Management Plan (including traffic management) should be prepared by the contractor and implemented during the construction phase.

With reference to the construction phase of the proposed development, the objective of the *CWMP prepared by IE Consulting* is to ensure that waste generated during the proposed construction and operation phases will be managed and disposed of in a way that ensures the provisions of the Waste Management Acts 1996 - 2013 are complied with.

An Environmental Management Plan and Construction Health and Safety Plan will be developed to include all aspects of the project. These plans and construction activities must be in agreement with Strutec Ltd. policies such as environmental health and safety requirements for contractors.

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. The route of the sewerage connection, would be subject to a road open licence under Section 254 of the Planning and Development Acts 2000-(as amended) from Wexford County Council. As part of the road opening licence, it is anticipated that a Construction Traffic Management Plan would be agreed with Wexford County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

There will be some short term impacts during the construction phase as the pipes are laid, particularly in respect of traffic management with regards to sensitive receptors. This may cause local short term inconvenience and

disturbance to residents and business 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.

Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used.

With reference to natural disasters (e.g. flooding), the proposed development has undergone a Site Specific Flood Risk Assessment, prepared by IE Consulting. The main area of the site where development is proposed is not at risk of fluvial, pluvial or groundwater flooding.

A Health and Safety Plan will be prepared (required by the *Safety, Health and Welfare at Work (Construction) Regulations 2013*) to address health and safety issues from the design stages through to the completion of the construction and maintenance phases. The Health and Safety Plan will comply with the requirements of the Regulations and will be reviewed as the development progresses.

Safety on site will be of paramount importance. Only contractors with the highest safety standards will be selected. During the selection of the relevant contractor and the respective subcontractors their safety records will be investigated.

Prior to working on site, each individual will receive a full safety briefing and will be provided with all of the safety equipment relevant to the tasks the individual will be required to perform during employment on site.

Safety briefings will be held regularly and prior to any onerous or special task. 'Toolbox talks' will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed.

All visitors will be required to wear appropriate personal protective equipment prior to going on to the site and will undergo a safety briefing by a member of the site safety team.

Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with at all times.

Article 27 Risk Assessment

As set out in the IE Consulting Excavation Plan (included in the application) the proposed development of the site will require the by-product declaration of 4,470 m3 of soil/subsoil for offs-site re-use.

In accordance with Article 27 of the Waste Directive Regulations 2011, and the recent EPA Consultation regarding the Article, soil and stone may be suitable for use if the soil meets generally accepted standards for the management of soil contamination such as the LQM/CIEH Generic Assessment Criteria (2nd Edition) and the EPA's Management of Contaminated Land & Groundwater at EPA Licenced Sites. The Article 27 application can be supported where necessary by a site-specific use risk assessment that will assess the risk of the proposed soils re-use at the proposed end point.

The risk assessment process allows mitigating factors concerning the re-use of the material to be highlighted or addressed prior to the movement and placement of the soils at the end user site. The Article 27 Risk Assessment would be site specific to the receptor site.

15.4.3 Operational Phase

The operation phase is considered to have likely significant positive impacts on human beings in relation to the provision of additional residential units, open space, childcare provision, to cater for the demands of a growing population in accordance with the residential zoning objectives pertaining to the site.

During the operational phase of the development the design of the scheme has undergone a Road Safety Audit and has had regard to DMURS during its design. This will promote a pedestrian friendly environment, promoting sustainable development and reducing the influence of cars. This has the potential to reduce accidents within the proposed development.

15.4.4 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.

15.5 BIODIVERSITY

15.5.1 Construction Phase

The mitigation measures outlined below would be implemented to ensure there is no significant impact upon the biodiversity of the area and designated sites during the construction phase of the development. These measures have also been incorporated into the Construction Environmental Management Plan, which has been prepared for the project.

General Mitigation Measures

All construction works would be confined to the development footprint;

All plant machinery and equipment would be maintained in good working order and regularly inspected;

Where possible, no construction works would be conducted outside of normal working hours (8am to 6pm).

Flora and Habitats

Planting of 340 native trees would be undertaken within the open spaces of the site and along the boundaries;

Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place;

The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to the development site. All construction plant would pass through a wheel-wash system prior to entering or leaving the development site;

All relevant construction personnel would be trained in invasive flora species identification (main species of concern, including Japanese Knotweed) and control measures;

In the event any soils excavated as part of the proposed development, in particular in the south-eastern portion of the site, require removal off-site, they must first be confirmed to be free of Japanese Knotweed;

In the event of any invasive species listed in Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011;

Cognisance would be taken of National Roads Authority's Guidelines on "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*".

Fauna (Excluding Bats)

As a minimum, the construction work contractor would comply with all legislative provisions relating to hedgerow / tree removal and the protection of birds, and would have regard to reducing impacts on nesting birds;

In the unlikely event a protected fauna species such as badger or the common frog is found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of construction works.

Bats

Habitat loss

To mitigate the loss of foraging and commuting habitat significant tree and hedgerow planting has been proposed as part of the final scheme design including the following:

340no. new trees will be planted within the open spaces and along the boundaries.

134 metres (431 sq.m.) of new and replacement native hedgerow will be provided within the new development along the boundary with Fort Road, and approximately 307 metres of new native hedgerow to the boundary with Ramsfort Park Forest.

Lighting Impacts

All areas of hedgerows and treelines not previously identified for removal will be protected from site operations. The majority of existing hedgerow to the north and woodland to the east will be retained. The lighting design principles will be avoidance of lighting within particularly sensitive areas. Measures to mitigate the impact of lighting disturbance on bats during the construction period will include:

Avoid lighting of retained habitats i.e. boundary treelines/hedgerows, mature trees and the woodland edge. This will ensure that important foraging and commuting corridors are maintained;

Lighting if required shall be of a low height (as low as possible without compromising safe working standards) to ensure minimal light spill and, where practicable, timers or motion sensors shall be used to ensure areas are retained in darkness as much as possible. Lighting shall be directed to where it is required only and this can be achieved by fitting louvres to the lighting; and

White Light Emitting Diode (LED) will be used as this is considered to be relatively low impact in comparison to other lighting types, as it is less attractive to insects, has a sharp cut-off and is of lower intensity.

Construction works in the hours of darkness when bats are active (April – October) will be kept to a minimum.

Loss of potential roosts

Given that the initial daytime assessments of the trees for bat roost potential was undertaken when the trees were in full leaf (potentially obstructing a view of the entire tree trunk/branches which could support potential roost features) and given that a number of the mature trees were covered in dense ivy, which could also obscure potential roost features, it is recommended that all trees classed as having moderate potential (7 No. trees) to support a bat roost are either:

- re-assessed by a suitably qualified ecologist prior to felling;
- soft-felled under supervision of a suitably qualified ecologist.

It is recommended that the ivy on these trees is cut and killed off at the earliest convenience and well in advance of any feeling/re-assessment, to enable all or any potentially features to be fully observed. If the ecologist identifies further potential suitable features they will advise on whether further survey is required prior to felling.

Water Quality and Biodiversity

- Regular visual inspections of the Ballyowen Stream would be undertaken during construction works;
- Silt control features would be employed where appropriate, such as silt fencing adjacent the existing drainage ditch;
- Regular inspection and maintenance would be undertaken of any silt control features;

- Where spoil is generated, this would only be stored temporarily and away from the existing drainage ditch onsite. Where possible, spoil would be covered or alternatively, graded to avoid ponding or water saturation;
- If necessary, silt fencing would be placed around spoil areas;
- Where possible, surface water run-off would be diverted from areas of bare / exposed ground;
- In the event that pumping would be required during excavation works, the pumped water would be directed to silt control features, such as settlement ponds or silt traps, prior to discharge;
- The proposed works to the existing drainage ditch would be preferably undertaken when the drain is dry. If it is not possible to undertake works when the drain is dry, the drain would be temporarily dammed and the water pumped to silt control features, such as settlement ponds of silt traps, prior to being discharged to ground. Daily inspections of the Ballyowen Stream would be undertaken during drainage ditch works;
- During works on the drainage channel, a CCTV survey would be undertaken to ensure that any potential misconnections from nearby dwellings would be identified and addressed;
- The associated run-off from any wheel-wash facilities would be collected via a constructed settlement pond;
- Pre-cast concrete would be used where possible;
- The delivery and pouring of concrete would be supervised at all times;
- Concrete would be poured directly into the shuttered formwork from the Ready Mix Truck, reducing the risk of spillage;
- The wash-out of Ready Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;
- The disposal of excess uncured concrete would be removed from site by an authorised waste contractor;
- A temporary compound would be established by the construction work contractor for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;
- Should bagged cement be stored on site during construction work, it would be stored within the temporary site compound, in a dry and secure area;
- The re-fuelling of machinery would take place within a bunded area. Re-fuelling would not take place within the immediate vicinity of the existing drainage ditch;
- Any fuels or oils would be stored in designated bunded areas, with adequate bund provision to contain 110% of the largest drum volume;
- Fuels / oils would be handled and stored with care to avoid spillage or leakage;
- Where appropriate, small plant equipment would be placed on drip trays;
- Any waste fuel / oils would be collected in bunded containers at designated areas (i.e. temporary construction compound) and properly disposed of to an authorised waste contractor;
- Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be available onsite;
- In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material would be properly disposed of to an authorised waste contractor;
- Cognisance would be taken of Inland Fisheries Ireland's "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";

- In the event of a suspected deterioration in water quality, works would immediately cease, an investigation into the cause undertaken and the relevant NPWS and IFI personnel informed.

15.5.2 Operational Phase

The following mitigation measures would be implemented to ensure there would be no significant impact upon the biodiversity of the area and designated sites during the operational phase of the development:

- Native flora species would be incorporated in the landscaping plan as much as possible;

Bats

Similarly to construction phase mitigation procedures the lighting design principles will be avoidance of light spill into sensitive areas. Avoid lighting of all retained treelines/hedgerow as these have been confirmed as important foraging and commuting corridors within the site, in particular hedgerow 2 to the north and the woodland edge to the east of the site. Private gardens along these boundaries are likely to provide a sufficient buffer to retained habitats, with only low levels of lighting emitted from the houses. For lighting of public open spaces, lighting shall be directed to where it is required only, and lighting set as low as possible (e.g. bollards along pathways) to the ground to avoid any unnecessary light spill.

15.6 LAND AND SOILS

This section describes a range of mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the impacts of any emissions on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

With reference to radon, while the proposed site is not located within a High Radon area, standard radon barriers will be used in the construction of the proposed dwellings.

15.6.1 Construction Phase

15.6.1.1 Construction Management Plan

In order to reduce the impacts on the soils and geology environment a number of mitigation measures will be adopted as part of the construction works on site. An Outline Project Specific Construction Management Plan is included with the SHD application and will be maintained by the contractor during the construction phase. The PCMP will include mitigation measures to address the main potential impacts on soils and geology as follows:

- Existing topsoil will be retained on site to be used for the proposed development. Topsoil will be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works.

- Top-soiling and landscaping of the works will take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties.

- Stockpiled material will be covered/dampened during dry weather to prevent spreading of sediment/dust;

- In order to prevent the accidental release of hazardous materials (fuels, paints, cleaning agents, etc.) during construction site activity, all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil/diesel storage tanks will be used on the site during the construction phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the project.

- Controls for storage of any other potentially polluting materials/chemicals on-site e.g. any chemicals used on site will be required to be stored in designated bunded areas and the site manager will be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at storage locations as well as the site office.

- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads. In addition to this road washing machinery will be employed where possible.
- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.
- Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter watercourses.
- Where feasible, excavated material will be reused as part of the site development works (e.g. for landscaping works and for backfill in trenches under non-trafficked areas).
- Good housekeeping (site clean-ups, use of disposal bins, etc.) on the site project.

15.6.1.2 Controls on Damage to Underlying Geological Materials

The removal of soils and subsoil's/bedrock is an unavoidable impact of the development. One of the primary mitigation measures already employed at the preliminary design stage has been the minimisation of volumes of subsoil and bedrock that will be excavated. It is proposed that all of the excavated subsoils removed during construction will be re-used on site in the form of landscaping. Any subsoils that cannot be re-used on-site will be treated, recycled or disposed of where suitable using a licenced waste contractor.

Specialist machinery (such as tracked machinery) will be used to minimise compaction of the subsoils.

15.6.1.3 Control and Re-use of Potentially Contaminated Material On-site

Prior to any site works an investigation of the area of the former ESB substation will be undertaken to assess for the presence of any contamination from Polychlorinated Biphenyls (PCB's). An initial site inspection, sampling and assessment will be undertaken as per EPA guidance on PCBs (EPA, 2017). After the initial assessment if confirmed or suspected PCB contamination is present then an appropriate level of site investigation and corrective action will be undertaken as per EPA guidance (EPA, 2017). If remediation and removal of PCB contaminated material is required this will be undertaken using an appropriately licensed waste contractor and treatment facility. The site investigation and assessment will be undertaken by a suitably qualified environmental consultant with specific experience in the assessment and remediation of PCB contamination. Each stage of the process will be rigorously recorded from initial site inspections to completion and verification of any remedial actions required.

During construction works, all excavated materials including existing stockpiles will be visually assessed for signs of contamination. Should material appear to be contaminated, soil samples will be analysed by an appropriate testing laboratory. All potentially contaminated material will be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material will be appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

All operations in relation to the declaration of Article 27 by-product during the cut and fill activities will be completed in a controlled environment. As the intention is to re-use soils on-site and to declare the excess soils as a by-product, some relevant site investigations and soil analytical data must be gathered to demonstrate that the soils of both the greenfield and the former factory area of the development are situatable for re-use and that these soils are uncontaminated with respect to naturally occurring concentrations.

15.6.1.4 Control on Sources of Fill and Aggregates

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

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

15.6.2 Operational Phase

No significant long-term impact on the soil resulting from the proposed operational phase of the development is predicted. Once the development is completed, risks to the land and soils will be from pollutants deriving from the use of the dwellings and/or from contaminated surface water run-off.

The only mitigating measures envisaged during the operational phase are to ensure regular maintenance of SuDS features.

Ensuring appropriately designed, constructed and maintained site services will protect the soils and geology from future contamination arising from operation of the developments.

The surface water run-off from the development should be collected by an appropriately designed system. This system should ensure that contaminants are removed prior to discharge e.g. via a light liquids separator or by an appropriate treatment train of Sustainable Urban Drainage Systems as outlined in the Greater Dublin Strategic Drainage Study (GDSDS). Any separators and drainage systems should be maintained and operated by the facilities management company (prior to taking in charge by the Local Authority) in accordance with the manufacturers recommendations.

All new oil storage facilities will be designed and maintained in accordance with best practice and standards (BS 5410 and BS799-5). All waste storage areas will be designed to afford adequate containment for any liquid or solid waste. These measures combined with best practice will prevent any contamination of surrounding soil/bedrock.

A programme of inspection and maintenance of the foul sewer rising main pipeline will ensure that any damage, blockages etc. are identified and remedied.

15.6.3 Monitoring

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 5.6 including the project specific Construction Management Plan (PCMP). Soil removed during the construction phase is to be monitored to maximise potential for re-use on site. Monitoring of any hazardous material stored on-site will form part of the proposed Construction & Waste Management Plan. A dust management/monitoring programme should be implemented during the construction phase of the development. The quantities of topsoil, subsoil and rock removed off site will be recorded.

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

Adherence to the appointed contractors "*Construction and Demolition Waste Management Plan*".

- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road sub-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 from contamination for removal from site)
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.).
- Soil removed during the construction phase will be monitored to maximise potential for re-use on site
- Protection of topsoil stockpiled for re-use;
- Adequate protection from contamination of soils for removal;
- Cleanliness of adjoining road network;
- Prevention of oil and petrol spillages;

- Dust control;
- Representative soil samples will be taken of the excavated material to confirm its suitability for re-use on the site and/or to facilitate classification for disposal;
- The on-site interceptors and silt traps will be maintained and inspected on a regular basis.

15.7 WATER

This section describes a range of recommendations and mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the impacts of any emissions on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

15.7.1 Construction Phase

Construction Management Plan

In order to reduce the impacts on the water environment a number of mitigation measures will be adopted as part of the construction works on site. A Construction Management Plan will be prepared and will include measures to address the main potential impacts on surface water and groundwater as follows:

- Existing topsoil will be retained on site to be used for the proposed development. Topsoil will be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works. Stockpiles of topsoil/soils will be covered/dampened during dry weather to prevent spreading of sediment/dust;
- During construction of the foul water pipeline adjacent the Ballyowen Stream silt fences will be employed to prevent entry of sediment laden run-off to the stream;
- Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer;
- Top-soiling and landscaping of the works will take place as soon as finished levels are achieved, in order to reduce weathering and soil erosion and limit the generation of sediment laden run-off;
- A temporary site drainage system will be established for the duration of the construction works. All run-off from the site will be directed to settlement ponds and oil interceptors prior to discharge to existing site drain. This temporary system will throttle run-off and allowed suspended solids to settle out prior to entry to the site drain. The discharge to the site drain will be designed to prevent erosion and scour in the vicinity of the discharge. The discharge will be visually inspected regularly for any signs of contamination. Where any suspected contamination is observed, the discharge will cease immediately and will be treated and disposed of appropriately.
- Any minor volumes of groundwater required to be pumped during excavations will be passed through the temporary drainage system settlement prior to discharge to the existing site drain.
- Handling, transport and storage of fuel and chemicals will be controlled e.g. oil and fuel stored on site will be stored in designated areas. These areas will be bunded and located away from any surface water drainage.
- Refuelling of construction machinery will be undertaken in designated areas located away from surface water drainage.
- All machinery will be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas will be inspected on a daily basis for evidence of hydrocarbons leaking from machinery.
- All potentially polluting materials will be stored in bunded areas, the capacity of which will be 110% the volume of the largest volume of material OR 25% of the total volume of liquid to be stored, whichever is

greater. The site manager will be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at storage locations as well as the site office.

- The washing of any plant equipment will be carried out in designated areas constructed to prevent potentially polluting material from entering surface or groundwater.
- Spill kits shall be kept in the machinery refuelling areas and any chemical/fuel storage areas in the event of spillages. The spill-kits will comprise suitable absorbent material, refuse bags etc. to allow for the appropriate clean-up and storage of contaminated material in the event of a spillage or leak occurring.
- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads. In addition to this road washing machinery will be employed where possible;
- There will be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities will be stored for removal off site for disposal and treatment;
- If concrete mixing is carried out on site, the mixing plant will be sited in a designate area with impervious surface. Washwaters from cement mixing equipment will not be disposed of the surface
- The Contractor will be obliged to ensure no deleterious discharges are released from the site to surrounding watercourses during the construction stage. Throughout the works the Contractor will also take account of relevant legislation and best practice guidance including but not limited to the following:
  - C532 Control of water pollution from construction sites: guidance for consultants and contractors.
  - C648 Control of water pollution from linear construction projects
  - SP156 Control of water pollution from construction sites – guide to good practice

Measures to Prevent Pollution of Ballyowen Stream during Construction of Foul Pipeline

The route of foul water pipeline will cross underneath the Ballyowen Stream at a single crossing. Inland Fisheries Ireland (IFI) will be informed in advance of works and will be welcome to inspect the site at any time. Silt fences will be employed where excavation works are required in the vicinity of the stream. These will be erected in advance of works along the stream and remain in place until after landscaping elements have become established. It will be inspected on a daily basis during works to ensure it is functioning correctly. Because the timing of works is uncertain at this stage it is not possible to define when this might be. It is therefore proposed that the silt fence will be removed only following consultation with IFI personnel.

Control and Re-use of Potentially Contaminated Material On-site

Prior to any site works an investigation of the area of the former ESB substation will be undertaken to assess for the presence of any contamination from Polychlorinated Biphenyls (PCB's). An initial site inspection, sampling and assessment will be undertaken as per EPA guidance on PCBs (EPA, 2017). After the initial assessment if confirmed or suspected PCB contamination is present then an appropriate level of site investigation and corrective action will be undertaken as per EPA guidance (EPA, 2017). If remediation and removal of PCB contaminated material is required this will be undertaken using an appropriately licensed waste contractor and treatment facility. The site investigation and assessment will be undertaken by a suitably qualified environmental consultant with specific experience in the assessment and remediation of PCB contamination. Each stage of the process will be rigorously recorded from initial site inspections to completion and verification of any remedial actions required.

During construction works, all excavated materials will be visually assessed for signs of contamination. Should material appear to be contaminated, soil samples will be analysed by an appropriate testing laboratory. All potentially contaminated material will be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material will be

appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

Control on Sources of Fill and Aggregates

All fill and aggregate imported for use on the proposed development site will be sourced from reputable suppliers. All suppliers will be vetted for:

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

15.7.2 Operational Phase

Attenuation and Treatment of Stormwater

As indicated above the proposed stormwater management system for the development incorporates two attenuation tanks and hydrobrake flow controls to limit run-off from the site to the greenfield run-off rate to prevent increased flood risk. The run-off will pass through two Class I By-pass Interceptors prior to entry to the attenuation tanks and discharge to the Ballyowen Stream. The hydrobrake flow controls and oil interceptors will be inspected and maintained as per manufacturer's guidelines to ensure they are working to prevent contamination and increased run-off from the site. The two attenuation systems have been designed for no flooding up to the 1 in 100-year rainfall event including 10% climate change.

Foul Water

In order to reduce the risk of defective or leaking foul sewers, all new sewers will be laid in accordance with the relevant standards, pressure tested and CCTV surveyed to ascertain any possible defects.

A programme of inspection and maintenance of the foul sewer rising main pipeline will ensure that any damage, blockages etc. are identified and remedied.

In order to prevent fluvial flood waters from the Ballyowen Stream from flowing into the proposed 225mm foul pipe, the manholes in Flood Zones A & B along the foul water pipe route will be the manholes in these locations are constructed with sealed flood proof covers.

The proposed foul pipe will not result in any loss in flood plain storage as a result of its construction. There will be no local connections to the foul water pipeline downstream of the main development site area and therefore there is no flood risk posed to any existing or future residents as a result of the connection to the foul pipe.

Water Use

Water conservation measures such as the use of low flush toilets and low flow taps will be incorporated into dwellings to reduce volumes and associated abstraction and treatment costs for the proposed development.

Monitoring

The Site Specific Construction and Environment Management Plan will incorporate mitigation measures as outlined in section 6.6, this will include monitoring of construction related activities during the construction phase.

The construction phase will be monitored, in particular in relation to the following;

- The taking in charge of the water infrastructure will ensure the system is regularly inspected and maintained.
- The performance of all Suds features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed Hydrobrake and gullies will be required to prevent contamination and increased runoff from the site.

- Protection of topsoil stockpiled for re-use;
- Adequate protection from contamination of soils for removal;
- Cleanliness of adjoining road network;
- Prevention of oil and petrol spillages;
- Dust control;
- Representative soil samples will be taken of the excavated material to confirm its suitability for re-use on the site and/or to facilitate classification for disposal;

15.7.3 Operational Phase

The on-site interceptors and hydrobrake flow controls will be maintained and inspected on a regular basis as per manufacturer's requirements.

15.8 AIR QUALITY AND CLIMATE

It is considered that the proposed housing development will not result in any significant adverse impacts to air quality. Outlined below is a series of mitigation measures and good working practices to ensure that any potential impacts during the construction are minimised, and to ensure there will be no adverse impacts on the receiving environment. The mitigation measures have been sourced from international best practice guidance documents for the implementation of dust management plans, such as:

- *Control of Dust from Construction and Demolition Activities*, UK British Research Establishment (BRE).
- *Environmental Good Practice on Site*, Construction Industry Research and Information Association (CIRA),
- *Environmental Management Plans*, Institution of Environmental Management and Assessment (IEMA),
- *Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan*, National Roads Authority (NRA).

15.8.1 Construction Phase

Construction Phase Generation of Dust

In order to mitigate dust emissions during the construction phase, a *Dust Control Management Programme* will be prepared as part of the Environmental Management Plan and submitted to the Planning Authority. The dust minimisation plan will be cognisant of the industry guidelines such as the Building Research Establishment document entitled 'Control of Dust from Construction and Demolition Activities' and the Construction Industry Research and Information Association (CIRIA) 'Environmental Good Practice on Site'. A *Dust Control Management Programme* will be agreed with Wexford County Council (as part of Construction Management Plan).

The *Dust Control Management Plan* should be prepared, to include measures outlined in the following section, for the control and reduction of dust and fine particulate emissions (PM10).

- Protective hoarding screens should be erected around construction activities, to reduce dust-blow from the site, in particular where the sensitive receptors are in close proximity (i.e. along the south-eastern and western boundaries).
- A temporary wheel-wash facility should be installed close to the location of the site entrance, to prevent the hauling of silt and mud onto the local road surface by vehicles departing from the site.
- Exposed surfaces and entrances to the site should be dampened during dry windy conditions in the interest of controlling fugitive dust.
- Any spillage of material from vehicles departing the site should be promptly removed to prevent re-suspension of silt from the road surface by passing vehicles.
- Dust control measures will be active on equipment used for drilling, pavement cutting, grinding of block surfaces and similar types of stone finishing, as significant fine particulate emissions can be generated which may cause a local nuisance.

- Bulk fine-sized aggregates and other similar building materials that may easily become airborne by the wind should not be stored in uncovered stockpiles.
- Truck speeds will be controlled within the development area to prevent high levels of dust being re-suspended from the construction area.
- Vehicles and plant machinery operating on-site will be properly maintained to prevent excessive emissions of particulates and other pollutants from the exhaust pipes.

Construction Traffic Emissions

Mitigation measures to minimise related traffic emissions include:

- Ensure regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they perform most efficiently.
- Implementation of a *Traffic Management Plan* to minimise congestion.
- All site vehicles and machinery will be switched off when not in use (i.e. no idling).

Climate

CO_2 and NO_x emissions during construction will have a negligible impact on climate; therefore, no mitigation measures are required.

15.8.2 Operational Phase

Mitigation to ensure significant quantities of air pollutants are not generated during the operational phase has been incorporated into the design proposal.

The proposed energy and sustainability measures incorporated into the design of the building will improve energy efficiency at the development. High efficiency heating will reduce the energy input and CO_2 produced. Other electrical considerations including energy efficient lighting, shall allow for a further reduction in energy consumption.

Air Quality

It is considered that the operational phase of the development will not have a significant negative impact on the local air quality. Nevertheless, mitigation measures in relation to traffic-derived pollutants have focused generally on improvements in both engine technology and fuel quality. EU legislation, based on the EU sponsored Auto-Oil programmes, have imposed stringent emission standards for key pollutants for passenger cars to be complied with from 2009 (Euro V standard) and from 2014 (Euro VI standard).

With regards to heavy duty vehicles, EU directive 2005/78/EC defines the emission standard currently in focus, as well as the next stage which entered into force in October 2009. In addition, it defines a non-binding standard called *Enhanced Environmentally Friendly Vehicles* (EEV). In relation to fuel quality, S.I. No. 407 of 1999 and S.I. No. 72 of 2000 have introduced significant reduction in both sulphur and benzene content of fuels.

In relation to design and operational aspects emissions of pollutants from road traffic can be controlled most effectively by either diverting traffic away from the heavily congested area or ensuring free flowing traffic through good traffic management plans and the use of automatic traffic control systems.

Improvements in air quality are likely over the next few years as a result of the on-going comprehensive fuelled vehicles and the introduction of cleaner fuels.

Climate

The impact of the proposed development on climate will be negligible, therefore no site specific mitigation measure are required. Through EU legislation, on improvements in vehicle motor technology, and by an increased use of bio fuels, CO_2 emissions for the average new car fleet were reduced to 120g/kg over the period 1995-2013. 15% of the necessary effort towards the overall climate change target of the EU was met by this measure alone.

The average emissions level of a new car sold in 2016 was 118.1 grams of CO_2 per kilometre (g CO_2/km), significantly below the 2015 target of 130g. Since monitoring started under current legislation in 2010, emissions have decreased by 22 g CO_2/km (16%).

Additions made to the *National Climate Change Strategy* include:

- VRT and Motor Tax rebalancing to favour the purchase more fuel-efficient vehicles with lower CO_2 emissions.
- Continuing the Minerals Oils Tax Relief (MOTR) II scheme and introduction of a bio fuel obligation scheme.
- Implementation of a national efficient driving awareness campaign, to promote smooth and safe driving at lower engine revs.
- Enhancing the existing mandatory vehicle labelling system to provide more information on CO_2 emission levels and on fuel economy.

15.9 MONITORING

15.9.1 Construction Phase

It is recommended that monthly dust deposition survey be carried out along the boundary of the proposed site in order to monitor the effectiveness of dust management for the duration of the construction phase. The TA Luft (German Government *Technical Instruction on Air Quality)* states a guideline of 350mg/m^2/day for the deposition of non-hazardous dusts. This value should not be exceeded beyond the site boundary and any breaches will require a review of operations and dust mitigation measures.

15.9.2 Operational Phase

Not Applicable

15.10 NOISE AND VIBRATION

In order to sufficiently reduce the likely noise and vibration impact, a schedule of noise control measures has been formulated for both the construction phase and operational phase.

15.10.1 Construction Phase

With regards to construction activities, reference is made to BS5228: Noise Controls on Construction and Open Sites, which contains detailed guidance on the control of noise and vibration from demolition and construction activities. The following is a list of mitigation measures, which should be adhered to during the construction phase:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; Normal working hours will be 0800-1900 hours Monday to Friday and 0800-1600 hours on Saturdays. Sunday working will be avoided but may be necessary on some occasions. When working outside of normal hours is required the contractor will discuss such requirements with Wexford County Council.,
- Channels of communication between the developer, contractor, local authority and community should be established,
- A site representative responsible for matters relating to noise should be appointed,
- Noise level at sensitive location should be carried out monthly or during critical periods,
- All on-site construction roads should be maintained to prevent banging and vibration noise from traffic,
- Plant with low inherent potential to generate noise and vibration will be used on-site,
- Activities with the potential to create noise should be scheduled so as not to be carried out simultaneously,
- Noise/acoustic barriers should be erected between noise sensitive location and noise sources.

Vibration

The vibration from construction activities will be limited to the values set out in section 8.3. It should be noted that these limits are not absolute, but provide guidance as to magnitude of vibration that are very unlikely to cause cosmetic damage. 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. Where there is existing damage, these limits may need to be reduced by up to 50%.

Activities with the potential to create vibration should be scheduled so as not to be carried out simultaneously.

15.10.2 Operational Phase

With regard to the operational phase of the development, the majority of noise impacting upon the residences within the development would be due to traffic on the Fort Road. It is recommended that the county council be approached to reduce the speed limit from 80 kilometres per hour to 50 kilometres per hour on the Fort Road adjacent to the boundary of the proposed development. Reducing internal traffic speed limits to 25 km/hour may also be considered to reduce internal traffic noise.

15.10.3 'Worst Case' Scenario

The worst case scenario is that the development is not constructed as per the drawings and details provided in the planning application. While one would expect that the development is required to be constructed in accordance with the planning documents, which includes various mitigation measure outlined above, the worst-case scenario would be that the attributes and mitigation measure were not carries out and subsequently not appropriately enforced by the local authority.

The main potential for adverse impacts on local quality will occur during the construction phase. The worst-case scenario, therefore, corresponds to the situation where the mitigation measures for construction activities fail or are not implemented. Should noise mitigation measures not be implemented during the construction phase, significant noise nuisance is likely in areas close to the construction site.

15.10.4 Predicted Impacts of the Proposed Development with mitigation

Outward Noise Impact

Construction phase

During the construction phase there is the potential for some minor impact on nearby noise sensitive properties due to noise generated by construction site activities. The implementation of the construction phase noise and vibration mitigation and monitoring programme as detailed in Section 8.6.1 below, will minimise the potential noise and vibration impact on the receiving environment including existing residential receptors.

Operational Phase

The predicted noise impact generated by additional traffic movements associated with the development is predicted to be of insignificant impact at existing residential receptors in the vicinity of the existing and proposed road network., however the road speed should be limited to 25kph.

Inward Noise Impact

It may be concluded that during daytime and night-time periods, acceptable internal noise levels can be achieved across the site as defined in BS 8233 with windows closed using the recommended glazing, wall and roof constructions.

With regard to the recommended mitigation by design measures as specified above, it may be concluded that residential properties located within the proposed development can be appropriately designed and constructed to achieve acceptable internal noise levels.

Outward Vibration Impact

Construction Phase

During the construction phase there is no predicted adverse vibrational impact on any existing properties or on human beings, however a vibration monitoring programme will be implemented as part of the comprehensive construction monitoring programme for the development.

Operational Phase

There is no operation phase outward vibrational impact predicted as part of the development.

Inward Vibrational Impact

There is no inward vibrational impact predicted as part of the proposed development.

15.11 MONITORING

15.11.1 Construction Phase

It is recommended that monthly noise monitoring be carried out along the boundary of the proposed site in order to monitor the effectiveness of noise management for the duration of the construction phase. Noise levels at noise sensitive locations should not exceed 70 dB(A) during weekdays and 65 dB(A) during Saturdays as per NRA guidance. These levels should not be exceeded and any breach would require a review of operations. Noise mitigation measures should be put in place to ameliorate any exceedance which may be due to on-site construction work.

Should complaints arise, it is recommended that noise monitoring be carried out at sensitive receptors during the construction phase of the proposed development, including along the pipeline route, to ensure guideline limits are not exceeded and to determine whether further mitigation measures are required.

It is recommended that vibration measurements are carried out at requisite monitoring points. This will ensure that any vibration generated by the construction activities would not give rise to nuisance in the vicinity of the proposed development.

15.12 LANDSCAPE AND VISUAL

The following recommendations are put forward to mitigate against the negative impacts mentioned above and to reinforce the positive impacts of the proposed development. Mitigation measures are proposed and considered only on the lands of the subject site.

15.12.1 Construction Phase

The remedial measures proposed revolve around the implementation of appropriate site management procedures – such as the control of site lighting, storage of materials, placement of compounds, delivery of materials, car parking, etc. Visual impact during the construction phase will be mitigated somewhat through appropriate site management measures and work practices to ensure the site is kept tidy, dust is kept to a minimum, and that public areas are kept free from building material and site rubbish.

Site hoarding will be appropriately scaled, finished and maintained for the period of construction of each section of the works as appropriate. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary nature only and therefore require no remedial action other than as stated above.

A number of existing trees are to be retained and these are shown in the Arboricultural Reports and Drawings accompanying the planning application. Existing trees to be retained are particularly sensitive to negative impacts during the construction phase if proper protection measures are not adhered to. With regard to the protection of the retained trees on site during proposed construction works, reference should be made to BS5837: Trees in relation Design, Demolition and Construction – Recommendations (BSI, 2012), and also Murray and Associates Arboricultural Impact Assessment Plan (1706_TS_P_02).

Overall, there will be an increase of approximately 316 metres of native hedgerow on the boundary with Ramsfort Park Forest, with a further 521 linear metres being rehabilitated and enhanced (both the western boundary with Fort Road and the northern boundary adjacent to the neighbouring development site). Therefore, there is a total of 837 linear metres of native hedgerow associated with the development.

Across the site there will also be approximately 340 no. new native and non-native trees planted.

15.12.2 Operational Phase

The primary proposed mitigation measures can be seen on Murray and Associates Drawing no. 1706_PL_P_01, and are as follows:

1. Within the southern portion of the site there is an area of Open Space acting as an entrance area into the development. Semi-mature native tree planting and shrub planting is proposed. This will create a buffer space that will reduce the views into the site from adjacent properties. The development will continue to be softened and screened over time as the trees and planting mature.

2. Existing boundary hedgerows and trees within the site boundaries are retained where possible, maintaining the mature visual buffer between the proposed development and the surrounding area. Areas for tree removal to facilitate development include 15no. trees along the existing earth bank to Fort Road and 7 no. along the northern boundary. The associated vegetation will be retained and enhanced with new planting. This provides screening from Fort Road and adjacent properties.

The 7 no. existing trees along the northern boundary, bordering the adjacent site, are to be removed to facilitate the development. However, the existing hedge-line is to be retained and enhanced, with additional 26no. semi-mature native trees planted along the boundary.

3. There are substantial numbers of trees (340 no.) proposed within the development's open spaces and along the roadways.

At time of planting, the proposed trees will be at least 4.0m in height. The trees will reach a mature height of at least 7 to 15 metres, dependant on species within the medium term (seven to fifteen years).

If necessary, and subsequent to appropriate soil analysis, topsoil may be imported where necessary to ensure that mitigation measures establish and grow appropriately.

A summary of the mitigation measures that have been adopted in the proposed scheme are as follows: -

- The architectural layout aims to address visual impacts by proposing variety in scale and massing of buildings and by design of high quality buildings.

- The extensive planting of trees and shrubs throughout the site where possible will reduce the visual mass of the buildings, soften and partially screen the development over time from various viewpoints, as identified in the assessment, thereby minimising the visual impacts.

- Native and appropriate planting for biodiversity has been incorporated into the scheme in accordance with the advice of the Project Ecologist.

- Public open spaces have been designed as part of an overall design strategy that focuses on creating a 'sense of place' and individual character for the development area.

- Facilitate the creation of meaningful public open space.

- Design Public open space that forms part of a network of spaces that includes areas for passive and active recreation, social / community interaction and play facilities catering for all ages.

During construction there will be a change to the landscape and there will be negative visual impacts for residents and visitors to the areas adjacent to the site associated with construction activity.

The scheme design incorporates significant consideration and mitigation in respect of potential impacts. The quality of the public realm scheme is of a high standard and the quality of materials proposed is similarly high and robust.

Landscape works are proposed to reduce and offset any 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, both native and ornamental varieties, 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.

15.13 MONITORING

15.13.1 Construction phase

Landscape tender drawings and specifications will be produced to ensure that the landscape work is implemented in accordance with best practice. This document will include tree work procedures, soil handling, planting and maintenance. The contract works will be supervised by a suitably qualified landscape architect.

The planting works will be undertaken in the planting season after completion of the main civil engineering and building work.

15.13.2 Operational phase

Monitoring of the mitigation measures forms part of the landscape management plan. Replacement trees, replacement planting and pruning measures are captured in landscape management plans and are intrinsically linked to the proposed mitigation measures.

All landscape works will be in an establishment phase for the initial three years from planting. A landscape management plan accompanies the planning application. Prior to completion of the landscape works, a competent landscape contractor will be engaged and a detailed maintenance plan, scope of operation and methodology will be put in place.

15.14 MATERIAL ASSETS – TRAFFIC

15.14.1 Mitigation Construction Phase

A Construction Management Plan (an outline CMP accompanies the application) and the associated Construction Traffic Management Plan (CTMP) in addition to the application accompanying Construction and Waste Management Plan will be developed by the appointed contractor and submitted to Wexford County Council for approval prior to commencement of works.

The Construction Management Plan will incorporate a range of integrated control measures and associated management initiatives with the objective of mitigating the impact of the proposed developments on-site construction activities.

To minimise disruption to the surrounding environment, the following mitigation measures will be implemented:

- During the pre-construction phase, the site will be securely fenced off from adjacent properties, public footpaths and roads.
- All road works will be adequately signposted and enclosed to ensure the safety of all road users and construction personnel.
- A dedicated ‘construction’ site access / egress junction will be provided during all construction phases.
- Provision of sufficient on-site parking and compounding to ensure no potential overflow of construction generated traffic onto the local network.
- Site offices and compound will be located within the site boundary. The site will be able to accommodate employee and visitor parking throughout the construction period through the construction of temporary hardstanding areas.
- A material storage zone will also be provided in the compound area. This storage zone will include material recycling areas and facilities.
- A series of ‘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 the local authority prior to the commencement of constructions activities on-site.

- Truck wheel washes will be installed at construction entrances if deem necessary and any specific recommendations with regard to construction traffic management made by the Local Authority will be adhered to.

- On completion of the works all construction materials, debris, temporary hardstands etc. from the site compound will be removed off site and the site compound area reinstated in full on completion of the works.

- The proposal includes the construction of an underground pipeline from the subject site to the Arklow Road. . 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.

- As part of the road opening licence, it is anticipated that a Construction Traffic Management Plan would be agreed with Wexford County Council, by the contractor. The objective of which is to minimise the short term disruption to local residents, and reduce the potential for accidents.

15.14.2 Mitigation Operational Phase

Road Safety

The Wexford County Development Plan 2013 – 2019 sets out sightline requirements for proposed access / egress to public roads outside of a 50kph or 60 kph speed limit. The following are the indicative sightline requirements:

- National Road = 230m
- Regional Roads Class 1 = 220m
- Regional Roads Class 2 = 135m
- Local / Country Roads = 65m

The Fort Road would be considered as a Class 2 Regional Road due to the traffic volumes currently using Fort Road. Therefore, a sightline of 135m at a 3m set-back shall be achieved in both directions.

At the proposed access onto Fort Road a 135m sightline at a 3m set-back can be achieved in both directions. The visibility splay to the north and south of the proposed access is measured from a 3m set-back to the nearside kerb of the road.

Pedestrians

2m wide footpaths will be provided internally to cater for pedestrian movement within the development. In addition, a 2m wide footpath will be provided along the boundary of the proposed development adjacent to Fort Road and connecting to the existing footpaths at Willow Park. Full details of footpaths provided are provided are shown on the architects drawing which is provided in Appendix B – Drawings, in the Roadplan Traffic and Transportation Report.

Cyclists

A 2m wide cycle path will be provided within the proposed development which will cater for cyclist's movement within the development. A 2m wide cycle path will also be provided along the boundary of the development adjacent to Fort Road and will terminate at the existing junction to Willow Park. Full details of cycle paths provided are provided are shown on the architects drawing which is provided in Appendix B – Drawings, in the Roadplan Traffic and Transportation Report.

Internal Layout

Within the development the spine road is 6m wide and all internal access roads are 4.8m wide.

The 4.8m wide internal access roads will act as a shared surface for pedestrians and vehicles. The Design Manual for Urban Roads and Streets indicates that the minimum width for local streets with a shared surface is 4.8m wide.

Parking is provided to the front and rear of each residential dwelling. In addition, on-street parking is provided within the development. The parking bays are 2.5m wide x 5m long. Disabled parking spaces are provided through out the development.

HGV access to the site will be via the proposed access onto the Fort Road. The types of HGV's accessing the site would be emergency vehicles and a bin lorry. The internal layout can facilitate HGV movement within the site.

Once the pipeline is constructed, there would be no significant impacts during the operation phase in respect of traffic. Ongoing maintenance would be undertaken in a manner to reduce the impact to local residents.

15.14.3 Accidents & Disasters

Construction Phase

During the construction stage, the risk of accidents associated with the proposed development are not predicted to cause unusual, significant or adverse effects to the existing public road network. The vast majority of the works are away from the public road in a controlled environment. Measures will be put in place to access and risk of road traffic accidents during the construction phase. Furthermore, is expected that the risk of accidents would be low during the construction of the proposed development considering the standard construction practices which are to be used and no unusual substance or underground tunnelling works required or predicted.

15.14.4 Monitoring

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 and there will be a waste management plan in accordance with best practice.

Prior to the commencement of development, the Construction / Project Manager shall identify a permitted Waste Contractor who shall be employed to collect and dispose of all wastes arising from the project works. In addition, the Construction / Project Manager shall identify and all waste licensed / permitted facilities that will accept all expected waste exported off-site and will maintain copies of all relevant Waste Permits / Licences as required.

Waste materials arising from 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.

The Waste Management Plan specifically addresses the following points:

- Analysis of waste arisings / material surpluses;
- Specific Waste Management objectives for the Project including the potential to re-use existing on-site materials for further use in the construction phase;
- Methods proposed for Prevention, Reuse and Recycling;
- Waste Handling Procedures;
- Waste Storage Procedures;
- Waste Disposal Procedures;
- Waste Auditing; and
- Record Keeping.

Waste Minimisation

Waste minimisation and prevention shall be the primary responsibilities of the Construction Project Manager.

The following purchasing procedures will be implemented where feasible to reduce excessive material wastage from site:

- Ordering of appropriate quantities of materials, with a just-in-time philosophy and in an , to prevent over supply,
- Immediate and careful storage of materials delivered to the site to minimise generation of damaged materials/waste e.g. keeping deliveries packaged until they are ready to be used,
- Storing materials which are vulnerable to damage by rain under cover and raised above the ground,
- Careful handling of materials, using appropriate equipment, to avoid undue damage,
- Designation of separate storage areas for different types of waste, in order to maximise the reuse and recycling potential of the waste,
- Ensuring correct sequencing of operations, and
- Assigning individual responsibility (through appropriate contractual arrangements) to subcontractors for the purchase of raw materials and for the management of wastes arising from their activities, thereby ensuring that available resources are not expended in an extravagant manner at the expense of the main contractor.

Sub-contractors will be responsible for similarly managing their wastes.

Programme of Waste Management for Construction Works

It is proposed that the construction Contractor, as part of regular site inspection audits, will determine the effectiveness of the waste management statement and will assist the project manager in determining the best methods for waste minimisation, reduction, re-use, recycling and disposal as the construction phase progresses and waste materials are generated.

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.

In order to ensure that the construction contractor correctly segregate waste materials, it is the responsibility of the site construction manager to ensure all staff are informed by means of clear signage and verbal instruction and made responsible for ensuring site housekeeping and the proper segregation of construction waste materials.

It will be the responsibility of the Project Construction Project Manager to ensure that a written record of all quantities and natures of wastes exported -off site are maintained on-site in a Waste File at the Project office.

It is the responsibility of the Project Manager or his/her delegate that all contracted waste haulage drivers hold an appropriate Waste Collection Permit for the transport of waste loads and that all waste materials are delivered to an appropriately licenced or permitted waste facility in compliance with the following relevant Regulations:

- *Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007)*
- *Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008)*

- *Waste Management (Facility Permit and Registration) Regulations S.I.821 of 2007 and the Waste Facility Permit under the Waste Management (Facility Permit and Registration) Amendment Regulations S.I.86 of 2008.*

It is proposed that waste materials will be collected and stored in separate clearly labelled skips in a predefined waste storage area in the temporary site compound and that these materials will be collected by a Permitted Waste Contractor holding an appropriate Waste Collection permit in compliance with Waste Management (Collection Permit) Regulations 2007 (SI No. 820 of 2007) and Waste Management (Collection Permit) Amendment Regulations 2008 (SI No. 87 of 2008) and that they will be sent for disposal or further processing to appropriately Permitted / Licensed Waste Facilities in compliance with Waste Management (Facility Permit and Registration) Regulations S.I. No. 821 of 2007 and the Waste Management (Facility Permit and Registration) Amendment Regulations S.I. No. 86 of 2008.

Prior to the commencement of the Project, the Construction / Project Manager shall identify a permitted Waste Contractor who shall be employed to collect and dispose of all wastes arising from the project works. In addition, the Construction / Project Manager shall identify and all waste licensed / permitted facilities that will accept all expected waste exported off-site and will maintain copies of all relevant Waste Permits / Licences as required.

On-Site Waste Reuse and Recycling Management

Where prevention is not feasible, ways to reuse or recycle waste will be sought, preferably on-site to avoid the impacts arising from transportation. Excavation works below the existing ground level will be required during the construction of the development. Excavated soils and stones will be re-used as engineered fill on site. The re-use of this material will be subject to testing to establish suitability for its proposed re-use.

Construction waste material such as damaged or broken concrete slabs, blocks, bricks and tiles generated that is deemed by the Project Engineer to be suitable for reuse on the Project site for ground-fill material will be processed if necessary by on-site mobile crushing plant. This initiative shall provide a positive environmental impact to the construction phase as follows:

- Reduction in the requirement for virgin aggregate materials from quarries;
- Reduction in energy required to extract, process and transport virgin aggregates;
- Reduced HGV movements associated with the delivery of imported aggregates to the site;
- Reduced noise levels associated with reduced HGV movements;
- Reduction in the amount of landfill space required to accept C&D waste.

Inert Wastes

The waste material generated by site construction works will be mixed Construction & Demolition (C&D) waste, comprising of soil and stone, concrete, tiles, ceramics, and bricks. Material will be processed on site if necessary using an on-site crusher unit, which will process fill material into suitable size classes for the reuse as on-site construction materials. Mixed C&D waste with large non-uniform stone or compacted soils will be passed through a mobile crusher unit which will render the backfill material into a uniform shape and size which will allow for improved backfilling and compaction to required engineering standards.

All wood waste generated by site works will be inspected and examined and will be segregated as re-useable wood and scrap wood waste.

Where on site re-use is not feasible, opportunities to reuse or recycle the waste off-site will be investigated. If this is not feasible, then waste will be sent to an energy recovery facility, and only where there is no alternative, will waste be disposed of to landfill. To achieve this, existing waste management programmes and networks will be used such as the *National Waste Prevention Programme* (implemented by the *Environmental Protection Agency*) and material exchange networks.

Construction wastes arising from construction at the site will be appropriately segregated to facilitate recycling.

All waste removed from the site will be collected only by contractors with valid waste collection permits (under the *Waste Management (Collection Permit) Regulations 2001 as amended*).

Hazardous Wastes

The management of all hazardous waste arisings if they occur, shall be coordinated in liaison with Health and Safety Management. Hazardous waste will be managed in accordance with the Waste Management (Hazardous Waste) Regulations 1998 and 2000. Any Waste Electronic and Electrical Equipment (WEEE) will be source separated and the contractor will arrange for its removal from site for recovery or disposal.

Contaminated Soil

In the unlikely event of any evidence of soil contamination being found during work on site, the appropriate remediation measures will be employed. Contaminated areas of ground will be isolated and tested 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. The hazardous material will be sent for appropriate treatment / disposal to an appropriately Permitted / Licenced Waste Facility.

Any work of this nature would be carried out in consultation with, and with the approval of the Environmental Protection Agency and the Environmental Department of Wexford County Council.

Record Keeping

The contractor is responsible for ensuring the following:

- Waste from the proposed development will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 and the Waste Management (Collection Permit) (Amendment) Regulations, 2008.
- Waste from the proposed development will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996-2010.
- Any interim storage facilities have the appropriate waste licences or waste facility permits in place.

It is the responsibility of the Project Manager or his/her delegate that a written record of all quantities and natures of wastes reused / recycled during the project are maintained in a Waste File at the Project office.

Copies of relevant waste collection permits, certificates of registration, facility permits and waste licences will be retained on site. Where these have expired an up to date copy will be obtained from waste collectors by the Contractor.

The Project Manager will ensure that fully detailed records are maintained of any “incident/event” likely to cause harm to the environment. Contractors who report an incident will ensure details are identified and recorded.

15.14.5 Construction Phase

The following mitigation measures would be implemented during the construction phase to ensure the prevention and reduction of wastes arising onsite, and to ensure wastes are appropriately recovered, recycled and disposed of in an efficient manner:

- Waste would be managed in accordance with the waste hierarchy, as per Section 21A of the Waste Management Act 1996, as amended;
- Waste streams would be segregated as much as possible, to avoid cross contamination;
- Waste would be stored in suitably contained waste receptacles;
- Waste receptacles would be located in designated areas, within the temporary site compound, and would be appropriately labelled;
- Waste collection would only be undertaken by suitably authorised waste hauliers and would be treated at suitably licenced waste facilities;
- Removal of waste from the site would be undertaken on a regular basis, preventing large volumes of waste accumulating onsite;
- Waste records would be maintained onsite and copies of all waste contractors' collection permits and licences would be available on file;
- The construction works contractor would ensure the efficient ordering and purchasing of materials, to prevent waste being generated due to over-ordering or due to material degradation from long storage times;
- Where possible, materials would be re-used to prevent waste, such as the re-using of shutters for concrete works;
- Should surplus uncured concrete arise onsite, this would be returned to the batching plant where possible;
- Where practical and where permitted, certain waste streams would be used during infilling works;
- Where possible, subsoil and topsoil would be reused for the reinstatement and landscaping of the development site;
- Where hazardous wastes are generated, these would be stored within designated hazardous waste receptacles and disposed of to a licenced hazardous waste facility.

See Section 3.5 of the Construction and Demolition Waste Management Plan for further mitigation measures.

15.14.6 Operational Phase

Waste management during the operational phase of the development would be undertaken by private waste contractors, regulated by Wexford County Council. Therefore, no mitigation measures to be implemented by the developer are necessary.

15.15 MATERIAL ASSETS – UTILITIES

15.15.1 Construction Phase

The construction works contractor should 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 should 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.

15.15.2 Operational Phase

The proposed development would be serviced by existing utilities, with the capacity to accommodate the proposed residential development. Therefore, no mitigation measures are necessary.

There would also be a potential risk of disruptions to the local utility network; however, this would be temporary and therefore not considered significant. In the event that existing pipelines for water supply and wastewater treatment were undersized to deliver / accept estimated volumes, they would be replaced with pipelines of greater diameter.

15.16 ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE

Mitigation measures, both at pre-construction and construction phases, are required to be undertaken in compliance national policy guidelines and statutory provisions for the protection of archaeological and architectural heritage, including the National Monuments Acts 1930 – 2004, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Acts 2000 - 2014.

15.16.1 Avoidance of Impact

Avoidance of direct and indirect impacts upon all cultural, archaeological and architectural heritage sites is preferable with regards to the proposed development. As this is not always feasible due to the nature of the development, pre-, during and post-construction recommendations are offered to provide ameliorative measures when avoidance and preservation *in situ* are not possible. A buffer zone of 5m applied to AP6 and AP7 would mitigate against significant direct impact to these AP's.

15.16.2 Recommendations Prior to Construction

It is recommended that the following measures be undertaken well in advance of the construction phase. This will allow for a satisfactory timeframe in which the mitigation measures can be conducted and the results assessed without causing delays to construction.

Removal of vegetative root systems

Should the removal of vegetative root systems be required, it is recommended that this work be supervised by a suitably qualified archaeologist.

Archaeological Investigations

Archaeological investigations in the form of targeted test trenching in the vicinity of recorded monuments is recommended to further refine the nature, date, extent and significance of the remains present.

This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland. The results of this investigation will determine whether redesign to allow for preservation in situ, full archaeological excavation and/or monitoring are required. The investigation report will include mitigation proposals for dealing with the discovery of archaeological deposits and material during development. This work should be conducted by a suitably qualified archaeologist.

It is envisaged that the following will apply:

v. Should investigation yield evidence of archaeologically significant material or structures, preservation *in situ* may be recommended. Strategies for the *in situ* preservation of archaeological remains are conducted in consultation with the statutory authorities, and may include avoidance, if possible, of the remains during construction, or preservation in situ.

vi. Should investigation yield evidence of archaeologically significant material or structures that cannot be preserved *in situ*, archaeological excavation and recording, to full resolution, is recommended.
vii. Where less substantial archaeology is anticipated, it is proposed that groundworks are monitored by a suitably qualified archaeologist, with the provision for full excavation of any archaeologically significant material uncovered at this time (if an impact cannot be avoided)(see chapter 13.9 on Archaeological Monitoring below).
viii. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

Advance Topsoil Stripping

The proposed development will potentially have a direct impact on any sub-surface architectural or archaeological features or material at the site.

It is recommended that archaeologically-directed topsoil stripping be undertaken across the proposed development site prior to construction. Insertion of machine-excavated test trenches at intervals is an effective method for locating archaeological sites in advance of construction. This allows for resolution in advance of construction, thus minimising potential delays during the construction phase. Should topsoil stripping yield evidence of archaeologically significant material or structures, it is envisaged that the scenario set out in chapter 13.9 Archaeological Investigations would apply.

Architectural Survey

No additional architectural survey is required prior to construction commencing.

15.16.3 Monitoring

Recommendations during Construction

Archaeological Monitoring

Based on the results of Advance Topsoil Stripping (see chapter 13.7.2.3), archaeological monitoring of all ground works associated with the development may be recommended, with the provision for full excavation of any archaeologically significant material uncovered at this time.

The development is located within a combination of greenfield and former industrial brownfield site. In addition to the site inspection, aerial photographs were consulted. Nothing of an archaeological nature was noted on these. However, there remains the potential for archaeological features to be present at a very low above ground register, which may not manifest on aerial photography; though none were noted during the archaeological field inspection. There remains the possibility that subsurface unrecorded archaeological remains may be impacted during the development process.

It is envisaged that the following will apply:

iv. In the event of archaeological features or material being uncovered during construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.
v. Should archaeological features or material be uncovered during construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.
vi. This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland.

Post-Construction Recommendations

If in the event that archaeological material is uncovered in the course of the development works it is suggested that an information panel about the findings on the site be erected to inform the public of the investigations on the area. Allowances (financial) should be made to allow for the publication of an article in a peer review journal and a main stream publication like a local newspaper or an archaeological magazine.

PLEASE NOTE: All of the above recommendations are based on maps provided by the client at the time of writing. Should any alterations be made to these design drawings, further assessment may be necessary.

Recommendations are subject to approval by the Department of the Arts, Heritage and Gaeltacht.

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